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# SPEAKER RECOGNITION USING STATISTICAL METHOD

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such as the person's name. A text-independent system verifies the identity of a speaker regardless of what he or she says.

AT&T and TI (with Sprint) have started field tests and actual application of speaker recognition technology; Sprint's Voice Phone Card is already being used by many customers. In this way, speaker recognition technology is expected to create new services that will make our daily lives more convenient.

Automatic person recognition can be introduced in systems or services for restricting their use to only authorized people. Possible applications can be: retrieval of private information, control of financial transactions, control of entrance into safe or reserved areas, buildings and so on.

A usual approach, to cope with the speaker recognition problem, consists in classifying acoustic parameters derived from the input speech signal by short time spectral analysis. These parameters contain both phonetic information, related to the uttered text, and individual information, related to the speaker. Since the task of separating the phonetic information from the individual one is not yet solved many speaker recognition systems behave in a text dependent way (i.e. the user must utter a predefined key sentence).

However, this is not always possible, especially when the customer is supposed not to collaborate during the recognition process (think, for example, of criminal investigation applications). In these cases speaker recognition must be performed in a text independent way. According to the application area, speaker recognition systems can be divided into speaker identification systems and speaker verification systems.

#### 2. SPEAKER RECOGNITION

#### 2.1 Speaker identification

Speaker identification is the process of determining which register speaker provides a given utterance. The basic structure of speaker identification is as shown below.

# ABSTRACT

In this paper we provide a brief overview of the area of speaker recognition, describing applications, underlying techniques and some indications of performance. This paper is to authenticate speaker's identity by user's voice. In order to authenticate speaker's identity real time signal is compared with the pre-recorded voice signals in the database. Here the sampled signal's power spectrum density is compared with power spectrum density of the pre-recorded voice and on successful match the name of the particular speaker is displayed. The possible application of this project could to operate personalized digital gadgets with voice commands. Speaker Recognition in computer science, the ability of the computer to understand the spoken words for the purpose receiving commands and data input from the speaker.

#### **General Terms**

Speaker Recognition, Voice to Array, Sum-coefficient, Correlation-coefficient.

#### **Keywords**

Speaker Identification and Verification, Text Dependent and Independent.

# **1. INTRODUCTION**

Speaker recognition, which can be classified into **identification** and **verification**, is the process of automatically recognizing who is speaking on the basis of individual information included in speech waves. This technique makes it possible to use the speaker's voice to verify their identity and control access to services such as voice dialing, banking by telephone, telephone shopping, database access services, information services, voice mail, and security control for confidential information areas, and remote access to computers.

A text dependent system verify the identity of an individual on the basis of the utterance of a fixed predetermined phrase,



Fig 1: Speaker Identification

As seen in the block diagram the input speech is given to the feature extraction and the speech or voices which are recorded first, between them maximum selection is done. In which there is maximum selection that voice has been identify or selected.

The speaker identification system makes the decision whether the speaker belongs to the selected group (or the subgroup) of speakers whose models are kept in the database of models of this group and indicate the exact speaker. The quality of the decision made by a SIS is determined by the probability of the correct recognition of the speaker. Speaker identification consists in assigning the input speech signal to one person of a known group.

Speaker identification process encompasses two stages: 1) catching distinctive features of the speaker's voice due to

which he could be recognized among other speakers, 2) comparing these features to the saved reference voice features set. The effectiveness of the system performing the identification process depends mainly on adequacy of choice of distinctive parameters, i.e. on the fact how the quantitative speech utterance parameters reflect qualitative features.

#### 2.2 Speaker verification

Speaker verification, on the other hand, is the process of accepting or rejecting the identity claim of a speaker. Most applications in which a voice is used as the key to confirm the identity of a speaker are classified as speaker verification. The basic structure of speaker identification is as shown below.



Fig 2: Speaker Verification

Speaker verification systems make decision whether the speaker whose voice signals is presented to the system as a test sample corresponds or not to the model of his voice. All the voice models of the enrolled users are kept in a database; each model is marked with a unique PIN-code. In case the corresponding model is found the user is denoted as a "legal user" otherwise he is denoted as "impostor".

The quality of the decision made by the SVS is characterized by the type I and II errors false rejection rate and false acceptance rate. The speaker identification system makes the decision whether the speaker belongs to the selected group (or the subgroup) of speakers whose models are kept in the database of models of this group and indicate the exact speaker. The quality of the decision made by a SIS is determined by the probability of the correct recognition.

In verification, the aim is to determine if a given utterance was produced by the claimed speaker. This is most directly done by testing the utterance against the model of the claimed speaker, comparing the score to a threshold, and deciding on the basis of this comparison whether or not to accept the claimant.

# 3. THE SPEAKER RECOGNITION ALGORITHM

Speech recognition algorithm compares the real time sample and the recorded voice using two methods.

Before this comparison, both voices are converted into arrays of size 1000. These arrays represent their respective voice signal. A function – *FunSoundSig* used to convert voice signal to array. Once converted into arrays the voice signals can be compared calculating Sum-Coefficient and Correlation-Coefficient. The function *FunSoundSig* is the most important section of the program. So the program can be sub-divided into four small algorithms.

They are:-

1. Converting voice signal to array - FunSoundSig

2. Calculating Sum-Coefficient

3. Calculating Correlation-Coefficient

4. Selecting the matched database entry

Following sections explains each of these in detail

#### 3.1.Converting voice signal to array

As mentioned earlier, *FunSoundSig* is used for converting voice in to array, which is one of the important part of the project. In this function first DFT of the voice sample is taken to convert it into frequency domain. For this Matlab provides inbuilt functionfft. Consider a real time voice signal.

Y = fft(X) returns the Discrete Fourier transform (DFT) of vector X, computed with a fast Fourier transform (FFT) algorithm.

Using this function 100000-point DFT of the voice is obtained. To obtain power, which is equal to square of the amplitude, each DFT point is multiplied with its conjugate.

Thus we obtain the power spectral density.

However, still this spectrum cannot be compared with power spectrum of other voice signal using statistical parameters such as co-relation coefficient. On trying this, results obtained were inconclusive. Hence this spectrum needs to be modified in order that they could be compared using statistics.

To obtain modified power spectrum the actual 1000000 point spectrum is converted into 1000 point power spectrum. The first point of modified spectrum represents sum of powers of first 100 points (i.e. 1 to 100) of original spectrum. Similarly second point of the modified spectrum represents sum of powers of points from 101 to 200 of original spectrum. Likewise ith of the modified spectrum represents sum of powers of points from (i-1) x 100 to (i x 100).

Also if was found that for value of i greater than 50 the power was comparatively less. So we found the need to amplify it by factor of 50 to obtain better spectrum. This can be done as this amplification would be applied to every voice signal indiscriminately. To remove external disturbance or noise in voice signal all values of power less than or equal to 1.5 are made zero. Thus only significant power information is retained.

This array of 1000 represents comparable power spectral density of the voice signal. Let us call this array as '**voice array**' for further reference.

#### 3.2. Calculating Sum-Coefficient

This is the first method of comparing voice-arrays. Formula for calculating sum coefficient is given as

#### S = X (i).Y (i)....(1)

Where X and Y voice-arrays to be compared. If the  $\alpha$  and  $\beta$  are voice-arrays belonging to the same person, coefficient S will be maximum for that person. However, we cannot determine the threshold value of S, below which we could say that the two voice-arrays does not belong to the same person. However, from the database entries, S can be used to select the most accurate match with the real time voice signal to be recognized.

The above discussion clearly demands more that one method to compare voice-arrays to draw final conclusion.

Hence we have included Correlation coefficient computation as second method of comparing two voice-arrays.

#### 3.3. Calculating Correlation-Coefficient

Correlation-Coefficient is a statistical parameter which is used to degree of similarity between two sets of data values.

Formula of correlation-coefficient is given as

$$r = \frac{1}{n} \sum \left( \frac{x - \bar{x}}{s_x} \right) \left( \frac{y - \bar{y}}{s_y} \right) \dots \dots (1)$$

Where, X and Y voice-arrays to be compared.

Sx and Sy are standard deviation

nis number of data which is 1000 in our case.

If r is greater than 0.8 than the voice-arrays, than they are highly correlated and the program, with greater accuracies, can determine the correct result.

However real time signal cannot be recorded in same conditions as the pre-recorded condition during database entries. As a result r need not be greater than 0.8 always even if the two voice-arrays belong to the same person. While testing this program we found that 0.5 is optimum threshold value. That is if the value of r is greater than 0.5 than voice-arrays belong to the same person or else otherwise. However ideal threshold value of r should be as close to 1 as possible.

On compromising the value of r to nullify real time variation is the cause of error in the program. As a result 100% success cannot be obtained using algorithm presented here. Possible errors that can occur due to real time variations are discussed in subsequent section.

#### 3.4. Selecting matched data based entry

This is algorithm to match with the database entry

- 1. Record real time voice. Let it be RT.
- 2. Let DB be database voice
- 3. Call FunSoungSigwith RT (RT Frequency Domain)
- 4. Call FunSoungSigwith DB (DB Frequency Domain)
- 5. S = (RT) (DB)
- 6. Call FunCorrelate with (RT, DB)
  - r = FunCorrelate (RT, DB)
- 7. Repeat steps 2 to 6 for each database entry
- 8. Select DB with maximum value of S.
- 9. If r < 0.5

Else

Display No Match

Display the selected DB

10. Stop

#### 4. EXPECTED RESULT

Hence Speaker Recognition process can also be used in application of locker system, where the voice is taken as input and it is matched with the database to open the lock. If the external disturbance or noise signal is added than unwanted power would get added in real time voice signal. Due to this one person in database can identified as other.

### 5. ACKNOWLEDMENTS

The success of our paper on the whole does not depend on an individual student but on the creative team work of the entire group and faculty members. This would have been difficult without their support. So we acknowledge the precious guidance and help from those who willingly supported us.

#### 6. CONCLUSION

This paper presents process of automatically recognizing who is speaking on the basis of individual information included in speech waves. Here we are using completely statistical approach to get the result which is simple to achieve.

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# VISION BASED BLOCKAGE CLEARANCE USING ARDUINO **CONTROLLER**

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#### ABSTRACT

Robotic technology is one of the advanced technologies which is capable of completing tasks at situations where humans are unable to reach, see or survive. In this paper, we are changing the way of sewage pipe cleaning into modern manually operated robot. An inspection robot with ability to move inside horizontal pipes has been designed. Its working is controlled by Arduino Duemilanove Atmega328p.This can detect the blockage position and is further enhanced to clean the blockage also. Concrete pipes are used in variety of areas for conducting media underground (e.g. Waste water, cooling water, etc.) or for transportation purposes. Regular cleaning and inspection is required to ensure the static integrity of the pipe and to insure against the problems associated with failure of the pipe. Various aspects of the robot including its kinematics, the cleaning system and operating interface is discussed in detail.

#### **General Terms**

Computer and microprocessor-based control, Robotics and Automation system Keywords

Robot, Arduino board, blockage clearance

#### 1. INTRODUCTION

Robotic systems are becoming ever more complex everyday and the need for systems that can make tasks easier which make use of immense manpower, time and resources if done manually. In this paper, a robotic system that is capable of traveling through sewage pipes, determining blockage using ultrasonic sensors, clearing by means of drilling mechanism is designed to work in non-ideal environments. This is achieved by programming the robot using Arduino software that sends the appropriate signals to a microcontroller through a serial interface. Once the command signals are received by the microcontroller the appropriate actions are performed by the robot.

#### 1.1 Overview

The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is open-source, which means hardware is reasonably priced and development software is free. This guide is for students in ME 2011, or students anywhere who are confronting the Arduino for the first time.

This is what the Arduino board looks like.



Fig.1 Arduino Board Duemilanove

#### 1.2 Arduino Duemilanove Atmega328p

The Arduino Duemilanove is a microcontroller board based on the ATmega328. It has a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

#### Table no. 1 Specifications of Arduino

Operating Voltage	5v
Input Voltage	7-12v
Digital I/O pins	14(of which 6 provide PWM output)
Analog Input Pins	6
DC Current for 3.3 v pin	50mA
Flash Memory	32KB (of which 2KB used by bootloader)
SRAM	2KB
EEPROM	1KB
Clock Speed	16MHz

### 2. DESIGN METHODOLOGY

Microprocessor Atmega328p on board has three primary tasks:-

- 1. Changing the height
- Detect the obstacle using ultrasonic sensors 2.

- 3. Reach the obstacle with forward and backward moving mechanism.
- 4. To perform drilling mechanism using motors to clean the obstacle

#### 2.1 Working:

When switch is pressed, internal program gets executed. Robot moves forward, changes its height and sensor senses the obstacle. If obstacle is detected, robot moves ahead till "R" distance and stops. Now, cleaning mechanism is started and cleans the obstacle. Again it moves forward till 'x' distance. To get out of the pipe it moves backward till 'R+x' and motor is stopped.



Fig. 2 FLOWCHART

#### 2.2 INTERFACING WITH DC MOTOR

We are make use of DC driver L293D .The input pin of dc driver are changed according to the motion of motor required. Explain as follows:

Table No. 2 working principle of motor

Digital Arduino pin no	DC driver pin	Case	Motion of motor
Dig.3,4	I/p -1 &2	Dig3=low Dig4=low	Stop
	(wheels of robot)	Dig3=low Dig4=high	Backward direction
		Dig3=high Dig4=low	Forward direction
Dig 5,6	I/p 3&4	Dig 5=high Dig 6 =low	Increment in height
		Dig 5=low Dig 6 =high	Decrement in height

#### 2.3 INTERFACING WITH ULTRA-SONIC SENSOR

Ultrasonic means the frequency of the sonic (sound) pulse is above the human hearing range. The highest frequency that is detectable by the human ear is approximately 20 KHz. In this project, I have used DYP-ME007 Ultrasonic range finder (URF).

#### **Specifications:**

Voltage : 5V (DC) Current : max 15 ma Frequency : 40HZ Output Signal : 0-5V (Output high when obstacle in range) Sentry Angle : max 15 degree Sentry Distance: 2cm – 500cm Input trigger signal: 10us TTL impulse Echo signal : output TTL PWL signal

#### Pins:

- $1:VCC\ ;\ 2:trig\ (T)\ ;\ 3:echo\ (R)\ ;$
- 4 : OUT (Don't Connect); 5 : GND



#### Fig. 3 interfacing of ultra-sonic sensor with Arduino

#### **Module Working Principle:**

- 1) IO trigger Pin (2) should be given HIGH LEVEL pulses of at least 10us.
- 2) The module then starts sending ultrasonic sound of 40 kHz frequency and receives the pulses if there is any obstacle nearby.
- If there are signals returning, then the ECHO pin output high level pulses and the following formula is to used to calculate the distance of obstacle.
   R= (high level time \* sound velocity) / 2 Where: - sound velocity= 340m/sec

#### 2.1 HEIGHT CHANGING MECHANISM

We are changing the height of robot using nut and bolt mechanism fig 1.3. Where bolt is connected to 150 rpm motor shaft. Direction of motor is controlled as shown in table 1.



Fig 1.3 Height changing apparatus

#### 2.2 CLEANING MECHANISM

A motor can be connected to the Arduino board with help of DC driver which is rotated in clock and anti-clockwise direction. Due to high force and pressure cleaning mechanism is implemented .Cleaning part connected to the motor can be a brush, drill or any suitable tool used for cleaning.

#### 3. MAJOR EXPECTED RESULT

The Robot should be controlled by Arduino board. The Sensor should detect the distance of obstacle and cleaning mechanism should clean the obstacle. Once the action is completed Robot should be out of the pipe.

#### 4. FUTURE SCOPE

Actuator can be connected across the wheels so that Robot can move in vertical direction .In order to handle manually it can be interfaced with GUI or any remote controller. Clean mechanism can be made more advances by using suction pump, spraying of chemicals with help of motor.

#### 5. ACKNOWLEDGMENTS

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# **Smart Healthcare using Wireless Sensors Networks**

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Abstract—Technological advances in the last decade of low-power networked systems and medical sensors has led to advancements in healthcare monitoring. Wireless Sensor Networks for healthcare are used to collect data about people's physical, physiological, psychological, cognitive, and behavioral processes in spaces ranging from personal to urban. In this paper, we present some representative applications in the healthcare domain and describe the challenges they introduce to wireless sensor networks due to the required level of trustworthiness and the need to ensure the privacy and security of medical data. We outline prototype systems spanning application domains from physiological and activitv monitoring to large-scale physiological and behavioral studies and mention some ongoing research challenges.

*Keywords*—healthcare monitoring, medical information systems, wireless sensor networks.

#### Introduction

Sensing is a technique used to gather information about a physical object or process, including the occurrence of events. An object performing such a sensing task is called a sensor. Embedded in a variety of medical instruments for use at hospitals, clinics, and homes, sensors provide patients and their healthcare providers' insight into physiological and physical health states that are critical to the detection, diagnosis. treatment, and management of ailments. Much of modern medicine would simply not be possible nor be cost effective without sensors such as thermometers, blood pressure monitors, electrocardiography (EKG), glucose monitors. photoplethysmogram (PPG), electroencephalography (EEG), and various forms of imaging sensors.

Medical sensors combine transducers for detecting electrical, thermal, optical, chemical, genetic, and other signals with physiological origin with signal processing algorithms to estimate features indicative of a person's health status. Sensors beyond those that directly measure health state have also found use in the practice of medicine. For example, location and proximity sensing technologies [1] are being used for improving the delivery of patient care and workflow efficiency in hospitals, tracking the spread of diseases by public health agencies [2], and monitoring people's health related behaviors (e.g., activity levels) and exposure to negative environmental factors. such as pollution. Networks of wireless sensor devices are being deployed to collectively monitor and disseminate information about a variety of phenomena of interest.

A wide range of health care applications have been proposed for wireless sensor networks (WSN), including monitoring patients with Parkinson's Disease, epilepsy, heart patients, patients rehabilitating from stroke or heart attack, and elderly people. Meeting the potential of WSN in healthcare requires addressing a multitude of technical challenges. These challenges reach above and beyond the resource limitations that all WSNs face in terms of limited network capacity, processing and memory constraints, as well as scarce energy reserves. Specifically, unlike applications in other domains, healthcare applications impose stringent requirements on system reliability, quality of service, and particularly privacy and security.



Fig. 1. Wireless sensor node architecture.

Modern wireless sensor networks (WSN) are the result of rapid convergence of three key technologies: MEMS (Micro-electro-mechanical systems), digital circuitry and wireless communications. Wireless sensor networks constitute of low-power, low-cost devices that accommodate powerful processors, sensing units, wireless communication interface and power sources, in a robust and tiny package. These devices have to work autonomously for long periods, with no maintenance, and be able to adapt to the environment. Energy constraints in a WSN critically affect the network lifetime and connectivity.

A wireless sensor device as shown in Fig. 1, is a battery-operated device, capable of sensing physical quantities. In addition to sensing, it is capable of wireless communication, data storage, and a limited amount of computation and signal processing. Recent years have witnessed the emergence of various embedded computing platforms that integrate processing, storage, wireless networking, and sensors. Embedded computing platforms used for healthcare applications range from smartphones to specialize wireless sensing platforms, known as motes.

Existing motes typically use 8 or 16-b microcontrollers with tens of kilobytes of RAM, hundreds of kilobytes of ROM for program storage, and external storage in the form of Flash memory. Motes are usually equipped with low-power radios such as those compliant with the IEEE 802.15.4 standard for wireless sensor networks. Finally, motes include multiple analogy and digital interfaces that enable them to connect to a wide variety of commodity sensors.

These hardware innovations are paralleled by advances in embedded operating systems, component-based programming languages [3], and networking protocols [4]. In contrast to resourceconstrained motes, smartphones provide more powerful microprocessors, larger data storage, and higher network bandwidth through cellular and IEEE 802.11 wireless interfaces at the expense of higher energy consumption. Their complementary characteristics make smartphones and motes complementary platforms suitable for different categories of healthcare applications.

#### **System Prototypes**

Several wireless sensing system prototypes have been developed and deployed to evaluate the efficacy of WSNs in some of the healthcare applications. While wireless healthcare systems using various wireless technologies exist, recently new systems based on low-power wireless platforms for physiological and motion monitoring studies, and smartphone based large-scale studies have been introduced.

### **Physiological Monitoring**

In physiological monitoring applications, lowpower sensors measure and report a person's vital signs (e.g., pulse oximetry, respiration rate, and temperature). These applications can be developed and deployed in different contexts ranging from disaster response, to in-hospital patient monitoring, and long-term remote monitoring for the elderly. While triage protocols for disaster response already exist, multiple studies have found that they can be ineffectual in terms of accuracy and the time to transport as the number of victims increases in multicasualty incidents.

Therefore, systems that automate patient monitoring have the potential to increase the quality of care both in disaster scenes and clinical environments. Systems such as CodeBlue, MEDiSN, and the Washington University's vital sign monitoring system target these application scenarios. Specifically, CodeBlue aims to improve the triage process during disaster events with the help of WSNs comprising motes with IEEE 802.15.4 radios. The CodeBlue project integrated various medical sensors [e.g., EKG, SpO2, pulse rate, electromyography (EMG)] with mote-class devices and proposed a publish/subscribe-based network architecture that also supports priorities and remote sensor control. Finally, victims with CodeBlue monitors can be tracked and localized using RF-based localization techniques.

#### Motion and Activity Monitoring

Another application domain for WSNs in healthcare is high-resolution monitoring of movement and activity levels. Wearable sensors can measure limb movements, posture, and muscular activity, and can be applied to a range of clinical settings including gait analysis, activity classification athletic performance and neuromotor disease rehabilitation. In a typical scenario, a patient wears up to eight sensors (one on each limb segment) equipped with MEMS accelerometers and gyroscopes. A base station, such as a PC-class device in the patient's home, collects data from the network. Data analysis can be performed to recover the patient's motor coordination and activity level, which is in turn used to measure the effect of treatments.

In such studies, the size and weight of the wearable sensors must be minimized to avoid

encumbering the patient's movement. In contrast to physiological monitoring, motion analysis involves multiple sensors on a single patient each measuring high-resolution signals, typically six channels per sensor, sampled at 100 Hz each. It is necessary to carefully balance data sampling, storage, processing, and communication to achieve acceptable battery lifetimes and data fidelity.

# Large-Scale Physiological and Behavioral Studies

The final application of WSNs in healthcare that we discuss is their use in conducting largescale physiological and behavioral studies. The confluence of body-area networks of miniature wireless sensors (such as miTag and SHIMMER platforms as shown in Fig. 2), always-connected sensor-equipped smartphones, and cloud-based data storage and processing services is leading to a new paradigm in population-scale medical research studies, particularly on ailments whose causes and manifestations relate to human behavior and living environments.



Fig. 2. Wearable SHIMMER platform [5].

Traditionally such studies are either conducted in controlled clinical laboratory settings with artificial stimuli, or rely on computer-assisted retrospective self-report methods. Both of these approaches have drawbacks: the complex subtleties of real-life affecting human behavior can rarely be recreated accurately in a laboratory, and self-report methods suffer from bias, errors, and lack of compliance. Typically, data are collected from wireless sensors worn by subjects, wireless medical instruments, and sensors embedded in devices such as smartphones.

One example of such systems is Autosense in which objective measurements of personal exposure to psychosocial stress and alcohol are collected in the study participants natural environments. A field-deployable suite of wireless sensors form a body-area wireless network and measure heart rate, heart rate variability, respiration rate, skin conductance, skin temperature, arterial blood pressure, and blood alcohol concentration. From these sensor readings, which after initial validation and cleansing at the sensor are sent to a smartphone, features of interest indicating onset of psychosocial stress and occurrence of alcoholism are computed in real time. The collected information is then disseminated to researchers answering behavioral research questions about stress, addiction, and the relationship between the two.

# **Healthcare System Applications**

WSN and body sensor networks (BSN), has enabled health care systems to provide wellinformed and high-quality patient care services. In what follows, we introduce a list of healthcare applications enabled by these technologies.

- *Monitoring in mass-casualty disasters*: While triage protocols for emergency medical services already exist [6], their effectiveness can quickly degrade with increasing number of victims. The increased portability, scalability, and rapidly deployable nature of wireless sensing systems can be used to automatically report the triage levels of numerous victims and continuously track the health status of first responders at the disaster scene more effectively.
- *At-home and mobile aging*: Diseases such as diabetes, asthma, chronic obstructive pulmonary disease, congestive heart failure, and memory decline are challenging to monitor and treat. Wirelessly networked sensors embedded in people's living spaces or carried on the person can collect information about personal physical, physiological, and behavioral states and patterns in real-time and everywhere.
- Large-scale in-field medical and behavioral studies: Body-worn sensors together with sensorequipped Internet-connected smart-phones have begun to revolutionize medical and public health research studies by enabling behavioral and physiological data to be continually collected from a large number of distributed subjects as they lead their day to day lives.

### **Technical Challenges**

#### Trustworthiness

Healthcare applications impose strict requirements on end-to-end system reliability and data delivery. For example, pulse oximetry applications, which measure the levels of oxygen in a person's blood, must deliver at least one measurement every 30s [7]. Using the same pulse oximetry example, measurements must deviate at most 4% from the actual oxygen concentrations in the blood. The combination of data delivery and quality properties is the trustworthiness of the system. Medical sensing applications require high levels of trustworthiness.

#### **Privacy and Security**

WSNs in healthcare have privacy specification languages to specify privacy policies for a system in a formal way. Since context can affect privacy, policy languages must be able to express different types of context from the environment such as time, space, physiological parameter sensing, environmental sensing and stream based noisy data. There is a need to represent different types of data owners and request subjects in the system as well as external users and their rights when different domains such as assisted living facilities, hospitals, and pharmacies interact. One of the more difficult privacy problems occurs when interacting systems have their own privacy policies. There is a need to support not only adherence to prsivacy for data queries (e.g., data pull requests), but also the security for push configuration requests to set system parameters (e.g., for private use).

#### Conclusion

In this paper we looked at how the recent advances in hardware and software, especially WSNs has led to smart healthcare. The first generation of WSNs for healthcare has shown their potential to alter the practice of medicine. We also looked at the issues of trustworthiness and privacy. The success of WSNs will depend on the ability to deploy large-scale systems that meet the applications requirements and their unsupervised operation in deployed environments. This decade will see a large scale integration of WSNs in healthcare practice and research.

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# PDA based Home Automation System using Wireless Technology

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# ABSTRACT

This paper aims at a design and prototype implementation of new home automation system that uses Wi-Fi technology as a network infrastructure connecting its parts. This paper offers a new approach to control home appliances from a remote terminal, with an option from a local server, using the internet This system is accomplished by personal computers, interface cards, microcontroller, along with window-type software and microcontroller control software. The system is designed to control home appliances' on/off, to regulate their output power, and to set their usage timing.

**Keywords** -Microcontroller, Microcontroller 89C51, Telnet, C programming language.

#### 7. INTRODUCTION

The vision of the system is to provide an efficient internet based system to control everyday home appliances. The system offers users an easy & effective means of controlling their various home appliances from a remote location i.e. without physically being present at home. The system makes use of the internet to enable remote access to the various home appliances. Apart from merely turning the appliances ON & OFF, the scope of the system can be extended to regulate their output power & set their usage time [1].

With advancement of technology things are becoming simpler and easier for us. Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist them with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy and in daily experience. Automatic systems are being preferred over manual system. Through this project we have tried to show automatic control of a house as a result of which power is saved to some extent.

It enables users to control various aspects of their home appliances form a remote location through the use of the internet. It hence makes for a powerful & versatile system which expands the mobility of users by granting them total control over their home without the need of physical presence. The layout is explained below along with the components required to build a system:

1) A graphical user interface will be designed as a part of the web based application.

2) The user will access this interface and control the home appliances.

3) The data from this application will be passed on to the local server, that is, the home PC.

4) The PC will pass on the signals to the microcontroller.

5) The microcontroller will be programmed in an appropriate way to understand this signal and thus convert it to an electrical signal and transmitted to the switch controlling the home appliance. The end result will be a simple action like: switching ON/OFF a light.



Fig.1 Layout

# 8. DESIGN COMPONENTS

The system contains both hardware & software components which are classified as follows:

#### 8.1 Software components

i.**Visual Basic**: It is a versatile programming language which can be used to create various GUI applications. In this system, VB is used for creating a client-server application for the remote and local server respectively.

ii.**TTL:** The purpose of the TTL Protocol is to provide a fairly general, bi-directional, eight-bit byte oriented communications facility. Its primary goal is to allow a standard method of interfacing terminal devices and terminal-oriented processes to each other. TTL will be used to set up a server-client program to execute commands from the remote terminal.

iii.**TCP/IP** - It provides end-to-end connectivity specifying how data should be formatted, addressed, transmitted routed and received at the destination. This functionalityhas been organizedinto four abstraction layers which are used to sort allrelated protocols according to the scope of networking involved.

#### 8.2 Hardware components

i.**Microcontroller:** The microcontroller used is the brain of the entire system. It will receive the commands executed on the remote server and compute the appropriate instructions to control the home appliances[2].

ii. Local Server: This machine serves as a focal point in the system. It acts as a bridge between the users (Remote machine) & the various home appliances. It interface to the microcontroller. also acts an The microcontroller is connected to the local server via the RS-232 port [6]. The local server passes on the user commands to themicrocontroller via the interface created in VB. The local server has a GUI also be used which can to control the home appliances.

iii.**Modem**: The modem receives the command signals sent to the local server from the remote PC. The modem is directly connected to the local server & acts as a connection between the local sever & the internet. The modem used in the system can either be a wired or a wireless modem.

iv.**Remote Workstation:** The remote machine is the component from which the actual user of the system will use the system to control the home appliances. The remote machine can be any machine which is connected to the internet. The remote machine can be used to access the Telnet client application over the internet. The user of the remote machine will be able to control the various home appliances remotely.

v.**Home Appliance:** The home appliances must be connected to the main power supply at all times. This is a precondition for the system. The various aspects of the system which can be controlled are :

- a. The appliances status (ON/OFF)
- b. The output power of the appliance
- c. The time for which the appliance is running.

# 9. DATA FLOW DIAGRAM





#### **10. ADVANTAGES**

**Convenience** - It provides the user with comfort & convenience since the user can control the connected home appliances from any remote machine having internet connectivity.

**Real-time Control** - User can monitor the real-time status of each of the connected appliances and make adjustment as & when he/she feels it necessary.

**Notifications** - Provides user with appliance related notifications regarding state of the appliance etc. as & when required.

Addition of an appliance - Enables users to add an appliance with ease & simplicity. The overhead of adding an appliance is very low & is restricted to the hardware required.

#### **11. LIMITATIONS**

**Dependence on the internet** - The most significant limitation of the system is that it is completely dependent on the internet for the feature of remote access. In case of loss of internet connectivity, the user will still be able to control the home appliances directly from the Local Server using the GUI created for it.

**Dependence on power supply** - For the system to function properly, all appliances must be connected to the main power supply at all times. If appliances are disconnected from the main supply, they can no longer be controlled by the user & that part of the system would be rendered non-functional.

#### **12. OBSTACLES FOR THE SYSTEM**

The system is not complete within itself due to its dependence on the internet. The main obstacle is building a system which can use a back-up method of control in case the internet connectivity is lost

# **13. FUTURE APPLICATIONS OF THE SYSTEM**

**Security & Surveillance** - Various security systems can be integrated along with this system such as, cameras, motion sensors, luminance sensors etc to enable the users to monitor various accepts of their home via a remote machine in real-time.

Management -Energy One of the major applications of this system one involving the optimised management of energy consumed by the of a various appliances household. Since all appliances can be monitored & controlled in realtime, users can program the system so that a schedule is followed for the various appliances. It can be particularly useful in situations where the user has forgotten to manually turn off a particular device (lighting, fan etc.) while leaving the house. All the user needs to do is access the web application & make the required changes.

**Lighting** - The system can be programmed to switch on certain lights as & when required, using the timers in the circuit. Example: turning on the porch light at 7PM every day.

**Entertainment** - The system can be integrated with other devices such as sound systems, special lightings etc. For example, the user can program the system to turn lights ON & OFF in a sequence.

Access Control - The system can be integrated with access control devices such as digital locking systems, facial/finger-print recognition systems etc. so as to provide the remote user with real-time information about who is entering/leaving the house and so on.

#### 14. CONCLUSION

The system for the "Home Automation Network" has a vast scope & almost limitless application in today's technology driven market. The system can be made efficient by modularising each andevery component of the system hence ensuring that it can be integrated with a varied range of devices. The basic vision of the system is to provide a convenient & secure system to the user, which would aid the high degree of mobility & control we aim achieve nowadays.

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# **Video Enhancement Using MATLAB**

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# ABSTRACT

Digital Image Enhancement technique provides a multitude of choices for improving the visual quality of images where one or more attributes of images are modified. Principle objective of Image Enhancement is to improve the interpretability or perception of information in images for human viewers and providing better input for other auto-mated Image processing techniques. VideoProcessing is a step ahead of Image Processing. Frames obtained by image, can enhance quality of video. These frames are stored sequentially for regeneration of video. Enhancement process does not increase the inherent information content in the data, but increase the dynamic range of the chosen features for easy detection.

#### **Keywords**

FFT, Low pass filter Algorithm, High pass filter Algorithm, Histogram Algorithm

# **16. INTRODUCTION**

The quality of video captured from a low-resolution camera is very poor containing noise and other distortions. Because of these distortions, loss in information occurs and the content of the video may not be visible clearly.

This paper aims at providing enhanced video using simple image processing algorithms. In this paper, the video whose quality is to be improved is converted into sequential images and are stored in MATLAB environment. We can perform arithmetic operation to change the brightness or sharpness and for noise removal using MATLAB software.

Linear and Gaussian filter can be used to reduce noise and improve image quality. These filters play a key role in image processing. Some of the important filters that can be used are Gaussian Filter, Linear Filters, Laplace Filters, Max and min Filter, Mid-point Filter etc. With the help of these filters the noise can be reduced to a great extent. This paper uses low pass filter algorithm, high pass filter algorithm, fft algorithm.

# **17. TECHNIQUES USED:**

**Image enhancement:** When picture are converted from one form to another by processes such as imaging, scanning or transmitting, the quality of the output image may be inferior to that of the original input is visually more pleasing to human observers from a subjective point of view. To perform this task, it is important to increase the dynamic range of the chosen features in the image, which is essentially the process of image enhancement. Enhancement has another purpose as well, that is to undo the degradation effects which might have been caused by the imaging system or the channel. The growing need to develop automated system for image interpreted should be free from noise and other aberrations. Thus it is important to perform preprocessing operations on Pooja K.DalviNVIVA-TechVEXTC DepartmentEpoojadalvi508@gmail.comm

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the image so that the resultant preprocessed image is better suited for machine interpretation.

# 2.1 Image enhancement techniques:

- Averaging
- Sharpness
- Blur
- Gaussian

# 2.1.1 Averaging:

Image noise can compromise the level of detail in your digital or film photos and so reducing this noise can greatly enhance your final image or print. The problem is that most techniques to reduce or remove noise always end up softening the image as well. Some softening may be acceptable for images consisting primarily of smooth water or skies, but foliage in landscape can suffer with even conservative attempt to reduce noise.

Averaging has the power to reduce noise without compromising detail, because it actually increases the signal to noise ratio (SNR) of your image.

#### 2.1.2 Sharpness:

Sharpness ultimately limited by our camera equipment, Image magnification and viewing distance. Two fundamental factors contribute to the perceived sharpness of an image resolution and acutance.

#### Acutance:

Acutance describes how quickly image information transition at an edge, so high acutance result in sharp transition and detail with clearly define boarders.

#### **Resolution:**

Resolution describe the camera ability to distinguished between closely spaced elements of details such as two sets of line .Sharpness depend upon the factors which influence our perception of resolution and acutance.

#### 2.1.3 Blur:

Blurring is that thing which happens when camera is out of focus. What happened is that what should be seen as a sharp point gets smeared out, usually into a disc shape. In Image terms this means that each pixel in the source image gets spread over and mixed into surrounding pixels. Another way to look at this is that each pixel in the destination image is made up out of a mixture of surrounding pixels from the source image.

#### Linear filtering:

Linear filtering is used to remove certain types of noise. Certain filters, such as averaging or Gaussian filters, are appropriate for this purpose. For example, an averaging filter is useful for removing grain noise from a photograph. Because each pixel gets set to the average of the pixels in its neighborhood, local variations caused by grain are reduced.

#### **Gaussian Filtering:**

The one-dimensional Gaussian filter has an impulse response given by

$$g(x) = \sqrt{\frac{a}{\prod}} \ell^{-a \cdot \chi^2}$$

As shown in fig.1

 $\chi$  is the distance from the origin in the horizontal axis. *y* is the distance from origin in vertical axis.



Fig.1 Gaussian Filtering

#### **18. DESIGN METHODOLOGY:**



Fig.2 Block Diagram

#### Working:

Video is captured from low resolution camera. The captured video is stored in MATLAB environment. The stored video should be transformed into appropriate number of frames, normally 25 frames per second. These frames are then

transformed into images. The images should be stored sequentially .Once the frame is converted into sequential image, perform the shot detection. In the shot detection two different shots of a video is being detected. The images are processed using various image processing techniques which are Averaging, Sharpening, Blur and Gaussian .Once the images are processed, they have to be sequentially retransformed back into the frames. These frames are then converted back into original video.

#### **19. EXPECTED RESULTS:**



Fig.3 Input Image (435 X 343)



Fig.4 Output of original image processed under Gaussian filtering



Fig.5 Output of original image processed under Sharpness



Fig.6 Output of original image processed under Blur



Fig.7 Output of original image processed under brightness

# 20. CONCLUSION AND FUTURE WORK:

The paper presents a short description of various enhancement image techniques in order to make familiar with the enhancement of blurred image, noise removal setting the brightness and contrast and degradation of images in image processing.

We can also perform live video processing. To implement we may use web cam or CCTV camera. Live video processing will improve security system in ATM centers, railway stations and at airports as processed video will have better view ofpicture even if camera used in taking video is ordinary. We are also planning to preserve audio part of video which otherwise would be lost during processing. Different effects can be added in video so that user will able to see same video in more than one tab at a same time keeping the code simple and quick to execute.

# **21. ACKNOWLEDGMENTS**

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# SOLAR WATER PUMPING WITH RADIATION TRACKER

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# ABSTRACT

The paper presents a way in which the efficiency of solar power collection can be increased. Efficiency is based on accurately positioning the solar panel throughout the day. The efficiency of solar power conversion is increased by increasing the amount of time for which solar panel is directly perpendicular to the sunlight. It uses a geared motor to change the position of the solar panel, the motor is controlled by the 89c51 microcontroller, which detects the sunlight using photo sensors. The objective is to design and implement an automated, one-axis solar-tracking mechanism and use the battery voltage to drive the water pump with minimum cost and reliable structure.

### Keywords

Solar radiation tracker, solar water pump.

# 1. INTRODUCTION

In remote areas the sun is a cheap source of electricity because instead of hydraulic generators it uses solar cells to produce electricity. While the output of solar cells depends on the intensity of sunlight and the angle of incidence, it means to get maximum efficiency; the solar panels must remain in front of sun during the whole day. But due to rotation of earth those panels can't maintain their position always in front of sun. This problem results in decrease of their efficiency. Thus to get a constant output, an automated system is required which should be capable to constantly rotate the solar panel to receive maximum solar energy.

Photovoltaic (PV) panels are often used for agricultural operations, especially in remote areas or where the use of an alternative energy source is desired. In particular, they have been demonstrated time and time again to reliably produce sufficient electricity directly from solar radiation (sunlight) to power livestock and irrigation watering systems.

A benefit of using solar energy to power agricultural water pump systems is that increased water requirements for livestock and irrigation tend to coincide with the seasonal increase of incoming solar energy. When properly designed, these PV systems can also result in significant long-term cost savings and a smaller environmental footprint compared to conventional power systems.

# **1.1 Motivation**

They are energy source gotten from natural resources such as wind, sunlight, water and thermal heat which can be renewed

after use. Solar energy is one gotten from sunlight and is called photovoltaic system. Photovoltaic energy is the process of converting the sunlight directly to electricity, using solar cells It is clean, nonpolluting, sustainable resource that requires easy installation and little maintenance. Most solar panels are statically aligned, that is they are placed at a fixed position towards the sky. As the sun moves across the sky throughout the day, the angle of incidence of the sun rays to the panel keeps on changing thereby resulting to low power output from the solar cells Maximum energy is collected by the solar panel when the orientation is such that the sun rays fall directly on it. This means that the sunlight's angle of incidence has to be constantly perpendicular to the solar panel. Thus, a system which can continuously track the sun's radiation as it changes position in its motion during the day is the interest of this project. A benefit of using solar energy to power agricultural water pump systems is that increased water requirements for livestock and irrigation tend to coincide with the seasonal increase of incoming solar energy. When properly designed, these PV systems can also result in significant long-term cost savings and a smaller environmental footprint compared to conventional power systems.

# 2. Working Principle:

This system is tracking for maximum intensity of light. When there is decrease in intensity of light, this system automatically changes its direction to get maximum intensity of light. Here we are using three sensors in three directions to sense the direction of maximum intensity of light. The difference between the outputs of the sensors is given to the microcontroller unit. Here we are using the microcontroller for tracking and generating power from sunlight. It will process the input voltage from the comparison circuit and control the direction in which the motor has to be rotated so that it will receive maximum intensity of light from the sun. The power generated from this process is then stored in a lead acid battery and is made to charge an emergency light and is made to glow during night.

# 3. BLOCK DIAGRAM



# **3.1 BLOCK DIAGRAM DESCRIPTION**

Solar Tracking system has following blocks

- 1. Radiation sensor
- 2. Microcontroller 89C52
- 3. Relay Driver & Motor
- 4. Solar panel
- 5. Power supply

#### 1. Radiation Sensor:

This is one of the main part of our project. The main intention of this block is to sense the person and to sense the light. For sensing the person we are using LTH1550 sensor and for sensing light we are using the light dependent register (LDR). By using this sensor and its related circuit diagram we can control the Room Light.

#### 2. Microcontroller 89C52:

It is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash Programmable and Erasable Read Only Memory PEROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the MCS-51<sup>TM</sup> instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer.

#### 3. Relay Driver and Motor:

This block has the potential to drive the various controlled devices. In this block mainly we are using the transistors and the relays. Total 2 relay driver circuits we are using to control the direction of DC gear motor.

Output signal from 89C52 are given to base of transistor, which we are further energizing the particular relay. Because of this appropriate device is selected and it do its allotted function. Relay 1 and 2 are used to control the direction of the DC motor.

If relay 1 is turned On then DC motor will rotate in clock wise direction. And if relay 2 is turned ON then DC motor will rotate in Anti-Clockwise direction.

#### 4. Solar Panel:

Solar cells convert sunlight directly into electricity. Solar cells are often used to power calculators and watches. They are made of semiconducting materials similar to those used in computer chips. When sunlight is absorbed by these materials, the solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. This process of converting light (photons) to electricity (voltage) is called the photovoltaic (PV) effect.

#### 5. Power supply :

Here we used the +12V and +5V dc power supply. The main function of this block is to provide the required amount of voltage to essential circuits.

+5Vdc is given to Radiation sensor, microcontroller etc. and +12V is given to relay driver, relay and DC gear motor.

# 4. MAJOR EXPECTED RESULTS

A new solar tracker is designed employing the new principle of using small solar cells to function as self-adjusting light sensors, providing a variable indication of their relative angle to the sun by detecting their voltage output. By using this method, the solar tracker will be successful in maintaining a solar array at a sufficiently perpendicular angle to the sun. The water pump will be driven by the voltage stored in the battery. Hence a convenient and non-conventional use of solar energy is done efficiently.

# 5. ACKNOWLEDGMENTS

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# 6. CONCLUSION

The usage of solar energy is increasing day by day. With the effect of increased efficiency and reducing the cost of solar energy conversion makes the utilization of solar energy simple and reliable at domestic and industrial level. This promotes the solar energy to become one of the major sources of energy in future. By using this method, the solar tracker can be successful in maintaining a solar array at a sufficiently perpendicular angle to the sun. Solar tracking is by far the easiest method to increase overall efficiency of a solar power system for use by domestic or commercial users. By utilizing this simple design, it is possible for an individual to construct the device themselves.

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# Street Lights That Glows On Detecting Vehicle Movement

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# ABSTRACT

This system is designed to detect vehicle movement on highways to switch ON only a block of street lights ahead of it (vehicle), and to switch OFF the trailing lights to save energy. During night all the lights on the highway remain ON for the vehicles, but lots of energy is wasted when there is no vehicle movement. This proposed system provides a solution for energy saving. This is achieved by sensing an approaching vehicle and then switches ON a block of street lights ahead of the vehicle. As the vehicle passes by, the trailing lights switch OFF automatically. Thus, we save a lot of energy. So when there are no vehicles on the highway, then all the lights remain OFF. However, there is another mode of operation where instead of switching OFF the lights completely, they remain ON with 10% of the maximum intensity of the light. As the vehicle approaches, the block of street lights switch to 100% intensity and then as the vehicle passes by, the trailing lights revert back to 10% intensity again. High intensity discharge lamp (HID) presently used for urban street light are based on principle of gas discharge, thus the intensity is not controllable by any voltage reduction. White Light Emitting Diode (LED) based lamps are soon replacing the HID lamps in street light. Intensity control is also possible by Pulse Width Modulation (PWM) generated by the microcontroller. Sensors used on either side of the road senses vehicle movement and sends logic commands to microcontroller to switch ON/OFF the

LEDs. Thus this way of dynamically changing intensity ON/OFF helps in saving a lot of energy. The circuit uses an 8051 series microcontroller.

### **General Terms**

Energy conservation, HID lamps.

#### Keywords

Prof. Swapna Patil, High power LED street lamp, IR sensors, White light, Vehicle movement sensing.

#### 23. INTRODUCTION

Theoretically, light emitting diode (LED) has many distinctive advantages such as high efficiency, good reliability, long life, variable color and low power consumption. Recently, LED has begun to play an important role in many applications. One typical general lighting product of LED is LED street lamp, which is emerging in market. For modern LED street lamps, the thermal management is a critical factor for their high performance, which is particularly important for high power LED street lamps where the self-heating in each LED and the thermal coupling among the LEDs lead to a non-uniform temperature profile. Therefore, the LEDs in higher temperature area have shorter life and lower reliability than the others in lower temperature area, which reduces the reliability of the high power LED street lamp.

There are many significant benefits to working with LEDs; energy conservation is one of the most widely known. A direct comparison of LEDs to other prevailing lighting technologies, such as incandescent and fluorescent, indicates the energy savings that can be realized. Incandescent light uses the most energy, fluorescent is second, and LEDs are the most efficient of the three.

#### Encapsulation Resin



Fig. 1 LED Cross Section.

#### 24. DETAILS OF COMPONENTS

### 2.1 IR Led

An IR LED, also known as IR transmitter, is a special purpose LED that transmits infrared rays in the range of 760 nm wavelength. Such LEDs are usually made of gallium arsenide or aluminum gallium arsenide.

They, along with IR receivers, are commonly used as sensors. The appearance is same as a common LED. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify whether the IR LED is working or not, unlike a common LED. To overcome this problem, the camera on a cell phone can be used. The camera can show us the IR rays being emanated from the IR LED in a circuit.

#### Features

- Extra high radiant power
- low forward voltage
- suitable for high pulse current operation intensity



Fig2. IR Led

### 2.2 Photodiodes

A photodiode is a type of photo detector capable of converting light into either current or voltage, depending upon the mode of operation. Photodiodes are similar to regular semiconductor diodes except that they may be either exposed (to detect vacuum UV or X-rays) or packaged with a window or optical fibre connection to allow light to reach the sensitive part of the device. Many diodes designed for use specifically as a photodiode will also use a PIN junction rather than the typical PN junction.



Fig. 3 Photo diode

# 2.3 Filter

Capacitive filter is used in this circuit. It removes the ripples from the output of rectifier and smoothens the D.C. Output received from this filter is constant until the mains voltage and load is maintained constant. However, if either of the two is varied, D.C. voltage received at this point changes. Therefore a regulator is applied at the output stage.

The simple capacitor filter is the most basic type of power supply filter. The use of this filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode-ray and similar electron tubes that require very little load current from the supply. This filter is also used in circuits where the power-supply ripple frequency is not critical and can be relatively high. Below figure can show how the capacitor changes and discharges.



Fig. 4 Output Waveform

# 2.4 Voltage Regulator 7805

#### Features:

- Output Current up to 1A.
- Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V.
- Thermal Overload Protection.
- Short Circuit Protection.
- Output Transistor Safe Operating Area Protection.
- Fast response.
- Low dropout.

# 2.5 White LED'S

Light Emitting Diodes (LED) have recently become available that are white and bright, so bright that they seriously compete with incandescent lamps in lighting applications. They are still pretty expensive as compared to a GOW lamp but draw much less current and gives a fairly well focused beam.

The diode in the photo came with a neat little reflector that tends to sharpen the beam a little but doesn't seem to add much to the overall intensity.

When run within their ratings, they are more reliable than lamps as well. Red LEDs are now being used in automotive and truck tail lights and in red traffic signal lights. You will be able to detect them because they look like an array of point sources and they go on and off instantly as compared to conventional incandescent lamps.





# 25. HARDWARE AND SOFTWARE REQUIREMENTS

# 3.1 Hardware Requirements

- TRANSFORMERS
- VOLTAGE REGULATOR (LM7805)
- RECTIFIER
- FILTER
- MICROCONTROLLER (AT89S52/C51)
- LEDs AND PHOTODIODES
- POTENTIAL DIVIDER

### **3.2 Software Requirements**

- IDE
- KEIL C CROSS COMPILE
- BUILDING AN APPLICATION IN UVISION2
- BUILDING PROJECTS & CREATING HEX
  FILES
- CPU SIMULATION
- START DEBUGGING
- DISASSEMBLY WINDOW
- EMBEDDED C

#### 4. ARCHITECTURE

As illustrated in Fig.6 the architecture consists of a transformer which is an electrical device that transfers energy between two circuits through electromagnetic induction. Transformers may be used in voltage conversion to transform an AC voltage from one voltage level on the input of the device to another level at the output terminals, to provide for different requirements of current level as an alternating current source. The output of the transformer is connected to the next component which is a rectifier that converts AC to DC. Further the rectifier and the IR sensors gives logic input to the row of leds and the microcontroller and performs accordingly.

### 4.2 Modes of Operation

- There are two basic modes of operation,
  1. Transition of streetlights from dark to bright state.
  2. Transition of streetlights from dim to bright state.
- In the first mode of operation, when the vehicle is not present, all the streetlights will be in dark state.
   When a vehicle is sensed then the window of streetlights is illuminated in front of the vehicle.
- In the **second** mode of operation, initially when the vehicle is not sensed, all the streetlights will be in dim state. This is achieved by use of pulse width modulation technique through the program stored in the microcontroller.
- When a vehicle is not present on the highway, then the streetlights are made to glow for about 1ms and then for 100ms they are switched off. Thus, we get streetlights with less brightness.



Fig6. Architecture

# 4.2 Circuit Working

The highway model consists of 14 leds as streetlights and 8 pairs of photodiodes-IR diodes used as sensors, variable resistors and transistors which acts as switch as explained above. The IR diodes are placed on one side of the road and photodiodes are placed on the other side of the road, directly facing the IR diodes.

Consider the case when there is no vehicle on the highway. In this case, the IR radiation emitted from the IR diode directly falls on the photodiode which is exactly opposite to it. This implies that photodiode conducts and current passes through it. The current passes through the photodiode and goes through the variable resistor and the base-emitter region of the transistor. This in turn connects the collector of the transistor to the emitter. From the circuit diagram we can see that emitter is connected to ground which implies that the collector also goes to the ground. The collector region of the transistor is connected to the port 1 (input port) which in turn goes to ground i.e., logic ZERO. So, to summarize we can say that, when there is no vehicle on the highway, then all the inputs to ZERO. the microcontroller port 1 is

# 5. APPLICATIONS



#### Fig7.Applications

- **Highways:** This technology can be used in street lights to avoid wastage of power and light them only when needed.
- Industries: This technology can be used in industries warehouses and also in the industries lighting system n reduce the expense of high intensity lights by replacing it with Leds.
- **Museums:** This technology can be used in museums to light the sealing as well as the artifacts

as Led lights can be paired with optical fibers and give good amount of illumination.

### 6. CONCLUSION

This research paper work is an attempt to develop a Street Light Control and Maintenance using embedded system based application. We have made use of the IR Sensor for the Street Light application which aims to reduce the power consumption. The network has capability of automatic detection of vehicles. There is great scope for future work in this area. Further this system can be enhanced by using appropriate sensors for detecting the failed street light and then sending an SMS to the control department via GSM modem for appropriate action.

### 7. ACKNOWLEDGEMENT

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# SELF- AUTOMATED POWER EFFICIENT ENERGY SAVER FOR CLASSROOM

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#### ABSTRACT

Energy crisis is the commonest cry of the world today and the techniques ensuring the conservation of it are better suited than those preventive measures. This paper presents comprehensive smart self-automated system that conserves the power and save energy.

The idea behind this device is that it takes control signals from various sensors such as LDR, PIR and Thermistor and gives the signal to the microcontroller. The microcontroller then processes the control signals and according to programmed values switches the tube lights and fans accordingly.

This device has less payback period than solar devices which makes it more cost efficient. The result of such an implementation brings about saving not only on the energy and power but also helps in bringing down the electricity bills.

#### **Keywords**

Microcontroller 89S51, Sensors, ADC 0808, embedded C programming language.

#### I. INTRODUCTION

Energy saving, in any system, deals with the minimization of energy wastage. To achieve this, the efficiency of the individual components and processes of the system needs to be improved. Automatic control refers to any controlling mechanism which does not require any human intervention. There are many motivations to improve energy efficiency. Reducing energy use, reduces energy costs and may result in a financial cost saving to consumers. Reducing energy use is also seen as a solution to the problem of reducing emissions. A wide variety of sensors are used in digital control systems and interfacing them requires a good understanding of linear amplifier design and signal conditioning techniques. Connection to an MCU is simplified if the sensor itself contains built-in signal conditioning, such that the output is linear, reasonably large, conveniently scaled and pre-calibrated.

Thus our project is very useful idea for conserving the energy for the future generations. If such projects are installed in all commercial as well as residential societies we can save a lot amount of power. More such projects must be developed and encouraged by the government and educational institutes. According to the International Energy Agency, improved energy efficiency in buildings, industrial processes and transportation could reduce the world's energy needs in 2050 by one third, and help control global emissions of greenhouse gases.

#### II. ARCHITECTURE



Fig.1

The main mode of the device is the scheduled mode, in which the fans and tube lights are ON during the scheduled time. Then if there is no one present in the room the PIR sensors senses it and gives a signal to the MCU. The MCU then turns OFF the fans and tube lights. Also the thermistor and LDR is used to measure the room temperature and the light intensity in the classroom.LDR is a photo resistor or light dependent resistor (LDR) or photocell is a resistor whose resistance decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A thermistor is a type of resistor whose resistance varies significantly with temperature, more so than in standard resistors the microcontroller is programmed with some threshold values. The LDR senses measures the light intensity of the room and gives it output to the ADC.Similarly the Thermistor measures the temperature of the room and gives the output to the ADC. Then the ADC converts the analog signal received from the sensors to digital signals and forwards it to the microcontroller .The PIR Sensor is a Passive Infrared Sensor which controls the switching on/off of the lighting load when it detects a moving target. The built in sensor turns on/off the connected lighting load when it detects motion in the coverage area. It is digital sensor so if there is any movement in the room the PIR directly gives the output to the microcontroller.LCD User Interface shows the scheduled time of the light and FAN system in Schedule Mode. It also shows the current room temperature and the light intensity in Lux. The LCD also shows the mode in which the device is working. All information is gathered from the microcontroller.

#### **III. SOFTWARE DESIGN**

#### 1. SOFTWARE :

**1. BASCOM:** It is the Windows BASIC COMPILER for the 8051 family. It is designed to run on W95/W98/NT/W2000 and XP.

**2. EMBEDDED C:** The C programming language is perhaps the most popular programming language for programming embedded systems. C remains a very popular language for micro-controller developers due to the code efficiency and reduced overhead and development time. C offers low-level control and is considered more readable than assembly.

#### IV. DATA FLOW DIAGRAM

#### Free Mode

Allow users to set a timer for turning ON the light and fan (Maximum: 2 Hours).Once the timer goes to zero, light and FAN will be turned OFF automatically. Users can reset the timer anytime.

#### Schedule Mode

Allow users to set a time period (e.g. 11am-3pm) that will turn ON the light and FAN without interruption. The schedule will apply from Monday to Friday only. If NO SCHEDULE is set or anytime other than the scheduled time, the device will run in Free Mode. Allow users to set a desired temperature within a range. (Between  $50^{\circ}$ F to  $80^{\circ}$ F).



Fig.2

The devices works in 3 modes. The main mode is the scheduled mode in which the user programs a particular schedule into the MCU. For eg. If we are using the device in colleges, the professors can schedule the lecture timings into the MCU. Then as per the lectures the lights and fans are turned ON. And suppose no one is present for the lecture i.e. if there is no movement in the classroom the PIR sends a signal to the MCU and the fans and lights are turned OFF. Also if the room temperature is above the preset value the fans are then turned OFF and if the light intensity is above the preset value the lights are turned OFF. The other two modes are the bypass key mode and the push button mode.

1. Bypass key mode:

In this mode there is a key given to the user by using the key he can bypass the schedule mode and turn ON the fans and lights. For eg. If the college timings are over and the professors want to take an extra lecture he can use the bypass key and turn ON the fans and tube light. In the bypass mode the fans and lights remain in the ON condition till the key inserted in the device. The fans and light will turn off if the temperature or light intensity falls below threshold or if the key is removed.

2. PUSH button mode:

In this mode there is a push button given on the device. If we press the push button the light and fans turns ON for particular time duration. The duration can be changed as per our requirement.

#### V. ANALYSIS FOR POWER SAVING

Residential meter	W/o	With
	sensor	sensor
Cost of electricity per kw	5.6	5.6
Operational hours of passage tube lights	12	3
Power capacity of tube light in watts	57	57
Total consumption in watts	684	171
Number of days	30	30
Total power used by one tube light in kw	20.5	5.13
Amount paid per month	115	29
Savings per month per tube light		86
E'. 2		

Fig.3

As per the analysis for the residential meter, we can save 86 Rs per month per tube light with sensor & as usual there are 4 to 5 tube lights in each classroom .So we can save 4000 to5000 Rs per year & payback period for this device is up to 2 years.

#### V. ADVANTAGES:

1. Simple and user-friendly interface.

2. Professors can use the Schedule Mode to fit their lecture hours.

3. Automatically switches between the modes.

### VI. OBSTACLES FOR THE SYSTEM

1. The sensors used are wired sensor because of which there can be a problem of range

2. Limited life span of sensors.

#### **VII. RESULTS:**

The device works as per the scheduled mode i.e. according to the timing of the lecture. We can turn ON/OFF the tube lights if the light intensity falls below a certain preset value which can be changed in the program. We can turn ON/OFF the fans if the temperature falls below a certain preset value which can

be changed in the program. The two other modes that are:

i. The bypass key mode

ii. Push button mode

Are also working as per there function.

The MCU reads light intensity level from an LDR voltage divider circuit. If the natural light intensity is below the preset threshold value then the lights are turned ON and vice versa. Room temperature readings are taken from a sensor thermistor and compared with the user defined threshold value. Motion detection is achieved by using a PIR sensor. If the room stays unoccupied for a preset amount of time the loads are turned OFF to prevent wastage. Lastly, the user defined thresholds are changed using preset value.

#### **VIII. FUTURE SCOPE:**

This ideology may be extended to be integrated with another energy supplying system to compensate for the shortage caused during power scheduling. The supporting system may be aided by a solar power system or an inverter or a generator depending upon the amount of the excessive demands of the consumer. It may also be implemented as a customized embedded system functioning along with the internal wiring system cable of being re - programmed by the user.

#### **IX. CONCLUSION:**

This focuses on ways to cut down power wastage rather than mechanizing new methodologies to automate reduced power consumption. Thus it may be easily retrofitted to the existing electrical circuitry to monitor and control the power utilization. Thereby it reduces the cost on electricity saving energy and ensures that the demands of the users are their actual needs. This system also proposes to be a solution to the frequent power cut scenario ruling out the need for inverters. A better suited alternative to home environments when compared with power strips and expensive generators.

#### X. ACKNOWLEDGEMENTS

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## Temperature Monitoring and Controlling via Zigbee

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## Abstract

This paper aims at designing a new industry automation system that use Zigbee module for automatic data logging at remote computer. There are various applications in which we need to maintain the temperature in a certain specified range. The system designed by us will automatically raise or decrease the temperature depending on the need. Also continuous data logging of the temperature will be done on a remote computer through zigbee.LM35 temperature sensor along with microcontroller AT89S52 is used in this process.

Keywords: Microcontroller AT89S52, Relay, Relay driver, 16\*2 LCD display, LM35 SENSOR, ADC 0808, IC555, ZigBee

## **1. INTRODUCTION**

The vision of the system is to provide automatic temperature monitoring and controlling. There are various applications in which we need to maintain the temperature in a certain specified range. If the temperature is not maintained in the specified range then the process might get disrupted. The result being damage to the product or the production machine itself. The study of control theory can help us build a device which can control the temperature in a specified range. Control theory is an interdisciplinary branch of engineering and mathematics that deals with the behavior of dynamical systems with inputs. The external input of a system is called the reference. When one or more output variables of a system need to follow a certain reference over time, a controller manipulates the inputs to a system to obtain the desired effect on the output of the system.

Designed System will maintain the temperature within the required range. A sensor will sense the temperature of the load and the microcontroller will continuously monitor it. Based on the feedback from the sensor the microcontroller will send a signal which will turn on the heater or fan depending on the need. The fan will be turned on if the temperature rises above the specified range. The heater will be turned on if the temperature falls below the specified range. In

addition to temperature control, continuous data logging of the temperature via zigbee module is done at remote computer. This will be useful in applications where humans cannot physically be present where the load is located.

## 2.ARCHITECTURE



Fig.1 Project Layout

Project layout of designed system has the following principle objectives:

- **Temperature Monitoring:** The temperature of the load is constantly under observation. IC LM35 is used as the temperature sensor which sends the data to the microcontroller.
- **Temperature Control:** The temperature of the load will be maintained within a certain prespecified range with the help of microcontroller.
- Automatic Control: All the decisions will be taken by the microcontroller. There will be no need of human interference.
- **Data logging:** The temperature will be recorded after specific time intervals on a computer located away from the load.

The project layout is explained below along with the components required to build a system:

LM35 temperature sensor senses the

temperature of the load.

- ADC0808 gives digitised temperature output to the microcontroller.
- Microcontroller 89C51 is programmed to analyse this temperature value and compare it with predetermined threshold level.
- If the recorded temperature is below threshold level then microcontroller turn on the heater using relay.
- If the recorded temperature is above threshold level then microcontroller turn on the fan using another relay.
- Hence temperature is maintained within the desired range and the process is fully automatic.
- Automatic data logging at remote computer is achieved using Zigbee.

#### **3. DESIGN COMPONENTS**

The system contains both hardware & software components which are classified as follows:

#### 3.1 Software component

**Visual Basic**: It is a versatile programming language which can be used to create various GUI applications. In this system, VB is used for creating a client-server application for the remote and local server respectively.

#### 3.2 Hardware component

3.2.1 Microcontroller: It is the brain of the system. It is programmed to analysis the temperature value from ADC0808. If the input from ADC from is below or above the certain predetermined threshold level then microcontroller will take the necessary action to maintain the temperature within the specified range.

3.2.2 Relay: It is an electrically operated switch. **Many** relays use an electromagnet to operate a switching mechanism, but other operating principles are also used. Two different relays are used to turn on the heater or fan as per action taken by microcontroller.

3.3.3ADC0808: ADC0808 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique.

3.3.4 16\*2 Char LCD: This is the LCD display.LCD has14 pin. The most commonly used ALPHANUMERIC display. This LCD displays the temperature at particular instant.

3.3.5 IC555: The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as

an oscillator, and as a flip-flop element. Derivatives provide up to four timing circuits in one package.

3.3.6 ZigBee: ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802 standard for personal area networks. It is used automatic data logging at the remote computer.

## 4. DATA FLOW DIAGRAM



Fig.2 Data Flow Diagram

### **5.ADVANTAGES**

1.Temperature can be monitored and controlled within the desired range automatically.

2.Data logging provides a backup of all the decisions taken by the system and also the temperature at the load after specific intervals of time.

3. Continuous human supervision is not required.

### 6. LIMITATIONS

Dependence on power supply- For the system to function properly, all appliances must be connected to the main power supply at all times. If appliances are disconnected from the main supply, they can no longer be controlled by the user & that part of the system would be rendered nonfunctional.

#### 7. OBSTACLES FOR THE SYSTEM

In case of failure in the wireless communication system the feature of data logging will not work and even manual commands in case of any emergency cannot be given to the system.

# 8. FUTURE APPLICATIONS OF THE SYSTEM

The system can be applied in fabrication industry. The cooling system will comprise of fluid cooling system or chillers.

## 9. CONCLUSION

Using this system of automatic temperature monitoring and controlling via zigbee, it is possible to control the temperature in a specified range as per the user's requirements. Also we have continuously monitored the data and stored it on a remote computer via zigbee. This system can be put to use in various industries or chemical plants or locations where human presence is not possible.

### **10. ACKNOWLEDGEMENT**

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## IVR SYSTEM FOR COLLEGE AUTOMATION

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### ABSTRACT

IVRS is an important development in the field of interactive communication which makes use of the most modern technology available today which provide a voice response to the customers and guide them to the information they require.

Our project deals with an IVR system that helps in automating the process of marks and attendance. The telephone user can access the information from anywhere at any time simply by dialing a specified number and following an on-line instruction. When a connection has been established, IVRS is usually employed to know more about the organizations.Our project allows the user to know the student's attendance and marks quickly through the telephone line without interrupting the college authority.It is the easiest and most flexible mode of interactive communication because pressing a few numbers on the telephone set provides the user with a wide range of information on the topic desired.

### **Keywords**

Microcontroller, IVRS, DTMF, text-to-speech

## **1. INTRODUCTION**

Now-a-days every institution needs automation. Taking advantages of IVRS we are developing the system for college automation .Interactive Voice Response System (IVRS) is one of the most important breaks through in the field of telecommunication. Nowadays it becomes very tedious for the college administration to keep paper records of the students' attendance and marks. It is also very time consuming to send letter regarding the details to each and every student's home. IVRS is very convenient for the college authorities, as they have to record the student's database in the computer, and the user whenever they want to acquire this information can just dial the accurate code and can get the details required.

IVRS is a unique blend of both the communication field and the software field, incorporating the best features of both these streams of technology. Our project allows the user to know the student's attendance quickly through the telephone line without intention of college authority. It will be very obliging to the parents to be acquainted with their son's/daughter's recital in the college. It includes speech-recognition software that allows a caller to communicate with a computer using simple voice commands. It is the easiest and most flexible mode of interactive communication because pressing a few numbers on the telephone set provides the user with a wide range of information.

IVRS provides a friendly and faster self -service alternative to speaking with customer service agents. It finds a large scale use in enquiry systems of railways, banks, universities, tourism, industry etc.

## 2. RELATED THEORY



fig.1

### 2.1 Hardware Development

The hardware consists of microcontroller IC 89S51, DTMF Decoder IC MCT2E, MAX 232, Audio interface circuit.

The basic microcontroller based hardware is used to interface Telephone line to provide various control signals and to give commands serially to PC.

MAX232 is used to convert the TTL/CMOS logic level signals from microcontroller to RS232 signal level so that the proper serial communication takes place between the hardware and VB software.

Audio Amplifier: To provide audio amplification to standard output and to act as a buffer between the telephone line and sound card. DTMF Decoder: This circuit is used to detect DTMF pulses on telephone line. The DTMF keypad is laid out in a 4x4 matrix, with each row representing a low frequency and each column representing a high frequency pressing a single key will send a sinusoidal tone of two frequencies. These tones are then decoded by the switching center to determine which key was pressed.

#### 2.1.1 Model development

Caller dials the IVRS service number. The computer waits for a specified number of ringing tones at the end of which, the connection is established. The connection is established by lifting the handset of telephone base from ONHOOK condition. Now a pre-recorded or a speech recognition voice greets the caller conforming that the number dialed corresponding to the particular service. Next, the menu is presented to the caller again in the voice form, giving him the various options to choose from. If the information to be relayed back is confidential, then the system may even ask the dialer to feed in a password number.

To send the voice data from PC over Telephone line we use the direct coupling. If we connect audio output directly to the wires of the handset Voice level is attenuated, noiseless. If we connect audio output directly to speaker wires of handset Voice level is better than first. If we connect audio output directly to the main telephone line Voice level is better than both.

#### 2.1.2 IVRS for an Educational Institution

An IVRS is an exemplary innovation in the area of voice assisted browsing and data retrieval on telephone, data that contains information of interest and has straight relevance to the user. This application software allows full resource sharing and integration with the database of system, the Software solution for the complete computerization of Educational Institutions. The software first converts the data into a voice format and then sends it on to the telephony network. The voice response by the system is then heard by the caller, and as discussed, shall cover the following informational requirements. *Sequence followed in the IVRS service* 

• Caller dials the IVRS service number.

• The computer waits for ringing tones at the end of which, the connection is established.

• The connection is established by lifting the handset of telephone base from ON-HOOK condition.

• Now, a pre-recorded audio or speech recognition software greets the caller conforming that the number dialed corresponding to the particular service.

• Next, the menu is presented to the caller again in the voice form, giving him the various options to choose from. If the information to be relayed back is confidential, then the system may even ask the dialer, to feed in a password number.

• The database is accordingly referenced and the necessary information is obtained.

- Next, the same information is put across to the user in voice.
- The caller generally given the option to :
- a. Repeat whatever information was voiced to him.
- b. Repeat the choices
- c. Break the call by restarting ON-HOOK condition



fig.2

The response to the user can be presented in two ways:

1. Pre-recorded voice- The term is also used more broadly to denote any system of conveying a stored telecommunications voice messages, including using a voice answering machine. Most cell phones services offer voice-mail as a basic feature.

Voicemail systems are designed to convey a caller's recorded audio message to a recipient. To do so they contain a user interface to select, play, and manage messages; a delivery method to either play or otherwise deliver the message; and a notification ability to inform the user of a waiting message. Most systems use phone-networks, either cellular or land-line based, as the conduit for all of these functions. Some systems may use multiple telecommunications methods, permitting recipients and callers to retrieve or leave messages through multiple methods such as PCs, Cell phones or Smart-phones.

Voicemail systems contain several elements shown in the figure below:

• A central processor (CPU) which runs the operating system and a program (software) that gives the system the look-and-feel of a voicemail system. This software includes thousands of pre-recorded prompts that "speak" to the users as they interact with the system;

- Disk controller and multiple disk drives for message storage;
- System disks which not only include the software above, but also contain a complete directory of all users with pertinent data about each (name, extension number, voice-mail preferences, and pointers to each of the messages stored on the message disk that belong to them);
- Telephone interface system that enables many phone lines to be connected to it.

2. Speech recognition software-**Speech recognition** (SR) is the translation of spoken words into text. It is also known as "automatic speech recognition", "ASR", "computer speech recognition", "speech to text", or just "STT".

Speech recognition can be implemented in front-end or backend. Front-End speech recognition is where the provider dictates into a speech-recognition engine, the recognized words are displayed as they are spoken, and the dictator is responsible for editing and signing off on the document. Back-End or deferred speech recognition is where the provider dictates into a <u>dictation</u> system, the voice is routed through a speech-recognition machine and the recognized draft document is routed along with the original voice file to the editor, where the draft is edited and report finalized

The performance of speech recognition systems is usually evaluated in terms of accuracy and speed. Accuracy is usually rated with word error rate (WER), whereas speed is measured with the real time factor. Other measures of accuracy include Single Word Error Rate (SWER) and Command Success Rate (CSR).

However, speech recognition (by a machine) is a very complex problem. Vocalizations vary in terms of accent, pronunciation, articulation, roughness, nasality, pitch, volume, and speed. Speech is distorted by a background noise and echoes, electrical characteristics. Accuracy of speech recognition vary with the following-

- Vocabulary size and confusability
- Speaker dependence vs. independence
- Isolated, discontinuous, or continuous speech
- Task and language constraints
- Read vs. spontaneous speech
- Adverse conditions

### **3. DISADVANTAGES**

#### 3.1 Inaccuracy and Slowness

the software may not recognize words such as brand names or uncommon surnames until you add them to the program's library of words.

#### 3.2 Environmental Factors

The ideal environment for any voice recognition program is a quiet one, especially if you do not own a microphone that filters out noise. In a loud environment, voice recognition software may fail to recognize your voice, and may even try to generate text from voices heard in the background Speech synthesizer: Speech synthesis is the artificial production of human speech. A computer system used for this purpose is called a speech synthesizer, and can be implemented in software or hardware. A text-to-speech (TTS) system converts normal language text into speech; other systems render symbolic linguistic representations like phonetic transcriptions into speech. Synthesized speech can be created by concatenating pieces of recorded speech that are stored in a database. Systems differ in the size of the stored speech units; a system that stores phones or di-phones provides the largest output range, but may lack clarity. For specific usage domains, the storage of entire words or sentences allows for high-quality output. Alternatively, a synthesizer can incorporate a model of the vocal tract and other human voice characteristics to create a completely "Synthetic" voice output. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood. An intelligible text-to-speech program allows people with visual impairments or reading disabilities to listen to written works on a home computer.

#### Common IVR applications include:

- Schools, Colleges and Educational Institutions.
- Bank and stock account balances and transfers.
- · Surveys and polls.
- Call center forwarding.
- Simple order entry transactions.
- Selective information lookup (movie schedules, etc.).
- Ticketing and Reservation.
- IT Enabled Services.
- Hotels, Airline & Train Ticket Enquiry & Booking Centers.
- · Entertainment Industry.
- Complaint Booking and Customer Support Centers.
- Banks, Finance and Credit Corporations

Based on the input and requested information the IVRS will visit the resource on the server and relevant business management information system, search the required data information and queries result to the IVR server, then build the voice files by TXT files, play the voice files to the customers through telephones. Then finish the process of IVR request and response. This system has the ability of simple management, convenient maintenance, controls neatly. The IVRS call attending results in automatic attending of phone calls. The functions such as the digit press, playing of .wav files used in tele-purchasing using IVR System for the convenience of customer orders. This system also stores the feedback of the customer & allows the admin to retrieve messages from remote place and performs action over messages such as read, delete etc.

This application is prepared in such a way that they can be easily accessed through computers. In the same way our project's aim is to provide the entire information to the user at the tip of his fingers. Due to this project the traditional manual way of handling the customer queries will be handled in a more technological and automated way. This type of system performs operations similar to that of a human telephone operator. The USP of the project is its relevance to the field of telephony and its cost that will be bearable even by a small concern due to its simpler and easily available components.

## 4. ADVANTAGES OF IVR

# 1. IVR works 24 hours a day and it never greets a caller with tired

Your office is now open 24 hours a day, manned by IVR to answer all calls without any tiring voice. It will also present all information, stores message, can alert to designated person in case of emergency, automatically! Depending on nature of the office, industry where IVR system is installed, it can even give out emergency instruction to the caller!

#### 2. Extend your automation to the caller/customer

Having installed sophisticated software to automate many activities in your office and are experiencing immense benefit of it, but have you extended the same benefit to your caller as well as customer. Provide all information about company, contact details categorically like marketing, technical etc.

#### 3. Create a Better Company Image

IVR systems again account for a lot for personalization and customer service; however, they also create a better impression on customers. Smaller companies, as well as home based companies, can create a bigger and more professional image by using automated systems. In contrast, bigger companies can use these systems to maintain consistency in customer service and call volume. Either way, IVR systems establish a professional image for the company.

#### 4. Wider Personalization

IVR systems allow for tremendous personalization that helps to create a better relationship with customers. Each IVR system can be programmed with personalized greeting for known callers based on their caller ID information. Along with addressing a caller by their name, the system can also identify and share information specific to the caller.

In addition to programming caller information, IVR systems are fitted with a number of language options. Languages options can be programmed for specific callers as well, which may help existing and/or potential customers feel more comfortable. Aside from their programming, languages can be selected as options for the caller.

#### 5. Better Customer Service

Although the personalization of a machine may be initially offsetting to some, it ultimately allots for more direct, specific, and thorough customer service. Through utilizing IVR system customers feel that they are being better attended to. If customers are calling with specific questions, the automation can generate quick responses that are informative, as well as time efficient. Additionally, calls can now be answered on the first ring, which in turn reduces customer wait time and cuts call volume, saving time for both the customer and company.

## **5. CONCLUSION**

A complete prototype of IVRS (Interactive Voice Response System) will be developed. The system will be tested under various conditions and situations. Ongoing cost includes electricity to run system, maintenance costs for the control and networking system, including troubleshooting and eventual cost of upgrading as standard change. Learning to use a complex system effectively may take significant time and training especially understanding the whole network system.

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## AUTOMATED WHEELCHAIR USING ARDUINO MICROCONTROLLER BOARD

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ABSTRACT

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Servo Motor with Arduino UNO Development Board", April 2012 has described the basic theory that will provide

directions on how to use an Arduino UNO microcontroller to control an analog Servo motor through signals sent to the Servo motors control line, wiring the Servo motor, the Arduino UNO and cover microcontroller programming techniques to control movement of the motor.

### 2. DESIGN METHODOLOGY

The basic idea of project is to control is to control the movement of wheelchair by Smartphone via Arduino microcontroller board. In our project we had interfaced Bluetooth HC-05 by Bluestick application, Stepper motor by Driver IC and GSM shield to Arduino board. The brief explanation of interfacing of all above mentioned components is as follows. (Ref.Figure.1.1)

#### Keywords Arduino Microo

Arduino Microcontroller Board, GSM Shield, Bluetooth HC-05, Bipolar Stepper motor and Driver IC LM293D.

In this modern age where every second there is a new

innovation made in every field various technologies and

equipments have been designed to help the senior citizens

with disability and to the physically challenged persons. Our

project is an attempt to help the physically challenged people.

In this project we are harnessing the **Bluetooth** technology to control a wheel chair we have also included a **GSM** module. The board that we are using in this project is the **Arduino**-

Uno programmer board which performs all the control and

data transfer processes. An Android Application Bluestick is

used to open up a Serial Communication between the

Bluetooth and the Arduino-Uno programmer board this in turn

is used to control two Stepper motors; the GSM module is

used in SOS conditions. When activated the GSM module automatically sends a text message to 4 numbers fed in the

system, the message comprises of the location of the user.

### 9. INTRODUCTION

Over last decade, the development in the integrated circuit technology has brought great progress to the design of high performance systems. It interfacing with various motor has made it easy to build a system which can help mankind in various fields especially handicap. With the progress in VLSI technology the microcontroller systems are getting compact, fast and robust. The following literature reviews give an account on successful attempt to build such system. Along with concept of interfacing the servo motor with Arduino.

1. Vigneshwar. Santhanam and Vignesh. Viswanathan has described a "Smartphone Accelerometer Controlled Automated Wheelchair" at 3<sup>rd</sup> International Conference on Electronics, Biomedical Engineering and its Applications (ICEBEA'2013), Hong Kong (China), January 26-27, 2013.It mention a "Smartphone" which have inbuilt 3 axis Accelerometer and Bluetooth Wireless technology. The other end of the system has a microcontroller which drives the various actions of the servo motor for directional movement and powers the DC motor for linear motion of the wheelchair. 2. Eric Mitchell, Electrical Engineer, General Motors Baltimore Assembly described "Control of a 180 degree



ARDUINO

MICROCONTROLLER

Figure.2.1 Block Diagram of system

The operation is initiated by Smartphone by sending the control signals to Arduino via Bluetooth HC-05 (Ref.Figure.2.2) serially. As far as the connection is concerned The TX pin of Arduino is connected to RX pin of Bluetooth HC-05 and RX pin of Arduino is connected to TX pin of Bluetooth HC-05. When pairing is in process there is blinking of LED is being observed on chip of Bluetooth HC-05. The process of paring is continued until the LED blinks

once the LED blinking stops indicates that Smartphone is successfully paired with Arduino.



Figure.2.2 Bluetooth HC-05

For sending the data to Arduino only pairing is not sufficient we require An Android Application to send data. The Android App that is being used is "Bluestick" this application should be installed in Smartphone.



Figure.2.3 GUI of Bluestick

This Application shows Arrow interface on screen. This application has certain arrow keys, modes and other useful buttons (Ref.Figure2.3). The four arrow keys represents four directions as" Left, Right, Forward, Backward. The movement of wheelchair depends on above commands given by Smartphone by application. There are two modes as "Button mode" and "Tilt mode". In Button mode movement of wheelchair is based on respective button press. In Tilt mode the movement of Smartphone as this mode is motion sensitive. Two other special keys are "Release and Pair". By pressing Pair key the pairing is been done and Release key is used to activate GSM Shield to send the SOS message to prefetched numbers.

As our Smartphone is successfully now we will send the command from Arduino to Stepper motors via Driver IC. LM293D (Ref.Figure.2.4) is a typical motor driver IC which can control the movement of motor in either clockwise or in anticlockwise direction. It's a 16 pin IC. The L293D contains two H-bridges (for more information on H-bridges, for

driving small Stepper motors. It can also be used to drive stepper motors because stepper motors are, in fact, two (or more) coils being driven in a sequence, backwards and forwards. For connection of stepper motor with Arduino (Ref.Figure3.5)



Figure.2.4 Driver IC



Figure.2.5 Schematic of Circuit Diagram

We are using bipolar Stepper motors (Ref.Figure.2.6) for the movement of wheels. Stepper motor gives step movement of wheel according to its Step angle which is defined in program or it can be set according to user requirement.. This motor provides smooth movement of wheels as compared to other motors. it has very precise "start" "stop" movement As the motors do not have brushes so its shelf life depends on its stress baring capacity.



Figure.2.6 Bi-Polar Stepper Motor

For the security Purpose we had incorporated a GSM Shield (Ref.Figure.2.7) in the system. This GSM shield has An antenna for communication, A slot for SIM card form which we are sending the message. The TX pin of Arduino is connected to TX pin of GSM Shield and the RX pin of Arduino is connected to RX pin of GSM shield i.e. these pins are shorted. When "Release" button is pressed the GSM is activated and an SOS message is send to pre-fetched numbers. The numbers are user defined and can be changed according to user.



Figure.2.7 GSM Shield

For the programming purpose we are using software called Arduino IDE (Integrated development environment)

## **3. RESULTS**

After implementing the system we had expected that all the components of our system work properly and the movement of wheelchair must be smooth and precise. Below table following table shows the expected results:

#### **Table.3 Results**

Input Expected output

Up arrow key	Move forward
Down arrow key	Move backward
Left arrow key	Move left
Right arrow key	Move right
Pair	Pair with Bluetooth HC-05
Release	Activated GSM shield

#### 4. CONCLUSION

After carefully scrutinizing the other automated wheelchair, we come to a conclusion that they are expensive, bulky and not easily available. Other thing that can be concluded is by using PIC microcontroller the project would require a separate interfacing circuit for each element to be incorporated in the system hence; the system becomes bulky and expensive. Such bulkiness in the system can be overcome using Arduino and the system can be made robust and a high degree of scalability can be achieved.

#### 5. ACKNOWLEDGMENTS

Our deep appreciation for the teaching and non teaching staff of our respected Institution .That they provided the basic required components to assemble our project. A special thanks to our HOD, guide and co-guide that they blessed us with their knowledge which helped us a lot. A warm thanks to our parents that they supported us during this time period.

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## **DUPLEX POWER LINE COMMUNICATION FOR TEXT**

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### ABSTRACT

Power line communication (PLC) technology can use the household electrical power wiring as a transmission medium without installation of additional control wiring.

PLC is like any other communication technology whereby a sender modulates the data to be sent, injects it onto a medium, and the receiver de-modulates the data to read it. The major difference is that PLC does not need extra cabling for assembling its communication link. The data to be transmitted is frequency modulated by X10 module and sent on the existing power line. SEL -X10 is a low cost and easy to build Power Line Modem capable to send and receive audio and data over the power lines. At the receiver side the received signal is demodulated. Microcontroller decodes the message and displays it on LCD display. In same way this technology can also be used in industrial automation to detect any fire or gas leakage. The buzzer on receiver side is activated to indicate danger.

Seen from a utility point of view, one of the main advantages of PLC is the full control over the physical medium, without the need to depend on third party providers like telecommunication companies or cellular operators.

## **KEYWORDS**

LCD	– LIQUID CRYSTAL DISPLAY
PLC	– POWER LINE COMMUNICATION
PLCC	– POWER LINE CARRIER
	COMMUNICATION
PLM	– POWER LINE MODULE
SEL X1	0 – NAME OF THE PLC MODULE

## **10. INTRODUCTION**

For the past years, power lines have been used for the transmission of electricity; but nowadays with the emergence of modem networking technologies and the need for information spreading, data transmission over power lines has seen a really big growth. The technologies already used for spreading information such as telephone wiring, Ethernet cabling, fiber optic and wireless have each its limitations in cost and reliability.

In this project we are going to discuss the advantages of using power lines as a communication medium and the wide range of applications that this technology can provide, in addition to the implementation of an industrial automation system using the data transmission over power lines.

The device used for communication is built in power line modem which receives and transmits the data over power line (PLM device). The data is streamed on to the line by frequency shift keying. The signal is coupled by PLM. On the other side the receiving PLM will receive the data and convert it back to the binary data stream.

## **11. POWER LINE COMMUNICATION**

To achieve communication between any two points, several paths are available. However, of lately the traditionally used channels have come to a saturation level and there was need to explore new kind of technology which is simpler to implement and easy on pocket as well. This idea gave birth to power line communication system. The basic idea here is to use the existing power cable infrastructure for communication purpose. Our system will mostly be implemented in small areas such as residences, offices, etc. and with the use of this system; various kind of devices can be controlled remotely without even having to go near the device.

PLC is like any other communication technology whereby a sender modulates the data to be sent, injects it onto medium, and the receiver demodulates the data to read it. The major difference is that PLC does not need extra cabling, it re-uses existing wiring. Considering the pervasiveness of power lines, this means with PLC, virtually all line- powered devices can be controlled or monitored!

The main benefit of this system stands to the residential users of making their dream of automation of their house. With just a simple set up of a transmitter and receiver, and ensuring equal phase supply, one can control a host of devices and enjoy the leisure of living in a fully automated house.

### **12. TECHNOLOGY**

### 12.1 X10 Communication Protocol

X10 communication protocol is developed by Pico Electronics. It is an international and open industry standard for communication among devices used for home automation and domestics. It primarily uses power line wiring for signaling and controlling, where the signals involve brief radio frequency bursts representing digital information.

#### 12.2 What is X10 Technology

X10 communicates between transmitters and receivers by sending and receiving signals over the power line wiring.

Different communication technologies are being used for the transmission of information from one end to another depending on the feasibility and needs. Some include Ethernet cables, fiber optics, wireless transmission, satellite transmission, etc. A vast amount of information travels through the entire earth every day and it creates an essential need for a transmission medium that is not only fast but economically reasonable as well. One of the technologies that fit in the above stated criteria is PLCC.

PLCC, Power Line Carrier Communication(X10), is an approach to utilize the existing power lines for the transmission of information. In today's world every house and building has properly installed electricity lines. Power Line Carrier Communication - PLCC By using the existing AC power lines as a medium to transfer the information, it becomes easy to connect the houses with a high speed network access point without installing new wirings.

This technology has been in wide use since 1950 and was mainly used by the grid stations to transmit information at high speed. Now a days this technology is finding wide use in building/home automation as it avoids the need of extra wiring. The data collected from different sensors, Keyboard, or other sources is transmitted on these power lines thereby also reducing the maintenance cost of the additional wiring. In some countries this technology is also used to provide Internet connection.

X10 transmissions are synchronized to the zero crossing point of the AC power line. The goal should be to transmit as close to the zero crossing point as possible, but certainly within 200 microseconds of the zero crossing point. The SEL - X10 provide a 50 Hz square wave with a maximum delay of 100 µsec from the zero crossing point of the AC power line. The maximum delay between signal envelope input and 120 kHz output bursts is 50 µsec. Therefore, it should be arranged that outputs to the SEL - X10 be within 50 µs of this 50 Hz zero crossing reference square wave.

SEL - X10 is a low cost and easy to build Power Line Modem capable to send and receive audio and data over the power lines (mains) at speed up to 2400 bps. SEL - X10 lets you communicate with other devices around the house without running any wires since it uses the wires already available in every house!



Figure 1

A Binary 1 is represented by a 1 millisecond burst of 120 kHz at the zero crossing point, and a Binary 0 by the absence of 120 kHz. The PL513 and PL523 modulate their inputs with 120 kHz, therefore only the 1 ms "envelope" need be applied to their inputs. These 1 millisecond bursts should equally be transmitted three times to coincide with the zero crossing point of all three phases in a three phase distribution system. Figure 1 shows the timing relationship of these bursts relative to zero crossing.

# **13. POWER LINE COMMUNICATION MODULE**

Power line module is useful to send and receive serial data over existing AC mains power lines of the building.

It has high immunity to electrical noise persistence in the power line and built in error checking so it never gives out corrupt data.

The modem is in form of a ready to use circuit module, which is capable of providing 9600 baud rate low rate bi-directional data communication. Due to its small size it can be integrated into and become part of the user's power line data communication system.

### 13.1 Features

13.1.1 Transmit and Receive serial data at 9600 bps

- 13.1.2 Powered from 5V
- 13.1.3 Low Cost & Simple to use

13.1.4 Direct interface with microcontroller UART Txd, Rxd pins

13.1.5 Embedded ready-to-go Power Line Carrier Modem module with SMT components

13.1.6 Small form factor for easy of system integration

13.1.7 Bi-directional half-duplex data communication over the mains

13.1.8 Applicable to universal mains voltage and frequency up to 250v, 50 - 60 Hz

13.1.9 Protocol independent, data transfer transparent to user's data terminals

13.1.10 High noise immunity and reliable data communication

13.1.11 Simple serial interface to user's data devices of 9600 bps

13.1.12 Built-in on board AC coupling circuit with direct connection to mains

13.1.13 Built-in carrier generation and detection

13.1.14 Multiple units can be connected to the power line of the distribution transformer

13.1.15 TTL level serial interface to user's data devices

13.1.16 Built with industrial grade components for operation under harsh environment

13.1.17 Built in Error Checking so it never gives out corrupt data

### 13.2 Applications

13.2.1 Home Automation

- 13.2.2 Automatic Meter Reading
- 13.2.3 Process Control

13.2.4 Heating & Ventilation, Air conditioning Control

- 13.2.5 Lighting Control
- 13.2.6 Status Monitoring and Control
- 13.2.7 Low Speed Data Communication Networks
- 13.2.8 Intelligent Buildings
- 13.2.9 Sign and Information Display
- 13.2.10 Fire and Security Alarm System
- 13.2.11 Remote Sensor Reading
- 13.2.12 Data/File Transfer
- 13.2.13 Fire & Security Alarm System
- 13.2.14 Power Distribution Management

#### 13.3 Module Details



Figure 2

Pin	Description		
Number			
1	RXD - Input serial data of 5V logic level Usually connected to TXD pin of microcontrollers		
2	TXD - Output serial data of 5V logic level. Usually connected to RXD pin of microcontrollers		
3	VCC - +3 to +5V Power Input		
4	GND - Ground		

### Table 1

The module provides bi-directional halfduplex communication over the mains of any voltage up to 250V AC and for frequency 50 Hz or 60 Hz. Half Duplex communication means it can either transmit or receive data at a time but not both at same time. Normally module is in receiving mode all the time listening to incoming communication on the power line. Once your application gives serial data to transmit on its RX-IN pin, it switches over to transmit and transmits the data through power line. Once transmit process is complete it switches back to receive mode. The transmission of data is indicated by Red LED. The reception of data by modem is indicated by Green LED which is on TX out pin itself. Data communication of the modules is transparent to user's data terminals and protocol independent; as a result, multiple units can be connected to the mains without affecting the operation of the others. There is no hassle of building interface circuits. Interface to user's data devices is a simple data-in and data-out serial link. Transmission is based on byte by byte basis. Once you give one byte to module for transmission, you will have to wait at least 500ms (mili second) before a new byte is given to module again since the module waits for zero crossing of AC mains to transfer a bit. For AC 50Hz system the zero crossing of AC signals happens every 10ms and modem needs 50 zero crossings to transmit one Byte with error checking data. That is why it takes 500ms for one byte. For example we want to Transmit character "TEST", then we will have to transmit 'T', then wait 500ms, then transmit 'E' and wait 500ms, then transmit 'S' and wait 500ms, then transmit 'T' and wait 500ms. This can be quite slow speed for big data transfer, but the purpose of this module is transfer of small data bytes like sensor readings and remote control for which this speed is ok to implement.

## 14. BLOCK DIAGRAM



Figure 3

1. Switch on transmitter and receiver.

2. For data transmission, press the required key on keyboard according to the message to be transmitted.

3. Signal is frequency modulated and sent on the power line.

4. Receiver receives the modulated signal and demodulates it.

5. Signal is demodulated and displayed on LCD display matrix.

6. If sensor detects any fire or gas leakage, it sends signal to PLC module through pic controller.

7. The modulated signals are transmitted on power line.

8. After receiving such signal, a buzzer on receiver side is activated to indicate danger.

#### **15. EXPECTED RESULT**

Both the ends can transmit as well as receive text message with the help of micro-controller using existing power line. The project can also be used in industrial automation for alerting about any danger detected.

#### **16. CONCLUSION**

Although there are strong wireless and wire line communication competitors, it is believed that power line communications (PLCs) will fulfill various communication tasks. Seen from a utility point of view, one of the main advantages of PLC is the full control over the physical medium, without the need to depend on third party providers like telecommunication companies or cellular operators. Especially PLC standardization, are important for the PLC industry as a whole when defending territory against competing wireless and wire line options.

## **17. ACKNOWLEDGMENT**

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## Hardware Implementation of RFID Reader Module

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#### ABSTRACT

This paper represents a Radio identification system that uses radio waves to retrieve data from a device called a tag or transponder. RFID is an area of automatic identification that has quietly been gaining momentum in recent years and is now being seen as a radical means of enhancing data handling processes, complimentary in many ways to other data capture technologies such bar coding. The object of any RFID system is to carry data in suitable transponders, generally known as tags, and to retrieve data, by machine-readable means, at a suitable time and place to satisfy particular application needs. Data within a tag may provide identification for an item in manufacture, goods in transit, a location, and the identity of a vehicle, an animal or individual.

RFID reader/writer contains a scanning antenna and a transceiver. It uses the scanning antenna to send out radio frequency signals in a relative short range. The radiofrequency sent out is used to communicate and power tags (also known as transponders) that are within range, which will then transmit the data on the tag back to the reader. The scanning antenna then picks up the information sent out by the tag. The data is then interpreted and decoded by the transceiver. This paper gives a detailed account of the hardware of such an RFID reader, its working and specifications and also shows the advantages that can be obtained by minor modifications and inclusion of interface systems with the reader.

#### **Keywords:**

RFID Reader, Ultra High Frequency, Electronic Article Surveillance, Read Only Memory, Electrically Erasable Programmable Read Only Memory

#### **1**.INTRODUCTION

Radio frequency identification (RFID) has become a hot topic in the fields of manufacturing and logistics.

It has emerged as part of a new form of inter-organizational system that aims to improve the efficiency of the processes in the supply chain. While RFID is perceived by many as a newly developed technology, its roots can be traced back to as early as the 1940s. During World War II the British Royal Air Force designed a system to identify their airplanes by the use of onboard transponders.

These transponders allowed them to identify incoming airplanes as allies or enemies. When the onboard transponders received signals from radar stations on the ground, coded identification signals were sent back to these radar stations.

RFID works according to this same basic concept. A signal is sent by a reader to a transponder or tag, which wakes up and either reflects back a signal (passive system) or broadcasts a signal (active system) using its own power source, for example an onboard battery, back to the reader.

RFID is much more than just an advanced version of the bar code with increased scanning range. It is envisioned that RFID will have a big impact on consumers and businesses in all kinds of areas. Many possibilities still need to be conceived. Some possibilities are real time inventory, anticounterfeiting protection of medical drugs and clothing, sensor equipped RFID tags that measure environmental conditions, etc... The possibilities are endless. Unfortunately this does not come without a price.

#### 2. TAGS AND TRANSPONDERS

For the smooth working and implantation of the reader passive tags are used in the project. A basic difference and advantage of using passive tags over active tags is that they do not require a power supply in the tag. Its generated automatically when the tag comes into the electromagnetic field of the antenna of the reader.

	Active tag	Passive tag
Tag power source	Internal to tag	Energy transferred using rf from to reader
Tag battery	Yes	No
Availability of power	Continuous	Only in the field of the reader
Required signal strength to tag	Very low	Very high
Range	Up to 100m	Up to 3-5m usually less
Multi tag reading	1000s of tags recognised up to 100mph	Few hundred within 3m of reader
Data storage	Up to 126kb read write with sophisticated search and access	128kb of read write

Table 1. Comparison between active and passive tags

#### 3. WORKING OF THE READER MODULE



Figure 1. Block diagram of the system

The basic components of an RFID system were mainly an interrogator (reader), a transponder (tag), and a coupling mechanism that defines the kind of communication link between the tag and the reader. In a RFID system is the reader sub-system. It is possible to divide an RFID reader system into two differentiated groups, namely the high frequency interface and the control system. These groups interact among each other and with an external host system.



Figure2. Transmission and reception of data to the reader

The main functions performed by a reader are demodulating the data retrieved from the tag, decoding the received data, and energizing in the case of passive and semi passive tags.



#### Figure3. Overview of the entire system

#### 4. MAJOR EXPECTED RESULTS

The RFID technology is an innovative solution to the current business process & management. It's a tool for companies to rethink the design of business process flow. It also has characteristics different from currently used barcode systems. The RFID tags cost a bit higher than the conventional barcodes. Thus tag prices have always been an issue for companies who are considering to adopt RFID. It's not created to replace the existing barcode labels but it's a tool which can provide the functionalities barcodes cant offer. It would render great importance in any institution or company once its brought into use as it only has advantages to be observed in it's functionality.

#### **5. FUTURE SCOPE**

Companies should first focus on the analytic benefits of value added services or products that the rfid technology can make but the existing barcode fails to achieve. Otherwise in terms of cost and benefit analysis to the new technology investment the option risk and success uncertainty should be taken into account.

The RFID reader that this project brings into light can be used in many applications both technical and medical, in the inventory and management fields and fields yet to be brought into large scale use.

### 6. CONCLUSION

Thus our final paper represents hardware implementation of RFID based tag reader is discussed. All the required terms and working procedures explained in the project show that with minor additions to the project it can used in the maintenance of attendance in be schools/colleges/offices, in inventory control of goods and industry products, tracking devices etc. the topic selected is a hot technology topic that is in current use in the market. It has brought about enormous progress in the event monitoring system of modern communication. The project being on a small scale can be used in small organizations and industrial level applications.

#### 7 ACKNOWLEGDEMENTS

We the students of Viva institute of technology, studying in final year of engineering in the department of Electronics are hereby obliged to present our efforts in developing the project "HARDWARE IMPLEMENTATION OF RFID READER". The success of our project on the whole does not depend on an individual student but on the creative team work of the entire group & faculty members. This would have been difficult without their support. So we acknowledge the precious guidance and help from those who willingly supported us in making this project.We are grateful to Prof.Archana Patil, H.O.D (Electronics) for giving us inspiration, timely guidance and valuable suggestions during the course of this project. We are especially thankful to Prof.Pratik Parsevar for guiding us throughout for the completion of the project.

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## **Cell Phone Operated Surveillance Robot**

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## ABSTRACT

Cell Phone Operated Surveillance Robot is basically made to operate by cell phone in order to simplify the control of robots. It is mainly focused to overcome the limited working range of wireless controlled robots which uses RF circuit. Cell phone controlled robot provides the advantages of robust control and increases the working range as large as the coverage area of the service provider.

There is not any interference with other controllers and can give up to twelve controls. It enables you to control the your robot only by pressing of your mobile key from anywhere just like that your cell phone works as remote control. Although, the Cell phone controlled robot's appearance and capabilities vary vastly. In spite of the fact all robots share the feature of a mechanical, movables structure under some form of control.

#### **General Terms**

Microprocessor - based control, Robotics and Automation system

Keywords: Cell Phone Based Microcontroller Robot

## **19. INTRODUCTION**

Conventionally, wireless-controlled robots use RF circuits, which have the drawbacks of limited working range, limited frequency range and limited control. Use of a mobile phone for robotic control can overcome these limitations. It provides the advantages of robust control, working range as large as the coverage area of the service provider, no interference with other controllers and up to twelve controls.

Surveillance, Espionage or spying involves individual obtaining information that is considered secret or confidential without the permission of the holder of the information. Spying area in military ground where enemy stay can be took before taking any action.

Our aim in building this project is to create a wireless controlled robotic vehicle which can be operated through cell phone. And wireless camera which will transmit the live pictures and videos remotely.

#### 19.1 Overview

In this paper "Cell Phone Operated Surveillance Robot", the robot is controlled by a mobile phone that makes a call to the mobile phone attached to the robot. In the course of a call, if any button is pressed, a tone corresponding to the button pressed is heard at the other end of the call. This tone is called DTMF. The robot perceives this DTMF tone with the help of the phone stacked in the robot. The received tone is processed by the microcontroller with the help of DTMF decoderMT8870. The decoder decodes the DTMF tone into its equivalent binary digit and this binary number is sent to the microcontroller. The microcontroller is programmed to take a decision for any given input and outputs its decision to motor drivers in order to drive the motors in forward direction or backward direction or turn. The mobile phone that makes a call to mobile phone stacked in the robot act as a remote. So this robotic project is not requiring the construction of receiver and transmitter units. Wireless camera is attached on the robot. This will capture the live video and transmit it. This signal will receive by RF receiver, then this signal is given to the TV tuner circuit and with help of TV tuner we are able to see live video on the PC.

#### **20. WORKING PRINCIPLE**



### 2.1 WORKING

Phone unit is to give the desired control to the decoder part. DTMF decoder is to decode the input signal to corresponding binary. Microcontroller converts the incoming binary to corresponding codes to require driving the motor driver. Motor driver amplify the input signal for driving motor. Wireless camera is used to capture live video. RF receiver to receive RF signals transmitted from wireless camera. USB TV TUNER to convert RF signal into signal compatible to pc.

In order to control the robot, you need to make a call to the cell phone attached to the robot (through headphone) from any phone, which sends DTMF tunes on pressing the numeric buttons. The cell phone in the robot is kept in 'auto answer' mode. (If the mobile does not have the auto answering facility ,receive the call by 'OK' key on the rover connected mobile and then made it in hands-free mode.) So after a ring, the cell phone accepts the call. Now you may press any button on your mobile to perform actions as listed in the table. The DTMF tones thus produced are received by the cell phone in the robot. These tones are fed to the circuit by headset of the cell phone. The MT8870 decodes the received tone and sends the equivalent binary number to the microcontroller. According to the program in the microcontroller, the robot starts moving, When you press key '2' (binary equivalent 00000010) on your mobile phone, the microcontroller outputs '10001001' binary equivalent. Port pins P0.0, P0.3 and P0.7 are high. The high output at P0.7 of the microcontroller drives the motor driver (L293D) port pins P0.0 and P0.3 drive motors M1 and M2 in forward direction( as per table 2.a).Similarly, motors M1 and M2 move for left turn, right turn, backward motion and stop condition as per table 1.

**Table No 1 Motion Control of Motor** 

Output from decoder	Output from microcontroller	Controlling action
0010	89h	forward
0100	85h	Left turn
0110	8ah	Right turn
1000	86h	Backward
0101	00h	stop

#### 2.2 FLOWCHART





#### 2.3 Device Discription:

#### Microcontroller (at89c51)

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density non volatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non volatile memory By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

#### Features:

- Compatible with MCS-51<sup>™</sup> Products
- 4K Bytes of In-System Reprogrammable Flash Memory Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-level Program Memory Lock
- 128 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-bit Timer/Counters
- · Six Interrupt Sources
- Programmable Serial Channel
- · Low-power Idle and Power-down Modes

#### Decoder (MT8870):

The MT8870 is a complete DTMF receiver integrating both the band -split filter and digital decoder functions. The filter section uses switched capacitor techniques for high and low group filters; the decoder uses digital counting techniques to detect and decode all 16 DTMF tone-pairs into a 4-bit code. External component count is minimized by on chip provision of a differential input amplifier, clock oscillator and latched three-state bus interface. It receives DTMF tones and generates 4-bit digital output corresponding to received DTMF signal of digits 0 - 9 and other signals (like \*, # etc) also.

 Table No 2 DTMF Data Output

Low	High	Digit	OE	P0.3	P0.2	P0.1	P0.0
group	group						
697	1209	1	Н	L	L	L	Н
697	1336	2	Н	L	L	Н	L
697	1477	3	Н	L	L	Н	Н
770	1209	4	Н	L	Н	L	L
770	1336	5	Н	L	Н	L	Н
770	1477	6	Н	L	Н	Н	L
852	1209	7	Н	L	Н	Н	Н
852	1336	8	Н	Н	L	L	L
852	1477	9	Н	Н	L	L	Н
941	1336	0	Н	Н	L	Н	L
941	1209	*	Н	Н	L	Н	Н
941	1477	#	Н	Н	Н	L	L
697	1633	А	Н	Н	Н	L	Н
770	1633	В	Н	Н	Н	Н	L
852	1633	С	Н	Н	Н	Н	Н
941	1633	D	Н	L	L	L	L
		ANY	L	Ζ	Ζ	Ζ	Ζ

#### Motor Driver IC(L293D):

The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide Bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other highcurrent/high voltage loads in positive-supply applications. All inputs are TTL compatible. Each output is a complete totempole drive circuit, with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN.When an enable input is high, the associated drivers are enabled and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications.

#### 2.4 Design methodology Software used:

Keil: It is used to convert the C language program into Hex language.

EAGLE 6.02 (for designing PCB): EAGLE contains a schematic editor, for designing circuit diagrams. This can be converted into PCB layout.

TV home media3: This software is used for live streaming of video captured through camera directly on pc.

#### 21. MAJOR EXPECTED RESULT

Robot vehicle should get operated through cell phone. The signal receive from mobile is process by DTMF decoder, and microcontroller will perform controlling action.

Wireless camera will transmit the live pictures and videos remotely to pc.

#### 22. FUTURE SCOPE

This elementary Robot can be used in hazardous environments like working in the Deep Ocean, and space exploration. Also it can be used on Human Restricted areas like: Land Mines Blast Furnace It can be used as a load carrying Vehicle controlled by mobile phone from remote place. It can be used in industries for multipurpose function by modifying the design accordingly it also lets you to operate your home appliances like light and water pump from your office or any other remote place.

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## **Solar Powered Agribot**

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#### ABSTRACT

This paper discusses and gives information about a theoretical solar-energy powered autonomous agricultural robotic-system which can greatly reduce the cost-of-production of bio-fuel feedstock as well as that of cash-crops and food-crops after its deployment. The Agribot, if produced on a commercial scale, will be as affordable as a tractor, and it will ensure less wastage and manpower, coupled with the solar powered energy panels, the cost of food production will fall drastically.

The purpose of the aforementioned robotic-system is to automate the process of crop-cultivation and maintenance as much as possible using eco-friendly methods. Although it would require initial-investment but it would be worth it because it would be a self-sufficient system in terms of labor and energy, thus greatly reducing cost of producing any type of crop.

### **Keywords**

Solar tracking and trapping, Microcontrollers, RF technology

#### **25. INTRODUCTION**

#### **Importance of project**

As our country has a very high solar incidence rate, one of the largest in Asia, it is important to use most of this clean energy in the reduction of our energy deficit and emissions of greenhouse gases. Harnessing this energy for farming on which 60% of Indians rely as an occupation provides an insight on how important this project is.

Solar energy is an unlimited supply and nonpolluting source; solar power is being moderately used compared to hydro and Wind power. This can be attributed to the low conversion efficiency of solar cells and high cost. There are two ways for maximizing the rate of useful energy; optimizing the conversion to the absorber level by properly choosing the absorber materials, and increasing the incident radiation rate by using tracking systems [1].

#### Motivation

This chapter describes the driving factors behind this research. Writing in issue 2888 of New Scientist, James Mitchell Crow introduced to the notion that robots will, sooner or later, be tending the crops we depend upon for food, discussing about the energetics of cultivation, saying "Why do we plough? Mainly to repair the damage that we have caused with big tractors. Up to 80 per cent of the energy going into cultivation is there to repair this damage." He proposes an altogether different approach, using light-weight and autonomous machines called Agribots.

The application of field robotics to agriculture is an emerging area of interest for our researchers. The increasing demands on our agricultural sector are forcing farmers to consider robotic assistance where before they worked alone. It is hoped that this generation of farm robots will be more aware of their immediate surroundings and will be capable of navigating autonomously. Unlike field robotics in other domains such as mining or the military (where safety and the removal of people from hazardous situations is a major driver), agricultural robotics will only make sense when the business case means that using robots will save money when compared to farming in a traditional manner.

#### 26. RELATED THEORY

- 1. **Switches:** It is used to control the field operations which are handled by Farmer. By pressing the switches he can ON /OFF the system and can control the field related work.
- 2. Encoder: HT12E is an encoder integrated circuit of 2<sup>12</sup> series of encoders. HT12E converts the parallel inputs into serial output. It encodes the 12 bit parallel data into serial for transmission through an RF transmitter. These 12 bits are divided into 8 address bits and 4 data bits. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data-format.

**Tx Module/Rx Module:** The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK).RF module

comprises of an RF Transmitter and an RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps.The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.











**BLOCK DIAGRAM** 

#### Fig 3: Field side control

- 3. **Microcontroller**: Microcontroller is low power, high performance 8bit CMOS microcomputer with 4kb of EPROM. Signal from every sensors or detectors is applied to the microcontroller for processing. Microcontroller gives the corresponding signal to every respected block for operations.
- 4. **Decoder**: HT12D is a decoder integrated circuit that belongs to 212 series of decoders. HT12D converts the serial input into parallel outputs. It decodes the serial addresses and data received by, say, an RF receiver, into parallel data and sends them to output data pins. The serial input data is compared with the local addresses three times continuously. The input data code is decoded when no error or unmatched codes are found. HT12D is capable of decoding 12 bits, of which 8 are addresse bits and 4 are data bits. The data on 4 bit latch type output pins remain unchanged until new is received.
- 5. .Motor Driver1, 2: This block takes various commands from the Micro controller and gives commands to the different motors that will run the device. Basically this block will drive the whole assembly of motors. Motor driver 1st is used to drive the base vehicle, 2nd for seeding and harrowing for field operation.
- 6. ADC: CMOS 8-bit successive approximation A/D converters that use a differential potentiometric ladder. ADC appear like memory locations or I/O ports to the microprocessor and no interfacing logic is needed. Since the output of current transformer is analog an 8-bit Analog to digital convertor is used in order to make the data readable for microcontroller to process.
- 7. **Buzzer:** It is used to give the notification to the farmer about the emergency or any problem occurred in the field.
- 8. **Solar Panel Tracking System:** Solar Panel is used for converting Sunlight energy into electrical energy. It is used to capture the sunlight and can use as electric signal for running the system in the field. This overcomes the battery backup setup in the system. Depending upon the position of the solar panel will change its alignment.[1]

- 9. **Relay Circuit:** It is used to switch to the pump for sprinkling the water as by given signal from microcontroller.
- 10. **Pump:** It is used for sprinkle the water for irrigation.
- 11. **IR Sensors:** It is used to detect any intruder (unauthorized person) who is coming into the field. This will after sensing sent to the microcontroller. The microcontroller will send the notification to farmer and will ring the buzzer.

#### **27. ACKNOWLEDGMENTS**

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### 4. Expected Results

The solar powered agribot will be able to:

- Plough
- Seed
- Detect moisture level and start irrigation
- Detect unauthorized person with help of IR sensor
- Solar tracking and trapping

### 5. CONCLUSION

This paper provides a broad-overview about the idea of the device. Solar powered robot in agricultural field will harness the solar energy and will be used for agriculture purposes in a unique and innovative way The AGRIBOT, if produced on a commercial scale, will be as affordable as a tractor, and it will ensure less wastage and manpower, coupled with the solar powered energy panels, the cost of food production will fall drastically.

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## **BARCODE RECOGNITION & CIRCUIT DETECTION**

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## ABSTRACT

Automated inspection of electronic circuits is a requirement to assure quality and to reduce manufacturing scrap costs and rework. There are many tasks such as barcode recognition, locating and identifying multiple objects in images used for circuit inspection. Component placement errors such as missing, misaligned components are a major cause of defects and need to be detected before and after the solder reflow process. Because circuit components are manufactured in high quantity and are small, human inspection is tedious and time

## **28. INTRODUCTION**

Our project barcode recognition & circuit detection is to analysis the circuit whether it is implemented as per database and check details related PCB.

It identify the difference between the database i.e. Sample & the duplicate copies produce by the machine by image segmentation based on discontinuation techniques

It performs the following operation using:

1. Image segmentation technique - Edge detection

- 2. Histogram equalization
- 3. Barcode Recognition

It is important to analysis the finished PCB to identify any flaws or mistake to avoid malfunctioning of the product & give proper output as per requirement.

Image processing involves changing the nature of an image in order to either,

1. Improve its pictorial information for human interpretation

2. Render it more suitable for autonomous machine perception

We shall be concerned with digital image processing, which involves using a computer to change the nature of a digital image. It is necessary to realize that these two aspects represent two separate but equal important aspects of image processing. consumes. Vision systems, on the other hand, can be used robustly to perform such tasks.

This project focuses on automated object-identification and barcode-recognition techniques using image processing live video acquisition. The work uses the edge detection and histogram equalization approach.

#### Keyword

Barcode, edge detection, image processing

## 29. FLOW CHART

### 29.1 FOR BARCODE ANALYSIS



## 29.3 FOR CIRCUIT ANALYSIS



#### 29.4 FOR CONTINUTY ANALYSIS



## 29.5 ALGORITHM

- 1. Take Image
- 2. ave image
- 3. Select frame
- 4 .Save it as image
- 5. Select region of interest (barcode or circuit)

#### If Barcode:

- 1. Apply edge detection
- 2 .Apply histogram equalization
- 3. Use the result
- 4. Detect barcode
- 5. Decode it

#### If Circuit:

- 1. Apply edge detection
- 2. Apply histogram equalization
- 3. Use the result and compare it to database
- 4. Do matching
- 5. Detect number of components

## 30. EXPECTED RESULTS

Grey scale









Subtracted Image

Original Image

Image with defects



## Edge detection







Fig. 1: Original image

Fig.2 Sobel

Fig.3 Prewitt

#### **31. CONCLUSION**

We will be implementing barcode recognition & perform circuit detection using matlab with help of above algorithm.

Circuit analysis using image processing provides us complete information about the circuit, its components, and its continuity.

#### **32. ACKNOWLEDGMENTS**

We are extremely delighted for getting an opportunity to express our gratitude for all those good souls who were more than guiding stars in helping us to complete the project. Our first and foremost thanks goes to Viva college of Engineering and our professors from whom we have learnt a lot. We are deeply indebted to our principal Dr. Arun Kumar, our HOD and our project guide Prof. Archana Ingle and our mentor Prof. Madhura Tilak. Their valuable feedback helped us tremendously to improve our project in many ways. The infectious chain of gratitude would be far from complete without our friends who were with us through the difficult times and who taught us many things that matter in improving our project

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## **BUS MONITORING SYSTEM**

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### ABSTRACT

In this project we present a novel approach to manage the bus transportation using RF module. This project focuses on how RF wireless technology can be used to solve problems faced by public transport in metropolitan cities of the country. A particular case study of BEST (A public bus transportation system of Mumbai) is presented. The proposed system can monitor bus traffic inside spacious bus stations, and can inform administrators whether the bus is arriving on time, early or late, also it would provide feedback via GSM. This information is then displayed on the different wireless displays inside the bus and outside the bus station. In this report we have explained the block schematics for the same. Also a detailed circuit with designing is provided. Testing methods for the completed prototype is discussed. Details for installation of the completed unit are given.

### **Keywords**

Bus monitoring system using RF, Centralized control for bus, Feedback in transportation system using GSM, Computerized monitoring, Transportation.

### **34. INTRODUCTION**

BEST BUS is one of the main major public transport systems in Mumbai. As of 2013, the BEST runs a total of 3,480 buses, ferrying 4.5 million passengers over 365 routes, and has a workforce strength of 38,000, which includes 22,000 bus drivers and conductors (this comes to an average of 11.2 employees per bus).

The main thing needed for the efficiency of public transport is monitoring. We can say that railways are monitored properly, but it's not the same in case of the BEST buses. The population traveling via BEST buses is more or less same as that of railways, so through our project we are trying to manage the proper monitoring of the network of the buses in our city.

The main problem BEST is facing a monitoring system across the city. The main requirement of monitoring system is to manage the bus network in traffic system and in less peak network. We can get feedback from the passengers to vary frequency of buses. Also there will be an annunciation system on bus stop to display the time remaining for arrival at a particular stop. "Bus monitoring system" is a centralized monitoring system through PC, annunciation system inside the bus which will announce next bus stop and display on bus stop to indicate time remaining for next bus to arrive. Throughout project we are monitoring the whole bus network across the city in a more simplified manner.

This system also proves to be of social help to those who are visually challenged. It is more efficient cost wise as well as it is beneficial for the daily travelers to know the exact time and location of the buses. This "Bus Monitoring System" if implemented can make the road journey for daily travelers a better experience.

## **35. BLOCK DIAGRAM**



Fig 1 : Block Diagram

#### **36. WORKING**

The above diagram shows the block diagram of project. Here it is divided into BUS, Bus Stop, and PC.

When bus reaches at the bus stop IR transmitter receiver pair in the bus sense the signal and then provide signal to the microcontroller indicating that now transmit the signal. Then RF transmitter present in the bus transmits the data (bus number) and announces the present and next bus stop name. Also there will be display of bus stop name.

When bus reaches at the bus stop IR transmitter receiver pair on the bus stop will sense the signal and provide the signal to the microcontroller indicating enable receiving. Then RF receiver receives the transmitted data. After receiving data bus stop displays that bus number.

This bus number is then transmitted to next bus stand through a wired link. Thus depending upon the data send by previous bus stop the LCD will display the time required for the bus to arrive. Thus each and every bus stand is connected to each other through wire medium and the entire bus stands are connected to PC for monitoring purpose.

Pc is our central unit. In central unit there is a display of each bus number and all bus stop names from where bus passes. If any user send a request for the bus location then GSM system will send the message to that user about the last bus stop attend by the bus.

### **37. COMPONENTS REQUIRED**

- 1) Microcontroller
- 2) RF Transmitter and Receiver Module
- 3) Encoder/decoder
- 4) IR Sensors
- 5) Serial communication with PC(RS 232)
- 6) pc/laptop
- 7) Power Supply
- 8) GSM

## **5. COMPONENT DETAILS**

#### 5.1 MICROCONTROLLER 89S52:

This controller has following features:

8K Bytes of In-System Programmable (ISP) Flash Memory
4.0V to 5.5V Operating Range
Fully Static Operation: 0 Hz to 33 MHz
Three-level Program Memory Lock
256 x 8-bit Internal RAM
32 Programmable I/O Lines
Three 16-bit Timer/Counters
Eight Interrupt Sources
Full Duplex UART Serial Channel
Low-power Idle and Power-down Modes
Interrupt Recovery from Power-down Mode
Watchdog Timer
Dual Data Pointer
Power-off Flag

#### 5.2 RF MODULE

For wireless communication between bus and bus stop we are using RF transmitter on the bus and RF receiver on the bus stop. In the bus we are using TWS-434 transmitter, and on the bus stop we are using RWS-434 receiver

The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier

wave. This kind of modulation is known as Amplitude Shift Keying (ASK).

This RF module comprises of an RF Transmitter and an RF Receiver. The transmitter/receiver pair operates at a frequency of 434 MHz An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

#### 5.3 ENCODER (HT12E)

HT12E is an encoder integrated circuit of  $2^{12}$  series of encoders. They are paired with  $2^{12}$  series of decoders for use in remote control system applications. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data format.

HT12E converts the parallel inputs into serial output. It encodes the 12 bit parallel data into serial for transmission through an RF transmitter. These 12 bits are divided into 8 address bits and 4 data bits.

#### 5.4 DECODER (HT12D)

HT12D is a decoder integrated circuit that belongs to  $2^{12}$  series of decoders. This series of decoders are mainly used for remote control system applications, like burglar alarm, car door controller, security system etc. It is mainly provided to interface RF and infrared circuits. They are paired with  $2^{12}$ series of encoders. The chosen pair of encoder/decoder should have same number of addresses and data format.

HT12D converts the serial input into parallel outputs. It decodes the serial addresses and data received by, say, an RF receiver, into parallel data and sends them to output data pins. The serial input data is compared with the local addresses three times continuously. The input data code is decoded when no error or unmatched codes are found. A valid transmission in indicated by a high signal at VT pin.

#### 5.5 POWER SUPPLY

We are using +9v and +5v dc power supply. The main function of this block is to provide the requirement amount of voltage to essential circuits.

#### 5.6 MAX 232

We are using MAX232 driver to convert TTL voltage levels into CMOS voltage levels.

#### 5.7 IR SENSORS

In our project we are using IR sensors on the bus and bus stop to provide signal to the microcontroller when bus arrive at the bus stop.

#### **38. EXPECTED RESULTS**

After the implementation, following results are expected-

1. When the bus reaches to the bus stop there will be an indication & announcement inside the bus about the name of present and next stop.

2. At bus stop there will be indication of bus no. which has arrived and next bus arriving.

3. Expected time. (Time required for bus to arrive)

4. In bus head office there will be detailed information about location of each bus. Reply from head office about the location of bus using GSM if requested.

## **39. ACKNOWLEDGEMENT**

It is always a difficult job to acknowledge all those who have been of tremendous help in the development of our project. In spite of that, we honestly thank all those who had put in tremendous efforts in guiding & helping us to successfully build this project. I take this opportunity to thank our honorable Principal, Dr. Arun Kumar, for his unfailing cooperation and support. I express my sincere gratitude to Mrs. Archana Ingle, H.O.D of Electronics engineering our Project guide for their valuable guidance throughout, without which the project would not have stood its ground as it has now. I sincerely thank Electronics Engineering department for giving me the opportunity to put forward this concept to the real world. A sincere quote of thanks to our lab and Library assistants for providing me all the information, we needed for the project. I would even like to thank our classmates who have directly or indirectly helped us with the making of project and I hereby deliver sincere thanks to them for their support.

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## **Spinning LED Display Using Microcontroller**

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## ABSTRACT

In present day scenario the displays that are used have a large number of LED's which require large power to drive them as compared to drive a single LED. So we will use less LED's and try to reduce the power consumption. The purpose of this project is to design and to create a persistence of vision (POV) display. This display will allow users to upload an image to be displayed through wireless communication. A persistence of vision (POV) refers the phenomenon of the human eye in which an after image exists for a brief time (10ms). A persistence of vision (POV) display exploits this phenomena by spinning a one dimensional row of LED's through a two dimensional space at such a high frequency that a two dimensional display is visible. In our case, we will create a circular display by spinning a column of LED's around a central motor shaft. The rotational speed of the LED's is fast enough such that the human eye perceives a two dimensional image.

### Keywords

Persistence of Vision, LED, DC servo motor, Voltage Regulator, Visual Basics

## 1. INTRODUCTION

The goal of our project is to design a prototype of an enlarged version of the Spinning LED display for displaying message. After studying various techniques like matrix LED's, rolling displays,etc. which are also techniques of displaying message at the high cost, therefore we choose spinning led display, an emerging technology applied for displaying message. The display consists of 7 LEDs only in a vertical row. By moving them fast enough on a circular path with the help of a DC motor, message can be displayed which appears to be Vinita Solanki Final year student of Electronics and Telecommunication from Viva Institute of Technology vntsolanki8@gmail.c om

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generated by a 7\*n matrix of LEDs and not a single column of LEDs, where n is the no. of columns of the display matrix. A quickly moving light source appears to be in many places at one time. If it's continuously ON, we see a solid line. If it's flashing, we see a line of dots. This phenomenon can be thought of as the brain having a limited "frame rate". We only think we're seeing fluid motion around us because the brain is so good at piecing bits of data into continuous images and stories.

This is the basic principle of our Project named as '**Spinning LED Display Using Microcontroller**'.

The Spinning LED display has been a project that has evolved from a simple design on paper to a complex functional prototype. The basic concepts of the project were to:

- a) Design and build a spinning led display using communication system.
- b) Program the controller using serial communication.
- c) The microcontroller also controls multiple LEDs to display messages and/or patterns.

The messages and commands can then be transmitted to a device that is capable of displaying messages or patterns using 7 light emitting diodes (LED).[1]

To accomplish this, we first have to design and build the hardware components. The hardware mostly consists of a spinning wood platform, a DC motor, LEDs, any other circuitry (including the microcontroller). The code itself uses a modified version of the 7x5 ASCII character set included in a prior lab to create a message across the spinning wood Platform. With precise timing of the angular velocity of the platform, an individual byte of data (containing either ON or OFF for each LED) can be sent at the appropriate time so that a visible message appears. Also included in the code is the ability for the user to decide the color of the message (red, blue, green or any combination of these three) and the characters included in the message.

#### 2. What is POV?

The concept of POV is taken from the fact that the human eye has the storing capacity. This arises from the fact that the sensation produced when the nerves of the eye's retina are stimulated by incident light does not cease immediately after the light is removed but persists for about  $1/16^{\text{th}}$  of a second. Thus if the scanning rate per second is made greater than 16, or the number of pictures shown per second is more than 16, the eye is able to integrate the changing levels of brightness in scenes. So when picture elements are scanned rapidly enough, they appear to the eye as a complete picture unit with none of the individual elements visible separately. [3]

## 2.1 RGB LED



Fig . 2.1 LED

Like a normal <u>diode</u>, the LED consists of a chip of semiconducting material <u>doped</u> with impurities to create a <u>p-n</u> <u>junction</u>. As in other diodes, current flows easily from the pside, or <u>anode</u>, to the n-side, or <u>cathode</u>, but not in the reverse direction. Charge-carriers—<u>electrons</u> and <u>holes</u>—flow into the junction from <u>electrodes</u> with different voltages. When an electron meets a hole, it falls into a lower <u>energy level</u>, and releases <u>energy</u> in the form of a <u>photon</u>.

The <u>wavelength</u> of the light emitted, and thus its color, depends on the <u>band gap</u> energy of the materials forming the p-n junction. In <u>silicon</u> or <u>germanium</u> diodes, the electrons and holes recombine by a non-radiative transition which produces no optical emission, because these are <u>indirect band gap</u> materials. The materials used for the LED have a <u>direct band gap</u> with energies corresponding to near-infrared, visible or near-ultraviolet light.

LED development began with infrared and red devices made with <u>gallium arsenide</u>. Advances in <u>materials</u> <u>science</u> have enabled making devices with ever-shorter wavelengths, emitting light in a variety of colors.

#### 2.2 Survey of DC MOTORS

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.



Fig. 2.2 Motor diagram

In a simple 2-pole DC electric motor, as shown above (here red (right side) represents a magnet or winding with a "North" polarization, while green (left side) represents a magnet or winding with a "South" polarization).

Every DC motor has six basic parts axle, rotor (a.k.a., armature), stator, commutator, field magnet(s), and brushes. In most common DC motors (and all that Beamers will see), the external magnetic field is produced by highstrength permanent magnets.

The stator is the stationary part of the motor this includes the motor casing, as well as two or more permanent magnet pole pieces. The rotor (together with the axle and attached commutator) rotates with respect to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the commutator. The above diagram shows a common motor layout with the rotor inside the stator (field) magnets.

### 3. Spinning LED Display

The display consists of 7 LEDs only in a vertical row. By moving them fast enough back and forth over each other, message can be displayed which appears to be generated by a 7\*n matrix of LEDs and not a single column of LEDs, where n is the no. of columns of the display matrix.



Fig. 3.1 Block Diagram

#### **Explanation:**

PC: -

From PC we are sending the message we want to display through Serial communication to microcontroller serial port. PC will convert the message in appropriate form and give signal to Microcontroller to display the signal on LED's.

#### Microcontroller: -

Microcontroller will drive the LED's and motor according to sequence generated by the PC.

#### LED: -

Ultra bright RGB LED is used for the better message display.

#### Motor: -

DC motor will be using to spin the LED at faster rate to perceive continuous message on the principal of persistence of vision.

## **3.1 Working Principle**

The project is a rotating LED display message display system which displays messages Programmed in microcontroller or Wireless communication (Radio frequency) using parallel port is the transfer of information over a distance without the use of electrical conductors or "wires". In RF there is user input for the system. We display the message using 7 LED"s .This is done by building 2 different parts first is mechanical part (use for rotating whole circuit) and second is Electrical part (deals with microcontroller and other electronics). In this the different messages will scroll, with respective intervals or delay by the microcontroller itself which is already programmed by the user. The code is written using software visual basic. This circuit needs to be mounted on the mechanical structure (rotating disc) where it displays the messages .The disc is rotating using DC motor with the speed of 1500rpm , the motor speed is kept constant .There are sensor and obstacle attached at the base of the disk and the base stand respectively that will help to detect one complete rotation of 360°. The message can be changed as per user needs by rewriting the microcontroller in built memory or through RF via sending wireless data through pc. The complete display system circuit is battery- run on 9v, Dc motor works on 9v and current of 3 mA. This unique way of displaying messages is a very eye catching, for it is use in many fields like advertising, toys etc.

# 4. Hardware and software requirements

Following Hardware and software we are using in our project:

#### 4.1 Microcontroller

The 8051 architecture provides many functions (<u>CPU</u>, <u>RAM</u>, <u>ROM</u>, <u>I/O</u>, <u>interrupt</u> logic, <u>timer</u>, etc.) in a single <u>package</u>

8-<u>bitALU</u> and <u>Accumulator</u>, 8-bit <u>Registers</u> (one <u>16-bit</u> register with mainly an <u>8-bitmicrocontroller</u>

Boolean processor with 17 instructions, 1-bit accumulator, 32 registers (4 bit addressable 8-bit) and up to 144 special 1-bit addressable RAM variables (18 bit addressable 8-bit)<sup>[3]</sup>

Multiply, divide and compare instructions

4 fast <u>switchable register banks</u> with 8 registers each (<u>memory</u> <u>mapped</u>)

address bus/program counter/data pointer and related 8/11/16bit operations; hence it is

(65536 locations) each of RAM and ROM

128 bytes of on-chip RAM (IRAM)

4 <u>KiB</u> of on-chip ROM, with a 16-bit (64 KiB) address space (PMEM). Not included on 803X variants

Four 8-bit bi-directional input/output port

UART (serial port)

Two 16-bit Counter/timers

Power saving mode (on some derivatives)

Fast interrupt with optional register bank switching

Interrupts and threads with selectable priority<sup>[4]</sup>

Dual 16-bit <u>address bus</u> – It can access 2 x  $2^{16}$  memory locations – 64 <u>kB</u> special <u>move instructions</u>), 8-bit data bus and 2x16-bit

## SM TX – 433 AM / ASK Transmitter Module



Fig. 4.2 Transmitter Module

### **KEY FEATURES**

Frequency: 433.92 MHz

5-12V Single Supply Operational

OOK / ASK Data Format

Up to 9.6 kbps data rate

4 Pin compact size module

+ 5 dbm out put power (12V, Vcc)

## 4.2 SM RX – 433 Receiver Module



Fig. 4.3 Receiver Module

#### FEATURES

#### Miniature Size

Wide Operating Range

Low Power Consumption

Improved Data Transmission

No Alignment Required

No External Components PIN Configuration and Size

Wide Range of Application

Analogue and Digital Output

## 4.3 LM7805 Series Voltage Regulators





**VOLTAGE REGULATOR**: A voltage regulator is an <u>electrical regulator</u> designed to automatically maintain a constant <u>voltage</u> level. It may use an electromechanical mechanism, or passive or active electronic components. Depending on the design, it may be used to regulate one or more <u>AC</u> or <u>DC</u> voltages. With the exception of shunt regulators, all voltage regulators operate by comparing the actual output voltage to some internal fixed reference voltage. Any difference is amplified and used to control the regulation element. This forms a <u>negative feedback servo control loop</u>. If the output voltage is too low, the regulation element is commanded to produce a higher voltage. If the output voltage is too high, the regulation element is commanded to produce a lower voltage. In this way, the output voltage is held roughly constant.

#### FEATURES

- Output current in excess of 1A
- Internal thermal overload protection
- No external components required
- Output transistor safe area protection
- Internal short circuit current limit
- Available in the aluminum TO-3 package
#### 4.4 Important GUI tools

It gives an overview of the design methodology and different GUI tools like keil IDE, Visual Basics, eagle for PCB making.

# 4.5 Software requirements

The Software used for programming is Keil. It provides a broad range of development tools like <u>ANSI</u> compiler, <u>macro assemblers</u>, <u>debuggers</u> and simulators, <u>linkers</u>, <u>IDE</u>, library managers, <u>real-time operating systems</u> and <u>evaluation boards</u> for 8051, 251, <u>ARM</u> families.[5]

# **4.6 Visual Basics**

Visual Basic was designed to accommodate beginner programmers. Programmers can not only create simple <u>GUI</u> applications, but to also develop complex applications. Programming in VB is a combination of visually arranging <u>components</u> or <u>controls</u> on a <u>form</u>, specifying attributes and actions for those components, and writing additional lines of <u>code</u> for more functionality. Since VB defines default attributes and actions for the components, a programmer can develop a simple program without writing much code. Programs built with earlier versions suffered performance problems, but faster computers and native code compilation has made this less of an issue.

# 5. Expected results

This project helps us to display the information in attractive multiple colors in 360° view. The total power utilization is about 3mW.Also, less number of LED's is required to display the message.

We will be successfully able to spin a one dimensional array of LED's through a two dimensional space at a high enough frequency such that display can be seen .We will successfully communicate to the spinning LED onboard microcontroller to update the display and change any of the pixels at any of the time.

# 6. Conclusion

This energy saving display system employe a single column of multi-color LED"s, rotating a high enough speed to be indistinguishable for human eye. Hence the display will appear to be constantly illuminated and brilliant color image can be seen from any angle of view. After completing the process of implementation of both hardware and software, followed by a rigorous testing phase, we can conclude that the spinning LED display appropriately display a visible message without blurs, flickering, or delays once the motor reached desired speed. Allowing a programmable message and the ability to designate color .Thus we can say that spinning LED display system using radio frequency as mode of communication will have an efficient and satisfying display quality compared to tradition dot matrix LED scrolling text systems.

# 7. Acknowledgments

It is always a difficult job to acknowledge all those who have been of tremendous help in the development of our project. In spite of that, we honestly thank all those who had put in tremendous efforts in guiding & helping us to successfully build this project. I take this opportunity to thank our honorable Principal, **Mr Arun Kumar**, for his unfailing cooperation and support.

I express my sincere gratitude to **Mrs Archana Ingle**, H.O.D – Department of Electronics and Telecommunication and our Project guide **Mrs Dipti Kale** and **Mrs Chitra Takle** coguide for their valuable guidance throughout, without which the project would not have stood its ground as it has now.

I sincerely thank Electronics and Telecommunication department for giving me the opportunity to put forward this concept to the real world. A sincere quote of thanks to our lab and Library assistants for providing me all the information, we needed for the project.

I would even like to thank our classmates who have directly or indirectly helped us with the making of project and I hereby deliver sincere thanks to them for their support.

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# **RF ENABLED SPEED LIMITING DEVICE**

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# ABSTRACT

As the days of manned driving are getting extremely numbered, so are those of traffic jams, dangerous and rough drivers and more importantly, accidents. So the idea of "Highway Speed Limiting& Automatic Breaking System", in which not only alert about particular speed limit into particular zone will be given to driver, but also car will not be allowed to drive above the specified means by the means of Automatic breaking system. Also for no horn areas along with the alert, horn will be automatically deactivated, which makes user to obey the rules automatically. The Radio Frequency band is available free for educational purpose so it is preferred over GPS technology. This idea uses RF transmitter-receiver modules.

# **Keywords**

Radio Frequency (RF), automatic breaking system, RF transmitter receiver.

# 41. INTRODUCTION

(Radio waves); this is the basis of radio The energy in an RF current can radiate off a conductor into space as electromagnetic waves technology. Radio Frequency (RF) transmission uses radio waves like radio or television signals to transmit audio via a carrier from a transmitter to a receiver. Like a radio station transmitter the transmitter has an antenna usually attached to the transmitter. From one of the papers decision was taken to work on speed controlling device [1].In paper [2] the idea of controlling speed got introduced. Authors in [3] [4] have used RFID which gave us the idea of using RF technology.Research has found that that, in urban areas, the risk of a casualty crash is doubled for each 5km/h over the limit. So travelling at 70km/h in a 60km/h zone quadruples the risk of a crash in which someone is hospitalized. As a result, it is estimated that about 10% of casualties could be prevented if the large group of motorists who routinely travel at up to 10km/h over the limit were encouraged to obey the speed limits. Savings in fatal crashes would be larger.

"Minor" speeding therefore makes up a large proportion of preventable road trauma.

The initial concept of limiting the vehicles with other idea has been started in some countries. The ISA- Intelligent Speed Adaptation devices in Sydney since mid-2006 are in use according to the survey. Some road safety researchers are surprised that Australia is leading the world with this technology. [5]

There are various classifications of speed limiting devices as follows:

- Speed limitation devices assist the driver in not exceeding a specified or selected speed, which is generally the posted speed limit for the section of road being driven along.
- Top-speed limiting prevents the vehicle for exceeding a set speed. Most modern vehicle engine management systems have a top speed setting but it is usually well in excess of maximum national speed limits and could not be regarded as a safety device.
- Speed alarm set by the driver alerts the driver if a selected speed is exceeded. Some production vehicles have this feature (e g Holden Commodore).
- Speed limiter set by driver prevents the vehicles from exceeding the selected speed, except for temporary over-ride situations. A few production vehicle models have this feature. These are also known as "Adjustable Speed Limitation Function" (ASLF).

# 42. DESCRIPTION

A Radio frequency is any frequency within the electromagnetic spectrum associated with radio wave propagation. When an RF current is supplied to an antenna, an electromagnetic field is created that then is able to propagate through space. Many wireless technologies are based on RF field propagation.

It comprise of a transmitter which includes 434MHz transmitter module which is a free band provided by the government for the educational purpose. The transmitter will be set up on this frequency. The encoder HT12E plays a major role to tackle the transmitter. This transmitter keeps on transmitting the signal to the vehicles passing by. This will help indicating the driver that now he has to slow down the speed as per requirement. The receiver of the project would be placed in the vehicles wherein the microcontroller and the decoder plays a vital role. Four switches which could be operated by traffic cops, limit 80, limit40, limit20 and no horn

area, are provided whenever these switches are pressed, they will transmit the corresponding alert message to the driver.

Receiver section which contains a 2X16 lcd, which will display the alert message and Buzzer to warn the driver that he is exceeding the allotted speed limit. Motor driver is being used for automatic break and one relay to disable horn in the no horn area. Current speed of the vehicle will be determined by the LED and photodiode detection technique.

Precisely if the vehicle is travelling in silence and no horn zone then the circuit will initially warn the driver to control the speed and if the driver happens to ignore the warning then the vehicle would be stopped immediately or else if the driver is constantly blowing the horn in specifically that zone then the horn will be disabled at that instant of time.

# 43. WORKING

### 43.1 Transmitter

This band is a free band allotted for educational purpose. An antenna is connected to this transmitter module which will help in transmitting the signal to the receiver section encoder HT12E. The main objective of selecting this encoder is that it is easily feasible and it fulfils the requirement. The input in 0 and 1 is given through the program in order to limit the speed of the vehicle.

#### 43.2 Receiver

As RF band is used in transmitter so there is the use in the receiver. The antenna will here receive the signal from the transmitter. From the decoder the decoder is now connected to the microcontroller AT89S52. The selection of microcontroller is because it is cost efficient and the size of the ROM is doubled which will help us adding more features in future.

# 43.3 DC motor

The 12v DC motor is connected to the microcontroller through the motor driver L293DF in the car. This motor is fixed in the vehicle to direct the wheel for deciding whether to move clockwise or anticlockwise or to stop, depending on the situation.

### 43.4 Buzzer

Further the buzzer is connected to the microcontroller through buzzer driver. The function of the buzzer is that it will blow when speed of the vehicle exceeds the restricted speed.

#### 43.5 Relay

Relay too is connected to microcontroller through relay driver. Relay is an electromechanical switch. It is similar to the buzzer.

But here the horn is disabled if the relay is short circuit and if open circuit then horn is active.

# 43.6 LCD display

A 2\*16 character LCD is used to display the output

### 44. BLOCK DAIGRAM

Place Tables/Figures/Images in text as close to the reference as possible (see Figure 1). It may extend across both columns to a maximum width of 17.78 cm (7").

Captions should be Times New Roman 9-point bold. They should be numbered (e.g., "Table 1" or "Figure 2"), please note that the word for Table and Figure are spelled out. Figure's captions should be centered beneath the image or picture, and Table captions should be centered above the table body.



#### TRANSMITTER MODULE



# **RECEIVER MODULE**

# 45. RESULTS



These features would be achieved by providing the inputs like:

0001 -speed limit 20

- 0010-speed limit 40
- 0011 -speed limit 60
- 0100-speed limit100
- 0101 NO HORN

Device will flash backlights (LED), the buzzer will beep when the receiver tries to exceed the limit.

# 45.1 CONCLUSION

This technology uses the Speed limitation devices and top speed limiting.

About 20% of casualties could be prevented if all vehicles complied with the speed limits.

Speed exceeding these features will be demonstrated using switches device will halt if it exceeds our programmed limit. (I.e. when it accelerates) or else will remain into the borders of the limit. Horn will be disabled in the no horn zone.

This technology can be used for governmental purpose of safety.

We can reduce the number of accidents happening due to over speeding since system assures strict speed limit rule obeying.

System assures no horn rule obeying in no horn area like hospitals, schools, etc. by means of automatic horn deactivating systems.

Low cost.

# **46. ACKNOWLEDGMENTS**

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# DISCRIMINATION OF FAULTS ON 400 KV TRANSMISSION LINE USING DISCRETE WAVELET TRANSFORMS

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# ABSTRACT

The aim of this paper is to discriminate the fault in Power System using discrete wavelet transform to provide uninterrupted Power supply to consumers but the performance of Power system is frequently affected by transmission line faults. In order to maintain the continuity of supply and to improve the efficiency of Power System the transmission line fault should be analysis and treated accurately. This paper describes the development of Discrete Wavelet transform method for classification of Faults on a Transmission line. The disturbances characterized are events from an actual, simplified 400KV transmission system of Maharashtra State Electricity transmission company limited (MSETCL) with actual line parameters. The main purpose of the algorithm is to classify the fault, where the fault types that can be classified are single-line-to-earth fault (LG), double line fault (LL), double line to earth fault (LLG) and three phase fault (LLL).

# **Keywords**

Discrete Wavelet Transform, Transmission Line Faults, MATLAB

# **1.INTRODUCTION**

Among the power system components the transmission lines are mostly affected since they are exposed to environment. In order to ensure the quality performance of power system the proper classification of fault is essential. Different techniques have been proposed to classify the faults. Dash PK et al. [1] simulated the real power system model using PS block set of Simulink (Matlab). Faults are conducted at different location, fault resistance and inception angle. The HS transform based time frequency analysis of current signals was performed and on the visual basis faults are classified. Classification of fault on visual basis is not reliable process. M. Jayabharata Reddy and D.K. Mohanta [2] presented DSP based frequency domain approach for classification of transmission line faults using a sample three phase power system simulated in MATLAB software. The line currents were processed using online wavelet transform algorithm to obtain wavelet MRA coefficient. The algorithm has used sixth level detailed coefficient values of current for classification purpose. The suggested algorithm in this paper involves too much mathematical computation. P. S. Bhowmik et al.

[3] used a portion of west Bengal state Electricity Board Power transmission system with actual line parameters as a source of study. The fault conditions were simulated using EMTP. DWT was used as a tool to process the fault voltage signal. Some meaningful features were extracted from the processed signal and fed to ANN for classification purpose. K.M.Silva et al. [4] proposed a novel method for fault detection and classification in transmission lines with the help of oscillographic record analysis. In module (1) i.e. detection of fault, the fault current and voltage sample were normalized and processed using DWT. In 2nd module once the fault is detected the samples related to fault clearing time were chosen and resampling of waveform was performed. Further with the help of windowing process, each window was analyzed through the ANN to classify the fault. Dalstein et al. [5] simulated the faults on a 380KV Transmission line with the help of simulation Program Netomac. Five consecutive sample points of normalized voltage and current of each line according to fault type are used as input to ANN. Therefore the 30 input nodes were build and ANN has to provide the 11 output nodes. One of these 11 output mapped to a value 0.9 and all the other valued mapped to 0.1. Hence this net is trained to learn that winner takes all problems. G. Sudha and T. Basavaraju [6] suggested the study of three approaches that effectively classify all types of transmission line faults. The study is performed in MATLAB, since it provides interactive environment among toolboxes like wavelet transform, fuzzy interference system and Simulink, making programming and transfer of data between program modules simpler.

This paper describes the development of Wavelet-ANN method for classification of Faults on a HV network. The disturbances characterized are events from an actual, simplified 400KV transmission system of Maharashtra State Electricity transmission company limited (MSETCL) with actual line parameters. The fault conditions are simulated in PSCAD software on the AKOLA-KORADI 250 km long transmission line .Fault signals in each case are extracted to several scales on the wavelet transforms, and then certain selected features of the wavelet transformed signals are used as an input for a training the neural networks. The features which are provided as an input to ANN includes maximum and minimum level 3 and level 4 detailed coefficients of line voltage and energies of level 3 and level 4 detailed coefficients of current. The main purpose of the algorithm is to classify the fault.

# 2. WAVELET TRANSFORM

The transform of a signal is just another form of representing the signal. The Wavelet Transform provides a time-frequency representation of the signal and uses multi-resolution technique by which different frequencies are analyzed with different resolutions.

The wavelet analysis described is known as the continuous wavelet transform or CWT. More formally it is written as:

$$Y(s,\tau) = \int f(t)\Psi^* s, \tau, (t)dt \quad \dots 1$$

Where \* denotes complex conjugation.

This equation 1 shows how a function f(t) is decomposed into a set of basic functions called the wavelets. The variables s and, scale and translation parameters respectively are the new dimensions after the wavelet transform. The Wavelet Series is just a sampled version of CWT and its computation may consume significant amount of time and resources, depending on the resolution required. The Discrete Wavelet Transform (DWT), which is based on sub-band coding, is found to yield a fast computation of Wavelet Transform. It is easy to implement and reduces the computation time and resources required.

$$\Psi_{j,k}(t) = \frac{1}{\sqrt{so^{j}}} \Psi \left( t - k \tau o s o^{j} / s o^{j} \right) \dots 2$$

In equation (2) j and k are integers and s0 > 1 is a fixed dilation step. The translation factor depends on the dilation step. In the case of DWT, a time-scale representation of the digital signal is obtained using digital filtering techniques. The signal to be analyzed is passed through filters with different cut off frequencies at different scales. The DWT is computed by successive low pass and high pass filtering of the discrete time-domain signal. The figure (1) shows the signal with sampling frequency of 200 KHz denoted by the sequence x[n], where n is an integer. This signal is decomposed up to level 4 and frequency bands contained in each level are represented in figure. The low pass filter is denoted by H0. At each level, the high pass filter produces detail information

d[n], while the low pass filter associated with scaling function produces coarse approximations, a[n].



Fig 1 Proposed methodology of fault classification

#### **3. NEURAL NETWORKS**

ANN is defined as a computing system made up of a number of simple, highly interconnected processing elements, which process information by their dynamic state response to external inputs.

Neural networks are typically organized in layers made of a number of interconnected 'nodes 'which contain 'activation function'. Patterns are presented to the network via the 'input layer', which communicates to one or more 'hidden layers' where the actual processing is done via a system of weighted 'connection'. The hidden layers then link to an 'output layer 'as shown in the Fig 2



#### Fig .2 ANN architecture

An input is presented to the neural network and a corresponding desired target response is set at the output. An error is composed from the difference between the desired response and the system output. This error information is fed back to the system and adjusts the system parameters in a systematic fashion (the learning rule). The process is repeated until the performance is acceptable. The performance of ANN hinges heavily on the data. If one does not have data that cover a significant portion of the operating conditions or the data is noisy, then neural network technology is probably not the right solution. On the other hand, if there is plenty of data and the problem is poorly understood to derive an approximate model, then neural network technology is a good choice.

#### 4. SIMULATED SYSTEM

MSETCL 400KV network shown in Fig (3) consists of total 28 buses out of which 20 are the intrastate buses and 8 are the interstate buses. This network also includes 55Transmission Lines, Four generating buses and 16 LOAD buses. Additional power require to fulfill the demand is imported from interstate generator namely Bhilai, Khandwa, Sardarsarovar, Boisar, Bhadravati, Tarapur, Satpura, and Mapusa.

In this Paper 400KV MSETCL network is simulated in PSCAD software with a sampling frequency of 200 KHZ. Different types of fault LG, LL, LLG and LLL are created at different locations on the AKOLA-KORADI 250 km long transmission line at an interval of 20 km including the different inception angle 0, 45, and 90 degrees. So in all 13 fault locations, three inception fault angles and four different types of faults (13\*3\*4=156) constitute 156 cases. The data from the single end from AKOLA bus is used for the classification of faults.



Fig 3 400 KV NETWORK OVERVIEW

# 5. FEATURE EXTRACTION

The line voltages and phase current signals of simulated system are recorded for a time period of 2cycles.i.e.1 prefault cycle and 1 during fault cycle. To extract some selected feature these line voltages and phase current signals are decomposed up to fourth detail level using Daubechies-3 (db3) as a mother wavelet. DWT is used since it is one of the best tools to analyses non stationary signal. Daubechies-3 (db3) wavelet is employed since it has been demonstrated to perform well.

The features extracted by processing the wavelet coefficient are maximum and minimum d3 and d4 level detailed coefficients of line voltages and energies of d3 and level d4 level detailed coefficients of phase currents. This analysis is performed on the Akola bus. The features obtained by processing the wavelet coefficient are provided as an input to ANN for the classification purpose. The analysis in case of LG fault is shown in fig.5, 6, and 7



#### Fig 4 LG fault

#### 6. RESULT AND DISCUSSION

The Frequency-Dependent Line Model is selected for simulation of 400 KV systems because it is the most accurate and it represents all frequency dependent effects of a transmission line. The faults cannot be distinguished merely by observing the simulated system waveform hence processing of signal is necessary. The phase current and line voltage signals are processed for prefault and during fault cycle using dwt. However the discrimination of fault is not possible just with the help of dwt transformed signals. Finally some distinguishing features were derived from the dwt transformed signal. The features include the maximum and minimum d3 and d4 level dwt coefficient of line voltages along with the energy of d3 and d4 level dwt coefficient of phase currents. The energy of signal is given as  $\mathbf{E} = \sum_{i=1}^{n} \mathbf{x}^2(\mathbf{i})$  where x(i) is the discrete sequence representing maximum and minimum d3 and d4level dwt coefficient of phase currents. These distinguishing features are provided as an input to ANN.

Some previous studies offer guidelines for selecting the architecture of ANN. Various training methods were used for ANN. In this paper Multilayer perceptron (MLP) neural network is used with combination of momentum leaning rule and tanhaxon axon is chosen as node activation function. The choice of 1 hidden layer with 10 processing element (PE) provides the 100% correct fault classification.

# 7. CONCLUSION

A new generalized algorithm to classify the faults occurring on High Voltage transmission line is developed in the paper. In the present work a 400KV MSETCL system is simulated in PSCAD with actual line parameters. DWT with its inherent time frequency localization property is employed to extract discriminating features from the phase currents and line voltages. A back propagation neural network classifier is then used for identification of fault type. Faults with various types, conditions and location have been tested and hundred percent accurate classifications are obtained.

The results obtained with the use of DWT-ANN based algorithm are promising and suggest that this approach could lead to useful application in an actual power system.

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# Average Current-Mode Control with Leading Phase Admittance Cancellation Principle for Single Phase AC-DC Boost converter

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### ABSTRACT

This paper presents an advanced Average Current-Mode Control (ACMC) technique for single phase AC-DC Boost Converter with Reactive Power Control. The leading phase admittance cancellation (LPAC) principle has been proposed to eliminate the current phase lead phenomenon. It results in reduction of the current control loop bandwidth requirement for a given line frequency. These features allow using relatively slow-switching power devices such as IGBT. Thus it can be used for higher ac line frequency such as in aircraft power system (360-800Hz). A theoretical principle & system modeling for bidirectional Boost converter are presented which can be used as shunt active filter for Harmonic Compensation, independently of the converter operation as an ac-dc converter.

# **General Terms**

Power Factor, Harmonics Filter, Converter.

#### **Keywords**

*Power Factor Correction (PFC), Average Current-Mode Control (ACMC), Active Power Filter.* 

#### **1. INTRODUCTION**

Single phase ac-dc static power conversation involves shaping of a sinusoidal ac line voltage waveform into a dc voltage with a relatively very small ac component. Rectification based on traditional diode rectifier capacitive and inductive filters draws non-sinusoidal and rich in harmonic current from ac line. As the number of electronic equipment increases every year, the problem of line current harmonic grows in its significance.

Significant reduction of current harmonics in single-phase circuits can only be achieved by using rectifiers based on switch mode power converters. These converters can be designed to emulate a resistive load and, therefore, produce very little distortion of the current. By using pulse-width modulation or other modulation techniques, these converters draw a nearly sinusoidal current from the ac line in phase with the line voltage. As a result, the rectifier operates with very low current harmonic distortion and very high, practically unity power factor. This technique is commonly known as power factor correction (PFC). The existing PFC technology is based on the boost converter topology with average-currentmode control with pulse width modulation (PWM) controlled converter. At the lower power ratings, MOSFETs are used as switching power devices because of their low conduction losses and high switching speed. For medium and high power applications, IGBTs can be used in PWM converter with switching frequency up to 30 kHz.

Generally to decrease the distortion in line current due to switching action of power devices, a switching frequency is kept at least 1000 times the line frequency. So the application of IGBTs in converter at higher line frequency such as in aircraft power system is fails due there slow switching speed.

In this paper, the LPAC method is introduced to relax the switching speed of converter and thus it also improves the performance of ACMC technique without any great change in their realization circuit. So before going to LPAC method, let we see what is the existing ACMC technique using for converter control.

# 2. AVERAGE CURRENT MODE CONTROL

The boost topology is a popular choice for a single-phase acdc pre-regulator with high power factor and low harmonic distortion of line ac current. The recently proposed ACMC has been widely used in PFC application. The basic control scheme of Bidirectional Boost Converter is shown in Fig.1

The control method works on the following principle: The inductor current of the converter  $i_L$  is sensed by a resistor Ri and compared with a control voltage  $v_m$  that represents the required average value of the inductor current. The difference is amplified by the compensator comprising of  $R_1$ ,  $R_f$ ,  $C_{fz}$  and  $C_{fp}$ . The output of the amplifier is compared to a triangular PWM signal at the comparator inputs to generate switching control signals for the converter.

In a boost converter example given in this paper, the switched variable is voltage applied to output dc link capacitor or current flowing through an input inductor. The boost PFC converter operating in continuous conduction mode requires line current sensing and output voltage feedback loop. The current controller (Fig.2) is a PI type controller. The control ensures that the average value of switched variable achieves its desired reference value within one switching cycle, hence the name one cycle control.



Fig 1: Control Scheme of Bidirectional Boost Converter



#### Fig 2: Current loop controller

The bandwidth of the current controller should be high enough to pass all significant harmonics of rectifier sine wave. For that the loop crossover frequency to line frequency ratio should be high to at least 150. The frequency response of current loop controller is shown in Fig.3



Fig 3: Frequency response of Current loop controller

If this ratio is much smaller, a zero-crossing distortion of line current waveform appears due to the leading phase of the current relative to the line voltage. This leading phase is a result of control action of the current loop compensation scheme. A PFC converter with a zero-crossing distortion of the line current may not be able to meet harmonic distortion requirement. The zero-crossing distortion is not significant in bidirectional converter, but it has to be taking into account for unidirectional converter.



Fig 4: Zero-crossing distortion

#### 3. SYSTEM MODELING

In Bidirectional PFC Boost converter, an input filter capacitor at the ac line terminals is commonly used to provide a lowimpedance path for the inductor current switching ripple in order to reduce propagation of the switching noise into the line. The required filtering capacitance is a function of the converter switching frequency and does not depend on the line frequency. However, this capacitor does affect the total current drawn from the line. Reactive current drawn by this capacitor is proportional to the line frequency. Because of this current, power factor of the converter is less than unity even if the converter without the filtering capacitor operates with unity power factor. At the utility line frequency (50-60 Hz), this current is relatively small and does not cause noticeable power factor degradation. However, in applications with much higher line frequencies such as in aircraft power systems (360-800 Hz), the input capacitor current becomes significant. For example, a 1.5-µF input capacitor typical for a 500W converter draws a current of only 113 mA from a 240V, 50-Hz line but as much as 0.8 A at 360 Hz, which causes a  $21^{\circ}$  phase shift of the total current at full load and even larger phase shift at a lower load.

Traditional design of a PFC boost converter utilizes a twoloop control structure (Fig. 5), with an outer voltageregulating control loop providing reference to an inner Current-shaping loop.



Fig 5: Full-bridge PFC converter with an input filter capacitor

*Hi*—current loop compensator, *Hv*—voltage loop compensator,

Fm-modulator gain, kx-multiplier gain,

hs-current sensor gain,

hvs and hvos-voltage sensors gain.

In practice, the dc link capacitance C is large enough such that it could be treated as a voltage source. Under this assumption, dc voltage Vo and the voltage loop compensator output Vc are constant values. Then, the dynamic model of the converter is described by the block diagram in Fig. 6. The power stage line-to-current and control-to-current transfer functions are

$$G_{iv}(s) = \frac{1}{r+sL} \quad \text{and} \quad G_{id}(s) = \frac{2V_o}{r+sL} \tag{1}$$

where r is an equivalent resistance of the current path. The compensator is a PI-type controller with the zero placed at or near the loop crossover frequency:

$$H_{i}(s) = \frac{\omega_{i} \left(1 + \frac{s}{\omega_{z}}\right)}{s \left(1 + \frac{s}{\omega_{p}}\right)}$$
(2)



#### Fig 6: Current loop control diagram of the converter

From Fig. 6, the total input admittance of converter is

$$Y(s) = \frac{i_g(s)}{v_g(s)} = \frac{G_{iv}}{1+T_i} + \frac{G_{id} F_m H_i}{1+T_i} k_x V_c h_{vs} + Y_{Ci}$$
(3)

Where T<sub>i</sub> is the current loop gain:

$$T_i = G_{id} F_m H_i h_s \tag{4}$$

According to (3), the total input admittance of the converter can be represented by two admittance branches  $Y_1(s)$ ,  $Y_2(s)$  and the input capacitor  $C_i$  (Fig. 7):

$$Y(s) = Y_1(s) + Y_2(s) + Y_{Ci}(s)$$
(5)



# Fig 7: Input admittance of the converter with the input filter capacitor

Below the current loop crossover frequency, neglecting r,

$$Y_1(s) = \frac{s}{2V_o F_m h_s \omega_i \left(1 + \frac{s}{\omega_z}\right)}$$
(6)

$$Y_{2}(s) = \frac{k_{x} V_{c} h_{vs}}{h_{s}} = \frac{I_{g}}{V_{g}} = \frac{P_{g}}{V_{g}^{2}}$$
(7)

$$Y_{Ci}(s) = s C_i \tag{8}$$

Component  $Y_2(s)$  is the closed-loop current-reference-tocurrent transfer function (current reference term), which provides desired input admittance magnitude with zero phase below crossover frequency of the loop gain  $T_i$ . This branch of the input admittance draws a current in phase with the line voltage, with the magnitude determined by  $V_c$ , which corresponds to the load power. Component  $Y_1(s)$  is the closedloop voltage to current transfer function (leading-phase admittance term) plus admittance of input filter capacitor  $Y_{Ci}(s)$ , which has a 90° leading phase below the crossover frequency (Fig. 8). This branch draws a leading-phase current, which is independent of the converter load and increases with the line frequency for a given current loop bandwidth. This is the reason why the current phase lead effect is observed at higher frequencies, which causes the zero-crossing distortion of the line current and increased harmonic content.



Fig 8: Closed-loop input admittance and its components

# 4. LEADING PHASE ADMITTANCE CANCELLATION

From the discussion above, it is clear that we need to compensate the effect of admittance component  $Y_1(s)$  in order to eliminate the current phase lead and the resulting zerocrossing distortion. The leading-phase admittance cancellation (LPAC) method uses an additional term  $Y_3(s)$  in the admittance equation (5) to cancel the leading-phase term  $Y_1(s)$ . Then, the current reference term is left as the only one that determines the magnitude and phase of the line current. A new input from  $v_g$  with a transfer function  $H_c(s)$  is introduced at the summing junction in order to cancel the undesired voltage term in (3) as shown in Fig. 9.

From Fig. 9(b), the total input admittance of the converter is,

$$Y(s) = \frac{I_g(s)}{v_g(s)} = \frac{G_{iv}}{1+T_i} + \frac{G_{id}F_mH_i}{1+T_i}k_xV_ch_{vs} + \frac{G_{id}F_mH_i}{1+T_i}H_ch_{vs} + Y_{Ci}.$$
(9)

According to (9), equation (5) is modified into,

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$$Y(s) = Y_1(s) + Y_2(s) + Y_3(s) + Y_{Ci}(s)$$
(10)



(a)



(b)

Fig 9: Full-bridge PFC converter with an input filter capacitor and LPAC



Fig 10: Input admittance of the converter with LPAC

Below the current loop crossover frequency, neglecting r and using the  $Y_3(s)$  to cancel the effect of  $Y_1(s)$  and  $Y_{Ci}(s)$ ,

$$Y_{3}(s) = \frac{H_{c} h_{vs}}{h_{s}} = -(Y_{1}(s) + Y_{C_{i}}(s))$$
(11)

From (11), the LPAC transfer function is given as

$$H_{c}(s) = -\frac{1+2V_{o}F_{m}\omega_{i}C_{i}h_{s}}{2V_{o}F_{m}h_{vs}}\frac{s}{\omega_{i}\left(1+\frac{s}{\omega_{z}}\right)}$$
(12)

As shown in Fig. 10,  $Y_3(s)$  draws a current opposite to the current  $Y_1(s)$  and  $Y_{Ci}(s)$  and, thus, cancels its effects at frequencies within current loop bandwidth. The result in Fig. 11, demonstrate that the frequency range of undistorted current operation is drastically extended for more than a decade.



Fig. 11 Close loop input admittance with LPAC Dash—uncompensated, Solid—LPAC-compensated

# 5. IMPLEMENTATION OF THE LPAC

A generic implementation of the LPAC in a standard PFC control system is shown in Fig. 12.  $H_c(s)$  is part of the compensator circuit; it is added to the system by means of an  $R_C$ - $C_C$  network from the rectified line voltage to the negative input of the current loop amplifier.



# Fig 12: Implementation of the bidirectional PFC converter with LPAC

Assume for generality that the  $R_C$ - $C_C$  Circuit is connected to  $v_e$  through a gain  $h_C$  of LPAC network amplifier. Then,

$$H_{c}(s)H_{i}(s) = \frac{v_{d}(s)}{v_{g}(s)} = -\frac{h_{c}\left(R_{f} + \frac{1}{sC_{fc}}\right) \|\frac{1}{sC_{fc}}}{R_{c} + \frac{1}{sC_{c}}}$$
(13)

$$H_{c}(s) = -\frac{C_{c} h_{c}}{C_{fp} + C_{fz}} \frac{s}{\omega_{i} \left(1 + \frac{s}{\omega_{c}}\right)}$$
(14)

$$\omega_c = \frac{1}{C_c R_c}$$
(15)

Comparing equations (12) and (14), we obtain

$$\omega_c = \omega_z, \qquad R_c = \frac{1}{C_c \, \omega_z} \tag{16}$$

$$C_{c} = \frac{C_{fp} + C_{fz}}{2V_{o} F_{m} h_{c} h_{vs}} \left(1 + 2V_{o} F_{m} \omega_{i} C_{i} h_{s}\right)$$
(17)

Eq.(16) and Eq.(17) shows that the achieved compensation of current phase lead is load invariant and line frequency invariant.

Thus in such a manner, the LPAC can be used to cancel *Ci* current as well such as the total current is in phase with the line voltage (Fig. 13), and the converter truly operates with unity power factor. The voltage and current waveforms of the converter without and with LPAC are shown in Fig. 13 (a) and (b) respectively.



(b)

Fig. Bidirectional PFC converter operation (a) without and (b) with LPAC-compensator

 $fac = 500 \text{ Hz}, fsw = 90 \text{ kHz}, Ci = 1.5 \text{ }\mu\text{F}, Po = 100 \text{ W}$ 

# 6. SHUNT ACTIVE POWER FILTER

Shunt active power filter is an important and recent application of Bidirectional PFC boost converter. For a single phase power supply, most economical, traditional Peak detection method is now replaced by Average Current-Mode Control technique. A typical block diagram of Shunt Active Power Filter using ACMC with LPAC is shown in Fig. 14.



#### Fig 14: Shunt Active Power Filter

The shunt active power filter is used for reactive power and harmonic compensation of power supply. Active filter using ACMC with LPAC has many advantages over traditional Peak detection method.

- It required only one voltage and current sensor.
- Good control on reactive power regulation.
- Dynamic response has been improved.
- Also applicable for higher line frequency supply.
- It has very low Switching noise.

# 7. CONCLUSION

Due to the slower switching speed of IGBTs, we are unable to use them in PFC boost converter with ACMC for higher line frequency power system. The lower switching speed causes zero-crossing distortion which reduced the performance of PFC and harmonic reduction.

This problem can be solved by LPAC compensation which also takes in account the effect of input filter capacitor and keeps power factor very close to unity.

This method also enables to use Active Power Filter using ACMC for higher frequency power system.

# 8. ACKNOWLEDGMENTS

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# **Space Vector Pulse Width Modulation**

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#### Abstract

The rapid development of high switching frequency power electronics in the past decade leads towards wider application of voltage source inverters in AC power generation. Therefore, this prompts the need for a modulation technique with less total harmonic distortion (THD) and fewer switching losses. Space vector pulse width modulation (SVPWM) provides a better technique compared to the more commonly used PWM or sinusoidal PWM (SPWM) techniques. SVPWM is a more sophisticated technique for generating a fundamental sine wave that provides a higher voltage, high reduction in the dominant harmonics and lower total harmonic distortion when used in an inverter. In SVPWM the complex reference voltage phasor is processed as a whole, therefore, interaction between three phases is exploited, and this strategy reduces the switching losses by limiting the switching. This paper will analyze the working and design of SVPWM and will provide comparative analysis of improved quality with the conventional methods.

*Keywords:* space vector pwm, space vector, pulse width modulation.

## **1. Introduction**

Pulse width modulation (PWM) has been studied extensively during the past decades. Many different PWM methods have been developed to achieve the following aims: wide linear modulation range; less switching loss; less total harmonic distortion (THD) in the spectrum of switching waveform; and easy implementation and less computation time. For a long period, carrier-based PWM methods were widely used in most applications. The earliest modulation signals for carrier-based PWM are sinusoidal. The use of an injected zero-sequence signal for a three-phase inverter initiated the research on non-sinusoidal carrier-based PWM. Different zero-sequence signals lead to different non-sinusoidal PWM modulators. Compared with sinusoidal three-phase PWM, non-

sinusoidal three-phase PWM can extend the linear modulation range for line-to-line voltages.

With the development of microprocessors, spacevector modulation has become one of the most important PWM methods for three-phase converters. It uses the space-vector concept to compute the duty cycle of the switches. It is simply the digital implementation of PWM modulators. An aptitude for easy digital implementation and wide linear modulation range for output line-to-line voltages are the notable features of space vector modulation. The comprehensive relation of the two PWM methods provides a platform not only to transform from one to another, but also to develop different performance PWM modulators. Therefore, many attempts have been made to unite the two types of PWM methods.

In SVPWM methods, the voltage reference is provided using a revolving reference vector. In this case magnitude and frequency of the fundamental component in the line side are controlled by the magnitude and frequency, respectively, of the reference voltage vector. Space vector modulation utilizes dc bus voltage more efficiently and generates less harmonic distortion in a three phase voltage source inverter.

# 2. PWM Principle

The dc input to the inverter is "chopped" by switching devices in the inverter (bipolar

transistors, thyristors, Mosfet, IGBT ...etc). The amplitude and harmonic contents of the ac waveform are controlled by controlling the duty cycle of the switches. This is the basic of the pulse width modulation PWM techniques.

There are several PWM techniques each has its own advantages and also disadvantages. The basic

PWM techniques are described briefly in the following subsections. The considered PWM techniques are:

# 1) Sinusoidal PWM (most common)

2) Space-Vector PWM

# 2.1 Sinusoidal Pulse width modulation

In this method a triangular (carrier) wave is compared to a sinusoidal wave of the desired fundamental frequency and the relative levels of the two signals are used to determine the pulse widths and control the switching of devices in each phase leg of the inverter. Therefore, the pulse width is a sinusoidal function of the angular position of the reference signal. The basic principle of three phase sinusoidal PWM is shown in Fig. 1. (refer fig.1)

The sinusoidal PWM is easy to implement using analog integrators and comparators for the generation of the carrier and switching states. However, due to the variation of the sine wave reference values during a PWM period, the relation between reference values and the carrier wave is not fixed.

Depending on whether the signal voltage is larger or smaller than the carrier waveform, either the positive or negative dc bus voltage is applied at the output. Note that over the period of one triangle wave, the average voltage applied to the load is proportional to the amplitude of the signal (assumed constant) during this period.

The resulting chopped square waveform contains a replica of the desired waveform in its low frequency components, with the higher frequency components being at frequencies close to the carrier frequency. Notice that the root mean square value of the ac voltage waveform is still equal to the dc bus voltage, and hence the total harmonic distortion is not affected by the PWM process.

The harmonic components are merely shifted into the higher frequency range and are automatically filtered due to inductances in the ac system.

Fig.2 is an example of the SPWM with modulation index more than 1. However, due to the variation of the sine wave reference values during a PWM period, the relation between reference values and the carrier wave is not fixed. This results in existence of harmonics in the output voltage causing undesired low-frequency torque and speed pulsations. The problems associated with SPWM are:

1) The machine models and characteristics used are valid only in steady state. This causes the control to allow high peak voltage and current transients. These damage not only the drive dynamic performance but also the power conversion efficiency. Additionally, the power components must be oversized to withstand the transient electrical spikes.

2) Great difficulty in controlling the variables with sinusoidal references: PI regulators cannot perform a sinusoidal regulation without damaging the sinusoidal reference, and hysteresis controllers introduce high bandwidth noise into the system that is hard to filter out.

3) No three phase system imbalance management. No consideration of the phase interactions.

4) Finally, the control structure must be dedicated according to motor type (asynchronous or synchronous).

# 3. Space vector pulse width modulation

Space vector PWM refers to a special switching scheme of the six power semiconductor switches of

a three phase power converter . Space vector

PWM (SVPWM) has become a popular PWM technique for three-phase voltage-source inverters in applications such as control of induction and permanent magnet synchronous motors. The mentioned drawbacks of the sinusoidal PWM are reduced using this technique. Instead of using a separate modulator for each of the three phases, the complex reference voltage vector s processed as a whole. Therefore, the interaction between the three motor phases is considered. It has been shown, that SVPWM generates less harmonic distortion in both output voltage and current applied to the phases of an ac motor and provides a more efficient use of the supply voltage in comparison with sinusoidal modulation techniques. SVPWM provides a constant switching frequency and therefore the switching frequency can be adjusted easily. Although SVPWM is more complicated than sinusoidal PWM and hysteresis band current control, it may be implemented easily with modern DSP based control systems.

3.1 Principle of space vector pulse width modulation

Eight possible combinations of on and off patterns may be achieved. The on and off states of the lower switches are the inverted states of the upper ones.

The phase voltages corresponding to the eight combinations of switching patterns can be calculated and then converted into the stator two phase ( $\alpha\beta$ ) reference frames. This transformation results in six non-zero voltage vectors and two zero vectors. The non-zero vectors form the axes of a hexagon containing six sectors (V1 – V6).

The angle between any adjacent two non-zero vectors is 60 electrical degrees. The zero vectors are at the origin and apply a zero voltage vector to the motor. The envelope of the hexagon formed by the non-zero vectors is the locus of the maximum output voltage. SVPWM consists of controlling the stator currents represented by a vector. This control is based on projections which transform a three phase time and speed dependent system into a two co-ordinate (d and q co-ordinates) time invariant system. These projections lead to a structure similar to that of a DC machine control. Field orientated controlled machines need two constants as input references: the torque component (aligned with the q coordinate) and the flux component (aligned with d co-ordinate). From Fig. 3

Va = Vm sin (ωt) Vb = Vm sin (ωt – 120)

Vc = Vm sin (ωt + 120)

Thus, Vs can be written as,

Vs = Va + Vb 
$$e^{+j\frac{2\pi}{3}}$$
 + Vc  $e^{-j\frac{2\pi}{3}}$ 

Solving above equations,

$$Vs = \frac{3}{2}Vm[sin\omega t - jcos\omega t]$$

Therefore magnitude of Vs =  $\frac{3}{2}$ Vm and it rotates in space by ( $\omega$  rad/sec)

Where  $\omega$  = frequency of three sine waves Va, Vb, Vc.

Thus Vs = Vx + Vy----from above diagram

In matrix form,

$\begin{bmatrix} v_{x} \\ v_{y} \end{bmatrix} = \begin{bmatrix} 1 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & \frac{\sqrt{3}}{2} & -\frac{\sqrt{3}}{2} \end{bmatrix}$	Va Vb Vc	
$Vx = Va - \frac{1}{2}[Vb + Vc] = \frac{3}{2}Va$ 1		
$Vy = \frac{\sqrt{3}}{2} [Vb - Vc]$	2	
Now consider Fig. 4		
Vao = Van + Vno	3	
Vbo = Vbn + Vno	4	
Vco = Vcn + Vno	5	
Knowing that Van + Vbn + Vcn = 06		
Adding equation 3, 4, 5 we get		
$Vno = \frac{1}{3} [Vao + Vbo + Vco]$	7	
Substituting equation 7 in 3, 4 & 5,		
$Van = \frac{2}{3}Vao - \frac{1}{3}[Vbo + Vco]$		
$Vbn = \frac{2}{3}Vbo - \frac{1}{3}[Vco + Vao]$		
$Vcn = \frac{2}{3}Vco - \frac{1}{3}[Vao + Vbo]$		

In Matrix form, hence the maximum output phase voltage and line-to-line voltage that can be achieved by applying SVPWM are:



3.2 Modulation index, time period and calculations of vectors

Considering Fig. 5 and Fig. 6, we get 8 combinations of switching instances as 2 switches of 3 legs of inverter will give  $2^3$ =8. Among this 6 are active vectors and two are zero vectors as the combination of [1 1 1] and [0 0 0] will give zero vectors.

e.g:(001)

Vbo = - Vdc / 2

Substituting in above matrix,

 $Van = \frac{2}{3}Vdc$   $\&Vbn = Vcn = -\frac{1}{3}Vdc$ Therefore,  $Vx = \frac{3}{2}Van$  ---- from eq. 1
Thus,  $Vx = \frac{3}{2} \times \frac{2}{3}Vdc = Vdc$   $\& Vy = \frac{\sqrt{3}}{2}[Van - Vcn] ---- from eq. 2$ Therefore Vy = 0Thus  $Vs = Vdc \angle 0$ 

Similarly for,

c b a

(110) which is complimentary of (001),

$$Vs = Vdc / 180$$

now for,

$$(011) \Rightarrow Vs = Vdc \angle 60$$

Thus for  $(1 \ 0 \ 0) \Rightarrow$  Vs = Vdc  $\angle 240$ 

Now for,

$(010) \Rightarrow$	Vs = Vdc <b>1</b> 20
Thus for (1 0 1) $\Rightarrow$	Vs = Vdc 🔼 300

Thus we get a simple relationship between phase & pole voltages.

If Van, Vbn, Vcn are sinusoidal, then

 $Vs = M e^{j\omega t}$ 

Where  $M \Rightarrow$  modulation index, 0<M<1

 $\omega \Rightarrow$  output frequency

 $Vs \Rightarrow locus of circle$ 

Vs moves in discrete steps of 60



Fig. 7 Space vector in sector 1

Now Van, Vbn, Vcn in terms of Vx & Vy are given as,

1

$$Van = \frac{2}{3}Vx \qquad \qquad --- \text{ from eq.}$$

$$Vbn = -\frac{1}{3}Vx + \frac{1}{\sqrt{3}}Vy \qquad \qquad ---\text{ from eq. 2}$$

$$Vcn = -\frac{1}{3}Vx - \frac{1}{\sqrt{3}}Vy \qquad \qquad --- \text{ from eq. 2}$$

Now,

Considering (001)

Van peak =  $\frac{2}{3}$ Vsmax

Therefore, Van peak =  $\frac{2}{3} \times \frac{\sqrt{3}}{2}$ Vdc ---- from eq. 9 Van peak = Vbn peak = Vcn peak =  $\frac{Vdc}{\sqrt{3}}$  = 0.577 Vdc

Therefore

mf = 
$$\frac{0.577 Vdc}{\frac{2}{\pi} Vdc}$$
 = 0.907

thus, 90.7% of fundamental component of square wave is available in SVPWM as compared to 78.5% of sine PWM.

Sampling time Ts should be as small as possible.

The time period can be shown graphically in Fig. 8.

Where,  $\emptyset \Rightarrow$  position of Vs in x-y plain.

There should be a volt-sec balance which depends on magnitude of Vs.

 $VsTc = V_1 T_1 + V_2 T_2 + VzTz$ 

(The value of VzTz is always zero)

Where,  $Tc = \frac{Ts}{2} \Rightarrow$  sampling time

If  $Tz = Tc - T_1 - T_2$ 

This condition is satisfied then it does not matter how long we use (000) & (111)

Maximum value of space vector i.e Vsmax = radius of circumscribing circle.

= Vdccos 30

$$=\frac{\sqrt{3}}{2}Vdc \qquad \dots 9$$

Now consider a ratio of fundamental component of SVPWM to square wave..

Let, mf = 
$$\frac{V1 sp}{V1 s}$$
 ......10

Where,

V1 sp = peak of fundamental of phase voltage of

# SVPWM

V1 s = peak of fundamental of phase voltage obtained by

square wave.





Fig. 2 SPWM with modulation index more than 1.

Fig. 4 Simplified inverter circuit for calculation









Fig. 5 Switching instances of MOSFET



Fig. 6 Phasor representation of Space vector



Fig. 8 Space vector switching pattern at Sector 1 and Sector 2

#### **5.** Conclusions

A SVPWM technique based on a reduced computation method was presented. The SVPWM scheme can drive the inverter gating signals from the sampled amplitudes of the reference phase voltages. The switching vectors for the inverter are derived using a simple digital logic which does not involve any complex computations and hence reduces the implementation time. SVPWM drive treats the inverter as a single unit with eight possible switching states, each state can be represented by a state vector in the two-axis space, the eight state vectors formed a hexagon shape with six sectors. The modulation procedure is accomplished by switching the state vectors in each sector by appropriate time intervals which are calculated in a certain sampling time (Ts). The linear region in SVPWM is larger than other types of PWM technique, where the modulation index approaches to (90.7%) and the maximum output fundamental is

(0.577Vd), whereas, in the SPWM the maximum linear modulation index is (78.54%) and the maximum output fundamental is (0.5Vd). The harmonic analysis of different output voltage and current, in both simulation and experimental results, gives excellent harmonic reduction and harmonic parameters with respect to squarewave inverter. The total losses of low order harmonics can be minimized by increasing the switching frequency, but in the other hand it may increase the switching losses, therefore, switching frequency must be selected to get minimum total harmonic and switching losses. The SVPWM is a digital modulating technique. Then from the above conclusion and due to simulation and experimental results, the SVPWM can be considered as the best and the optimum of all PWM technique.

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# **Eco-Fan**

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#### Abstract

Water & Warm air would lead to cooling of air. The cool air would be channelized through aluminum ducts which are thermally insulated which will be then released on top of a CEILING FAN which will eventually cool the room to an ever lesser degree. There is a provision for the recirculating the room air and then forcing it to the cooling unit where it will undergo the same process again. Also there is an arrangement of the LiCL container at the cool air emitting end to purify the air from bacteria. This would lead to an Economical an ENERGY EFFICIENT & an Eco-friendly method of cooling.

*Keywords:* CEILING FAN, ENERGY EFFICIENT COOLING.

# 1. Need of Cooling

In modern day lifestyle every individual require a cool atmosphere. For a cool atmosphere we need an efficient cooling system at an economical value. But the system currently in working are not economical in a time when the country is tackling inflation at its peak. Hence our idea is to create a cooling system which will provide people with cool air and consume less power.

# 2. Our Idea

In this system the room air from the surrounding would be pulled inwards with the help of an inverted exhaust fan. This air would then pass through the copper tubes which will be placed and bend according to requirement.

In order to ensure that proper temperature difference is maintained between water and air for efficient heat transfer, we are using peltier device. Peltier device or TEC is an electronic device which when charged with 12V DC produce a cool and a hot side. the cool side will cool the water to a lower temperature. The hot sidewould be attached to a heat sink which will project the hot air outside the room.

Once cooled the air would be channelized via the aluminum ducts which will thermally insulated avoiding further heat transfer and then released on top of the ceiling fan. There is a provision for the recirculating the room air and then forcing it to the cooling unit where it will undergo the same process again.

The water would be collected at the bottom and by using aquarium pumps of low wattage would be reverted back to the water tank.

This method is functioning using equipment's which use virtually negligible power as compared to the conventional cooling methods. Thus the per unit kw-hr consumption and hence the tariff rates would be considerably decreased.

There is no emission of Freon or CFC gas and hence it is ENERGY EFFICIENT, ECONOMICAL& ECOFRIENDLY idea.

# 3. Previously used cooling systems

3.1 AIR COOLED DX SYSTEM:-

In a direct-expansion (DX) unitary system, the evaporator is in direct contact with the air stream, so the cooling coil of the airside loop is also the evaporator of the refrigeration loop. The term "direct" refers to the position of the evaporator with respect to the airside loop.

The term "expansion" refers to the method used to introduce the refrigerant into the cooling coil. The liquid refrigerant passes through an expansion device (usually a valve) just before entering the cooling coil (the evaporator). This expansion device reduces the pressure and temperature of the refrigerant to the point where it is colder than the air passing through the coil.

The components of the DX unitary system refrigeration loop (evaporator, compressor, condenser, expansion device and even some unit controls) may be packaged together, which provides for factory assembly and testing of all components, including the electrical wiring, the refrigerant piping, and the controls. This is called a Packaged DX system.

#### 3.3 GLYCOL COOLED SYSTEM:-

This type of system locates all refrigeration cycle components in one enclosurebut replaces the bulky condensing coil with a much smaller heat exchanger. The heat exchanger uses flowing glycol a mixture of ethylene and glycol to collect heat from the refrigerant and transport away from the IT environment.

#### 3.4 WATER COOLED SYSTEM:-

The water cooler is connected to the building's water supply for a continuous supply of water and <u>electricity</u> to run a <u>refrigeration</u> unit to cool the incoming water, and to the building's waste disposal system to dispose of unused water.

In the standard wall-mounted cooler, also commonly referred to as a <u>water fountain</u> or <u>drinking</u> <u>fountain</u>, a small tank in the machine holds <u>chilled water</u> so the user does not have to wait for chilled water. Water is delivered by turning or pressing a button on a spring-loaded valve located on the top of the unit that turns off the water when released. Some devices also offer a large button on the front or side. Water is delivered in a <u>stream</u> that arches up allowing the user to drink directly from the top of the stream of water. These devices usually dispense water directly from the <u>municipal</u> water supply, without <u>treatment</u> or <u>filtering</u>.

### 3.5 EARTH COVERED ROOFS AND BUILDINGS:-

The system of soil cooled by a gravel layer can be applied in several ways. In case of a single storey building, or the top storey of multiple storey buildings with a flat roof structurally capable to support the load of the soil and gravel, the application of this cooling system is directly over the roof.

### 4.Figures



Fig 2.1Heat transfer by radiation [3]



fig 2.2 Heat transfer by natural convection [3]



Fig 2.3 .Actual heat transfer includes radiation and convection [3]

## 4. Conclusions

Thus by explaining the process and working of each and every component we are looking forward to making a demo working model of our Eco fan which would be able to meet our basic requirements of cooling. The total power consumption of our Eco fan is 210 watts which is negligible as compared to an compressor which itself consumes 1.3kw.In the forthcoming semester we would look to construct the model with the exact dimensions. The Eco fan once made would thus be able to satisfy the three "E"s-

ECOFIRENDLY

ECONOMICAL

ENERGY EFFICIENT!

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# MAJOR POWER SAVING POTENTIAL OF THERMAL POWER PLANT

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#### Abstract:

Thermal power plants are those power plants which synthesis electrical energy from passive energy comprised in coal. As coal cannot directly be used for generation water is used as an intermediate medium for doing so. Most thermal power plant uses 30-40% of energy value of primary fuels. The remaining 60-70% is lost during generation, transmission and distribution of which major loss is in the form of heat. Thermal power consist of various sub cycles / systems like air & flue gas cycle, main steam, feed water & condensate cycle, fuel & ash cycle, Equipment cooling water (ECW), auxiliary cooling water (ACW) system, Compressed air system, Electrical auxiliary power & lighting system, HVAC system etc.. There is tremendous scope of energy saving potential.

#### Keywords :

Air & flue gas cycle, main steam, feed water & condensate cycle, fuel & ash cycle, Equipment cooling water (ECW), auxiliary cooling water (ACW) system, Compressed air system, Electrical auxiliary power & lighting system, HVAC system.

#### 1. Introduction:

Steam is an important medium for exerting mechanical force on turbine blades. Steam

power stations are more suitable where coals are available in abundance.In a coal based power plant coal is transported from coal mines to the power plant by railway in wagons or by trucks. Coal is unloaded from the wagons to a moving conveyor belt. Coal obtained from mines are not of uniform size, they are brought to crusher where raw coal are crushed to small pieces .they are then stored at the place called dead storage where around 40 days of coal can be stored. Coals are further sent to pulverizer. Pulverized coal is taken to boiler where coal is sprayed in boiler. Steam is generated by boiler operation. The generated steam has high pressure, it is first forced on high pressure turbine, turbines rotate, axial connected to generator rotate and electricity is generated. The exhausted steam is super-heated by superheater and forced again on preceding intermediate pressure turbine. Remaining steam is again superheated and finally forced on low pressure turbine. Left out steam is still of high temperature, it is condensed with the help of cooling towers where the steam is converted back into liquid form. Condensed water is again taken to boiler where it is again converted to steam and the process continues. These plants are used as base load. Steam power plants using steam basically works on Rankine cycle. These plants are built in capacity range of 10 MW. Thermal powerplants account for 57% of India's installed electricity capacity. For a thermal power plant the range of pressure may vary from 10kg/ to super critical pressures and the range of temperature may be from 250°C to 650°C. In this entire cycle there are many assets whose parameters can be manipulated for conservation or reducing the overall consumption of power.

# 2. Sectors having scope of improvement :

- A. Air and flue gas system The major aspect of this entire cycle is the air-flue ratio. Also abbreviated as AFR. The AFR is defined as the mass ratio of airto fuel present in an internal combustion engine.
- B. Steam, Feed water and condensate cycle -

i. BFP (Boiler Feed Pump) in DP (Dynamic Positioning).
ii. LP& HP heaters.
iii. Replacement of BFP cartridge.

- C. Fuel and ash cycle i. Optimized loading of ball tube mill. ii. Use of A-Grade coal.
- D. Electrical and lighting system (Distribution transformer) A distribution transformer is a transformer that provides the final voltage transformer in the electric power distribution system, stepping down the voltage used in the distribution lines to the level used by the customer. If mounted on a utility pole, they are also called polemount transformers. if the distribution lines are located at the ground level or underground, distribution transformers are mounted on concrete pads and locked in steel cases, thus known as pad-mount transformers.
- E. Compressed air system.
  i. Reciprocating Compressor. It uses powerful pistons, have been around for hundreds of years and can be found ina wide variety of sizes and power ranges. While they can be used for larger jobs, the efficiency and cost effectiveness of these compressors are optimized when used for smaller application.
  ii. Electrically heated air dryer.

# 3. Improvement Techniques

**A. Air and flue gas system (Optimization of AFR**)–As discussed earlier this system comprises of an important concept of AFR.

AFR can be optimized for high performance of the system. The benefit of optimization of AFR is that it reduces FD fan & ID fan loading. The AFR can also refer to the volume ratio for combustion carried out in industrial furnaces. If exactly enough air is provided to completely burn all of the fuel, the ratio is known as the stoichiometric mixture, often abbreviated to stoich. For precise AFR calculations, the oxygen content of combustion air should be specified because of possible dilution by ambient water vapour, or enrichment by oxygen additions. The AFR is an important measure for anti-pollution and performance-tuning reasons. The lower the "richer" AFR, the the flame.

B.Steam, Feed water and condensate cycle i. BFP (Boiler Feed Pump) used in three element mode rather than in DP (Dynamic Positioning) -In three element mode throttling losses across FRS valve reduces leads to reduction in BFP power. One of the major auxiliaries of thermal power plant is Boiler Feed Pump (9000 KW). The purpose of Boiler Feed Pump is to pump feed water to boiler drum, provide spray water to HPBP, De-super heater station. One BFP caters to entire requirement of the process. The second pump remains as an auto stand by equipment. ii. Optimization of level set point in LP & HP heater -LP & HP heater - HP is installed after the BFP and it heats the feed water by exchanging heat with the steam that is extracted from the hp turbine from diff stages from different pressures.HP is installed after the condensated extraction pump and in the same way it heats the water but it takes the steam extraction from the LP turbine. Heater drip level affects TTD (Terminal Temperature Difference) & DCA (Drain Cooler Approach) of heater which finally affect feed water O/L (Over load) temp. Hence it requires setting of point correctly. drip level set iii.Replacement of BFP cartridge -The Boiler Feed Pump is generally of multistage (three stage) type. It was observed that the performance curve of the pump showed consumption of much higher power corresponding to the flow. The loss that takes place is due to interstage leakage or recirculation. Hence the BFP cartridge needs to be changed.BFP draws more current if Cartridge is wore out, causing short circuit of feed water Flow inside the pump. It affects performance. Hence cartridge pump replacement is necessary. Economically speaking it would result in savings of Rs. 2 crores against a mere 40 lakhs of investments.

C. Fuel and ash cvcle i. Optimized ball loading in Ball tube mill-A ball mill consists of a hollow cylindrical shell rotating about its axis of the shell may be either horizontal or at a small angle to the horizontal. It is partially filled with ball the grinding media is the balls which may be made of steel, stainless steel or rubber. The inner surface of the cylindrical shell is usually lined with an abrasion-resistant material such as manganese steel or rubber. Less wear takes place in that rubber lined mills. The length of the mill is approximately equal to its diameter.Excessive ball loading increases mill power. Hence ball loading is to be Optimized



depending upon coal fineness report. ii. Use of Wash Coal or Blending with Agrade coal - F-grade coal has high ash content. Overall performance can be improved by using Wash coal or blending of F-grade coal with A- grade coal instead of only using Fgrade coal F-grade coal-Bituminous coal ignites easily and burns long with a relatively long flame. If improperly fired bituminous coal is characterized with excess smoke and soot. Bituminous coals are graded according to vitrinite reflectance, moisture content, volatile content, plasticity and ash content. Generally, the highest value bituminous coals have a specific grade of plasticity &volatility and low ash content, especially with low carbonate, phosphorous and Sulphur. Volatility is also critical for steel-making and power generation, as this determines the burn rate of the coal. High volatile content coals, while easy to ignite often are not as prized as moderately volatile coals; low volatile coal may be difficult to ignite although it contains more

energy per unit volume. The smelter must balance the volatile content of the coals to optimize the ease of ignition, burn rate, and energy output of the coal.

# D. Electrical and lighting system – Distribution Transformer-

A distributioA distribution transformer is a transformer that provides the final voltage transformer in the electric power distribution system, stepping down the voltage used in the distribution lines to the level used by the customer. If mounted on a utility pole, they are also called pole-mount transformers. If the distribution lines are located at the ground level or underground, distribution transformers are mounted on concrete pads and locked in steel cases, thus known as pad-mount transformers. It is found that Operating voltage level is on higher side than required causing more losses. It is required to reduce the voltage level by tap changing.

E. Compressed Air System: i. Use of screw compressor instead of Reciprocating compressor: They can be optimized up to 30 horsepower at the maximum. Reciprocating air compressors are



marked by their highly efficient operation and steady air output. Usually sturdy and able to resist harsh industrial environments, reciprocating air compressors can stay maintenance-free for quite some time and ten to have a longer lifetimes. However its repair costs are much higher than any other air compressors.

Screw Compressors - They employ two interlocking screws to compress air. This is the most common type of compressor and has almost become an industry standard. A rotary screw compressor is more. These machines offer a reasonable balance between initial cost, maintenance, efficiency, size and options. They come in single stage, which can be a costly option because the motor runs constantly, or two-stage, which offers better energy efficiency, but has difficulties maintaining steady air output. Gaining popularity is the variable speed compressor, which allows users to produce more or less air to reduce unnecessary energy expenditure, but has higher initial costs.When comparing a rotary screw against a reciprocating compressor consider your output needs. For heavy duty high horsepower needs a rotary screw could be your best bet.

ii. Optimizing discharge air pressure by tuning loading/unloading cycle-

### 4.Conclusion

Thermal power plants contribute 70% of India's power generation installed capacity. It is not possible to meet the growing demand due to long gestation period of power plant. Only solution is to reduce auxiliary power consumption by energy conservation & energy efficiency practices. There is tremendous scope in power sector for reducing auxiliary power consumption (APC). Saved energy can be sold out. To minimize the gap between supply & demand. This changed scenario impacted the bottom line of power generation utilities. Hence the ways to retains one's competitive edge in the fiercely competitive industry are:-

- 1. Increase in Plant load factor (PLF)
- 2. Improvement in Heat rate
- 3. Improvement in APC
- 4. Reduction in O & M expenditure
- 5. Reduction in distribution losses
- 6. Better cost management.

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# POWER SECTOR REFORMS AND RESTRUCTURING

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# ABSTRACT

This paper gives brief idea about the crisis in Indian power transmission and distribution sector and its deficiencies. From this paper, we may get ideas to make power sector more efficient.

**Keywords:** Aggregate, Transmission, Commercial, Accelerated, Power, Development, Reforms, Programme, Losses

# **1. INTRODUCTION**

India's transmission and distribution losses are among the highest in the world. When non-technical losses such as energy theft are included in the total, losses go as high as 65% in some states and average about 35- 40%. The financial loss has been estimated at 1.5% of the national GDP. These act as a major deterrent to the private as well as global investments in the sector. To address the issue of Aggregate Transmission and Commercial (AT&C) losses funding mechanism was introduced for in the form of the Accelerated Power Development Reforms Program (APDRP). Its key objectives were to reduce AT&C losses, improve customer satisfaction as well as financial viability of the State Distribution Companies (SDCs), adopt a systems approach and introduce greater transparency. It was in this backdrop that the Restructured APDRP (R-APDRP) was conceived in September 2008 for the 11th Five Year Plan (2007-12).

# 2.1 The Indian Electricity Market

The electricity sector in India is predominantly controlled by the Government of India's public sector undertakings (PSUs). The Ministry of Power is the apex body responsible for the development of electrical energy in the country.

India is world's 6th largest energy consumer, accounting for 3.4% of global energy consumption. Due to India's economic rise, the demand for energy has grown at an average of 3.6% per annum over the past 30 years.

In March 2009, the installed power generation capacity of India stood at 147,000 MW while the per capita power consumption stood at 612 kWH The Indian government has set an ambitious target to add approximately 78,000 MW of installed generation capacity by 2012 in its "Power for All" mission.

About 75% of the electricity consumed in India is generated by thermal power plants, 21% by hydroelectric power plants and 4% by nuclear power plants. More than 50% of India's commercial energy demand is met through the country's vast coal reserves

Electricity losses in India during transmission and distribution are extremely high and vary between 30 to 45%. Theft of electricity, common in most parts of urban India, amounts to 1.5% of India's GDP

The financial health of State Electricity Boards (SEBs) has become a matter of grave concern considering that their losses have reached an alarming level of Rs.26,000 crores. World Bank estimates this loss would increase to Rs.40,000 crores in the next five years, unless this trend is halted with corrective steps. Out of total energy generated, approximately only 55% is billed and only 41% is realized. The gap between average revenue realization and average cost of supply has been constantly increasing.

The major factors responsible for financial sickness of SEBs are:

□ Skewed tariff structure leading to unsustainable cross subsidies by State Government

□ Huge T&D losses, largely due to outright theft and unmetered supply. It has been estimated that theft alone causes loss of about Rs.20,000 crores annually.

 $\hfill\square$  Lack of accounting and accountability in distribution.

 $\hfill\square$  Large man power – 27 to 30% revenue is used for establishment charges

□ Outdated rules, regulations, management structure and practices

Aging and poorly maintained system, unreliable and overloaded system, low demand side management (DSM) initiative, corporate governance challenges and lack of skilled resources and training.

# 2.2 Power Theft & Politics of Power

India"s electricity grid has the highest transmission and distribution losses in the world. Delhi not too long ago was dubbed the power theft capital of the world. Near a third of the country's electricity supply is unpaid for. No other country suffers revenue losses on this scale. In China, Asia's other emerging economic giant, no more than 3% of the nation's power supply is lost to theft as part of 8% total power transmission losses. OECD countries" transmission and distribution losses are just 7%.

Slum dwellers' unofficial hook-ups are the most visible sign of India's power theft crisis. Meter tampering by middle class households, electricity theft by industrial enterprises are other means for which the industry is bearing the brunt.

The main problem in arresting the theft is a lack of political will Often politicians regard laxness about revenue collection as a vote-winner. The political aspect is probably most blatant in rural areas. The powerful farmers' lobby is hard for politicians to ignore in country where a majority of the population still makes its living from agriculture. A key challenge for power companies is reducing theft by India's poor. Many have come to view free electricity as a right, something that politicians have done little to counter in a bid to win votes The problem is likely to get worse as rapid economic growth leads to greater energy consumption.

# 2.3 Subsidies

Several state governments in India provide electricity at subsidised rates or even free to some sections. This includes for use in agriculture and for consumption by backward classes. The subsidies are mainly as cross-subsidisation, with the other users such as industries and private consumers paying the deficit caused by the subsidised charges collected. Such measures have resulted in many of the state electricity boards becoming financially weak.

Haryana a small state with respect to area (~44000 km sq) tops chart of power subsidy to farmers as it has earmarked Rs 2,800 crore for power subsidy to farm sector for the year 2008-09, against Rs 2,132 crore for a year ago. The same Congress regime had announced Rs 1,600 crore waiver for arrears of rural domestic and agriculture categories of consumers in the year 2005.At present (2009), the price per unit of electricity in India is about Rs. 4 (8 US cents) for domestic consumers, and Rs. 9 for the commercial supply.

# 2.4 Stories of power theft in developing economies

In a demonstration project in nearby Malaysia, TNB Distribution, Malaysia"s largest power company, had to deal with similar problems. Facing enormous power theft, payment delinquency and poor power quality, they chose to implement a new program to reduce losses. They found many significant reasons for their losses, a lack of consistent billing practices, inconsistent meter readers, significant numbers of tampered meters, uncollected debt, and a general lack of information availability at all levels. TNB Distribution successfully dealt with their problems by increasing transparency, and using regular auditing. These are the same issues addressed by the deployment of an advanced metering infrastructure, which helps to increase information transparency and tracking.

# **3 STATUS OF DISTRIBUTION SECTOR IN INDIA: ISSUES & CHALLENGES**

# 3.1 Overview of the Distribution Sector

Distribution is the key segment of electricity supply chain. The distribution sector caters to rural and urban areas.Both segments are distinct with different problems and issues. In India the Electricity Act 2003 has recognized Rural Electrification as a separate entity.

The biggest challenge of the power sector is the high T&D losses. A combination of technical and non-technical factors is contributing to high Transmission and Distribution losses. Lack of consumer education, political interference, and inefficient use of electricity is further aggravating the problem. As T&D loss figures did not capture the gap between the billing and the collection, the concept of Aggregate Technical & Commercial (AT&C) loss was introduced in 2001-2002 to capture total performance of the utility.

The AT&C losses are presently in the range of 18% to 62% in various states. The average AT&C loss in the country is at 34%. There is wide variation of losses among the states and variation among the Discoms within the states. **The major portion of losses are due to theft and pilferage, which is estimated at about Rs.20, 000 crore annually**. Apart from rampant theft, the distribution sector is beset with poor billing (only 55%) and collection (only 41%) efficiency in almost in all States. More than 75-80% of the total technical loss and almost the entire commercial loss occur at the distribution stage. **It is estimated that 1% reduction in T&D losses would generate savings of over Rs.700 to Rs.800 crores**. Reduction of T&D loss to around 10% will release energy equivalent to an additional capacity of 10,000-12,000 MW. State-wise AT&C Losses in India

Less than Between 20-30% Between 30-Above 20% 40% 40% Andhra Pradesh Karnataka Delhi Goa Tamil Gujarat Uttar Assam Nadu Pradesh West Bengal Haryana Bihar Himachal Pradesh Jharkhand Rajasthan Tripura Meghalaya Madhya Pradesh Maharashtra Mizoram Arunachal Pradesh Uttaranchal Chhattisgarh Manipur Punjab Kerala Nagaland

Table 1: State-wise AT&C Losses in India

The Sub-transmission and Distribution systems have been the thrust areas during 10th Plan. The reduction of AT&C losses with improvement of quality and reliability were given special attention during the 10th Plan. In line with this, Accelerated Power Development and Reform Programme (APDPR) was launched with thrust on AT&C loss reduction through techno-commercial interventions to achieve commercial viability.

For rural areas Rajiv Gandhi Grameen Vidyutikaran Yojna was launched in April 2005 with 90% grant to achieve 100% electrification of villages.

# 4 ISSUES IN THE ELECTRICITY DISTRIBUTION SECTOR IN INDIA

The problems in Distribution sector have accumulated over the years mainly due to lack of investment, commercial orientation, excessive T&D losses, distorted tariff policies etc. Following are the key issues / key factors effecting overall performance of the distribution sector:

# 4.1 State Government related issues

Uncertain commitment of State Governments is key impediment to the ongoing reform process. This includes delay in unbundling and restructuring of State Electricity Boards, minimal/no financial support to unbundled utilities during transition period, inadequate financial support for providing subsidised power to domestic and agricultural consumers, inadequate administrative support in curbing theft of power etc. Frequently changing policies of the State Governments in regard to subsidies/free power to farmers adversely affecting the revenue recovery and cost coverage of utilities.

# 4.2 Regulatory process related issues

SERCs are inadequately staffed with poor infrastructure. Due to lack of competency and resources in Discoms, tariff filings are often delayed. In several cases, SERC asks Discoms to revise their filings on account of data gaps or improper information. There is no central repository of data in electronic form which leads to delay in filing petitions and responding to queries from the regulator. The distribution licensees have not been able to fully implement regulations and directives due to various reasons like lack of skilled human resources, resource constraints or inadequate training/awareness.

# 4.3 Corporate governance and institutional issues

Most of the distribution companies formed as a result of unbundling of SEB are still not fully autonomous. In many cases, unbundling is limited to operational and technical segregation. Segregation of accounts, cash flow, human resources is not complete. Successor companies are highly dependent on their parent company (i.e. residual SEB or single buyer/trade co or Transco) for financials/cash flow, human resources, investment decisions and other administrative matters and therefore, the focus on efficiency improvement from respective entities is lacking. Due to inadequate network expansion commensurate with load growth, many power transformers, distribution transformers, 33kV lines and 11kV feeders are overloaded. Reinforcement of existing network in the form of new transformers, new lines and augmentation of existing transformers and lines is poor. Most of the distribution networks in India are quite old which results in to reduced reliability, increased R&M expenses and poor quality of supply. The system also suffers low HT/LT ratio. The consumer awareness about Demand Side Management (DSM) is limited which results in to higher consumption and increased losses. DSM initiatives such as local reactive power compensation, use of energy efficient devices, Time of Day tariff, use

of renewable sources etc. are lacking.

# 4.4 Commercial issues

Commercial losses are primarily due to improper energy accounting and billing processes, faulty metering, underbilling, theft and pilferage of energy and lack of accountability within the organization. Commercial losses are estimated at about Rs. 26,000 crore during 2000-01 and theft of electricity is estimated to cost the country at about Rs. 20,000 crore per year (*Source: MoP*). The chart shows overall T&D losses in India.

Only 87% of the total consumers in India are metered (*Source: Mop, 2004-05*). Many states have undertaken 100% metering programs, but not yet completed. The chart below indicates consumer metering level in some of the states. This does not include defective meters.

High AT&C losses are due to high T&D losses coupled with low collection efficiency. Low level of collection is attributable to lack of employees accountability, inadequate collection facilities, limited usage of advanced systems and technology (e.g. payment through ECS, credit/debit cards, special centres like e-Seva centres), billing errors, political/administrative interference etc. The chart below shows level of collection efficiency in select Discoms.

# 4.5 Operational issues

Due to inadequate metering and data collection system in place, utilities have not been able to conduct energy audit, which is crucial for any energy business. Discoms do not have proper load monitoring and control mechanisms (e.g. SCADA, Distribution Control Centre, telecommunications etc.), which results in to haphazard control of the demand and often leads to loss of revenue and inconvenience to the consumers.

# 4.6 Human resources and training issues

In many of the state owned utilities, recruitment has been either stopped or restricted since last 15 years. Average age of employee in most SEBs is more than 50 years. Lack of fresh talent and domain expertise (e.g. in area of IT, communication, SCADA) impedes development of the sector and efficiency improvement. Induction of new technology in the field and office level also needs proper training for staff for efficient handling. Discoms need to undertake training need analysis and roll out training programmes for employees working in different areas. In a typical SEB, ratio of field staff to support/office staff is 54:46. However, customer facing staff is inadequate. Also, ratio of meter readers to consumers on the other hand ranges from 1:3000 to 1:7000.

# 4.7 Technological issues

Many of the distribution utilities in India are still lacking most basic requirements consumer database and asset database which can be addressed through IT and communication solutions. Utilities do not have complete record of all consumers, which results in to direct revenue loss. Most utilities maintain manual records of consumers (in the form of register) especially in rural areas. Electromechanical meters. manual reading of meters, manual bill preparation and delivery and inadequate bill collection facilities result in to overall delay in revenue collection and revenue leakage. Conventional complaint handling process results in delayed redressal and increased dissatisfaction among customers.Regular monitoring and testing of critical assets such as 11kV feeders, 11/0.4kV distribution transformers and

415V feeders etc. are very important in ensuring reliable supply.

# 5. IMMEDIATE STEPS REQUIRED IN INDIAN POWER SECTOR REFORM

The most important step is to effective and creative management to reduce theft and increase

revenues. The revenues along with performance-tied grants from government and multi- and

bi-lateral agencies can be used to improve technical performance involving reduction of T&D

losses and improvement of power quality (frequency, voltage, continuity). An emphasis on

demand management (peak reduction, load-curve smoothing, end-use efficiency improvement)

is also required. Advantage must also be taken of costeffective cogeneration and

decentralized generation. Corporatization and liberation from government control are

urgently required along with consumer-oriented and marketdriven development of the power

sector. An independent regulatory authority must be established with transparent democratic

functioning. Supply expansion to meet demand-supply gap must be resorted to after efficiency

improvement and decentralized generation. Price reform and subsidy-reduction cannot be

implemented without improving quality and continuity of supply because higher prices require

better quality and improved end-use efficiency.

# 6. PUBLIC BENEFITS AND SUSTAINABLE DEVELOPMENT

Power Sector Reform is a necessary, but not sufficient, condition: Power sector reform

based on corporatization may ensure profits and economic growth, and it may turn the

Electricity Boards around into profitable bodies. But marketdriven reform will not take care

of crucial public benefits -- access, environmental soundness, self-reliance/empowerment and

the long-term. Power sector reform has to be buttressed with a public benefits

dimension/imperative

Public Benefits and Sustainable Development: Left alone, a corporatised and market-driven

power sector will pursue economic growth rather than public benefits. A public benefits

imperative requires the perspective of sustainable development (rather than mere economic

growth). Sustainable development is a process of economic growth with the following

features: economic efficiency, equity through widening access and giving growth a basicneeds

orientation, environmental soundness, empowerment and concern for the long-term

Sustainable Development implies the New Energy Paradigm: What human beings -- as

individuals and as societies -- want is not energy *per se* but energy services to satisfy basic

needs, improve the quality of life, increase production and advance development.

Development requires, therefore, an increasing level of energy services to meet basic needs

more fully, to improve the quality of life and increase production. Thus the level of energy

services must be taken as the measure of development, rather than the magnitude of energy

consumption and supply. Environmental soundness has to be achieved by exploiting end-use

efficiency measures, renewable sources and "clean" centralized sources of energy. Selfreliance

and empowerment of rural communities by promoting decentralized sources for rural

areas. Self-reliance also requires the initiation and strengthening of technological capability in

energy analysis, planning and implementation. Economic efficiency by increasing energy

services through a rationally determined and efficiently achieved mix of end-use efficiency

measures, decentralized renewable sources and "clean" centralized sources of energy.

Economic efficiency also requires that the issues of policy, institutions, financing,

management, etc, involved in the implementation of such a mix be tackled. Concern for the

long-term by fostering and developing emerging technologies of end-use efficiency

improvement and of renewable sources and promoting their dissemination.

# 7. PRIVATIZATION FROM THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT

*Private Ownership does not necessarily create competition:* The transmission grid does not

lend itself to replication, or even duplication; hence, a single transmission grid and no

competition is the natural situation. Similarly, the distribution system does not lend itself to

10 replication/ duplication except in very small areas such as villages; hence, there is a bias

towards a single distribution system with no competition. It is only in generation that there

can be competition but even here there will only be a small number of generators (not the

"infinity" required by an ideal market), i.e., a duopoly or oligopoly. It is inevitable that there

are tendencies to dominate market and to collude. Hence, withdrawal of government from

market and change from public to private ownership will not result automatically in

competition

*Private ownership and Exploitation*: Private companies may exploit captive segment of

market by raising prices

*Private monopolies/oligopolies and regulation*: Private monopolies/oligopolies need heavier

regulation. Hence, no privatization without regulation

*Privatization and High Discount Rates*: Private capital uses high discount rates leading to

reduction of total investment and less capital-intensive shortgestation projects

*Private ownership and Performance*: Private ownership is neither only nor even central issue

in improving performance

*Privatization and Foreign Capital*: Is privatization a recipe for foreign capital to earn

substantial and secure profits from ownership of large segments of electricity sector?

# 8. A SUSTAINABLE-DEVELOPMENT-ORIENTED APPROACH TO THE ELECTRICITY SYSTEMS OF DEVELOPING COUNTRIES

# **8.1** Objectives of/Expected benefits from the programme

i) Reduction of AT&C losses from the existing around 60% to around 15% in five years to begin with in the urban areas and high density/ consumption areas.

ii) Significant improvement in revenue realization by reduction of commercial losses leading to realization of an additional Rs.20, 000 Crore approximately over a period of 4-5 years.

iii) Reduction of technical losses would result in additional energy equivalent to nearly 6,000 - 7,000 MW to the system, avoiding the need of 9,000 to 11,000 MW of fresh capacity addition besides avoiding investments to the tune of Rs.40,000 to Rs.60,000 Crore;

iv) Quality of supply and reliable, interruption- free power will encourage usage of energy efficient equipments / appliances, which will further lead to improvement in availability of energy.

v) Reduction in cash losses on a permanent basis to the tune of Rs.15, 000 Crore.

vi)Distribution reform as envisaged above will help States to avoid heavy subsidies, which are given to SEBs / State Utilities by State Governments.

# 8.2 R-APDPR

It was in this backdrop that the Restructured APDRP (R-APDRP) was conceived in September 2008.With a total program size of Rs 500bn, Restructured APDRP-II (R-APRDP) is Government of India''s initiative to reform Distribution Sector as part of the 11th Five Year plan. The program is proposed to cover urban areas – towns and cities with population of more than 30,000 (10,000 in case of special category states). The power reform initiative is spread over two phases of:

Phase 1: Covering IT applications in the distribution sector and

Phase 2: Strengthening system improvement.

# 8.3 Key features of R-APDRP

Funding under R-APDRP is contingent upon actual, demonstrable performance in terms of sustained reduction of AT&C losses. R-APDRP seeks to commence with tackling the problem of un-metered supply and lack of proper data acquisition systems, followed by system up-gradation and modernisation of equipment. Proposals under R-APDRP will be considered in two phases. In the first phase, proposals for establishing reliable and automated systems for the sustained collection of accurate baseline data and IT applications for energy accounting/auditing and IT-based consumer service centres will be considered for funding. In the second phase, proposals for strengthening/upgradation of power distribution will be considered.

# 8.4 Emerging Technologies Adopted under Distribution Reform Process

A plethora of emerging technologies are playing increasingly significant role in distribution system automation and reforms process in India's power sector. Some of the key technologies extensively adopted by some SEBs in power distribution reforms under R-APDRP are:

i. GIS-based consumer indexing and electrical network mapping:

ii. Automated Meter Reading (AMR)

iii. Energy Audit and Accounting:

iv. Load Flow Analysis:

v. Meter Data Logging System:

vi. IVRS-based consumer call centre:

vii. Spot billing machines:

viii. Prepaid Metering System:

ix. Any-time payment (ATP) machines

### 8.5 Financial Progress of APDRP

The total fund planned under APDRP in the 10th (2002-07) Plan is around Rs. 40,000 crores with investment component estimated to be around Rs 20,000 Crores and incentive for cash loss reduction at Rs.20, 000 crores.. Under investment component 583 projects were sanctioned with cost of Rs.19180.46 Crore against this Rs.6131.70 crores were released. The Counter-Part funds tied up were Rs. 7044.34 Crore and funds drawn were Rs. 4087.04 Crore and Funds utilized were Rs. 9518.13 Crore. Incentive for reduction of cash loss amounting to Rs.1536.64 Crore has been paid to the states of Andhra Pradesh, Gujarat, Haryana, Kerala, Maharashtra, Rajasthan, West Bengal and Punjab for showing cash loss reduction of Rs. 3446.60 crore.

#### 8.6 Achievements Under APDRP

8.6.1 Reduction in AT&C losses:

The AT&C losses which were about 36.81% in the year 2001-02 have reduced to 33.82% in the year 2004-05.313 towns covered under APDRP have shown reduction in the AT&C loss. 212 APDRP towns have brought down AT&C losses below 20 percent. 169 towns have shown loss below 15% and 38 towns have achieved AT&C loss between 15 & 20%. The overall commercial loss (without subsidy) of the utilities reduced from Rs. 29,331Crore during 2001-02 to Rs.19,722 Crore during 2003-04. However, the same increased to Rs. 22,126 Crore during 2004-05. Cash loss reduction of Rs.3447crores was achieved by states of AP, Gujarat, Kerala, Maharashtra, Punjab, Rajasthan and West Bengal.

8.6.2 Progress of Metering

#### (a) 11 kV feeders metering:

At national level 96% feeders have been metered as of now, as against 81% metered during 2001-02. 100% feeder metering has been achieved in 18 states.

#### (b) Distribution Transformer Metering:

The distribution transformer metering is a prerequisite for carrying out energy audits and identifies the high loss area in the LT system. The overall DT metering in the country is still low in most of the states. The maximum extent of DTR
metering is around 25% for the states of Karnataka and Maharashtra.

#### (c) Consumer metering:

During 2001-02 the consumer metering was at 78%. It has now increased to 92% during 2005- 06.Majority of the unmetered consumers belong to agriculture and flat rate categories.

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# A new approach to SMS Text Steganography using Emoticons

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#### ABSTRACT

One of the widely used service provided by mobile phones is the Short Messaging Services. It enables the user to send short messages to the receiver he/she intends to communicate.

This paper proposes a new method at text steganography where the emoticons that are so generously and frequently used in SMS's are used to hide information, particularly an alphabet or a number.

#### Keywords

Short Message Service, Information Hiding, Text Steganography, SMS Text Steganography.

#### 1. INTRODUCTION

Short message service is one of the most widely used services ever across the spectrum. There are approximately 17-18 billion SMS sent each day around the world [1]. Some might argue that instant messaging is overtaking Short Message Services but it has to be noted that there are 3.5 billion texters worldwide as compared to 586 million according to Informa's Pamele Clark-Dickson [1].

Just the sheer volume give great opportunity in sending secret messages without arising any major suspicion. The only thing that has to be made sure is that the language that is sent in as a SMS has to be sync with the SMS lingos or emoticons that are widely used worldwide.

Steganography is the art and science of hiding secret data in another medium. The data that has to be hidden is called secret message and the medium in which this secret message is hidden is called cover document. The cover document containing hidden message is called stego-document. This stego-document is sent over the unsecured channel to the intended receiver [2].

Steganography is further classified into text, image, video and audio, depending upon the cover medium. Of the text, image,

video and audio, text steganography is the most challenging because text documents contain very less redundant data as compared to image, video or audio [3].

Emoticons are widely used in SMS's. In this paper we propose a new approach to text steganography in SMS's by using emoticons as a cover document. Where each emoticons carry a specific hidden word.

#### 2. RELATED WORK

Over the years with the changes in the technology many new methods have been researched in the field of text steganography. In this section we will look at some of these methods that relate to text steganography. Hiding of words in specific characters of words approach as put forward by Moreland [4]. Where a word is hidden character by character in a collection words of a paragraph. Example, third character of every paragraph.

In Text steganography by Line shifting method [5] [6] lines are shifted vertically by some degree. And degree of shifting is taken as 0 and 1.

The approach that generates random sequence of words or characters to hide the information is called Random character and word sequencing method [7].

The word shifting method [5] [8] are those where words are shifted horizontally and by changing the distance between the words the information is hidden.

One way of hiding the information in text steganography is by placing punctuation at preoper places, this approach is called syntactic method [7].

hiding of the message by using synonyms of some particular words, mostly nouns, adjectives, verbs and adverbs is called semantic method techniques [9].

Text steganography by Feature coding technique [10] [11] changes the feature or structure of the text to hide the information.

Extra white spaces are added between words or at the end of the paragraphs according to the Open Spaces Method [12] of the text steganography.

In the field of text steganography in sms the abbreviations that generally used in the sms texting language for example gr8 for great has been used for hiding message. Where, the presence of abbreviation denotes bit 1 and the presence of the full form of the word denotes bit 0. [13]

This method has also been enhanced by EX-ORing the bits to hide the message.

A very similar method of using abbreviations and full forms has also been proposed for online chats [14]. Also emoticons have been used as cover documents for hiding of secret messages by dividing these emoticons in types of emotions, for example crying or laughing, etc. [15]

In this paper we propose a new technique for information hiding in SMS's with the help of emoticons.

#### 3. PROPOSED METHOD

An emoticon is a pictorial representation of a facial expression which draws the attention of the receiver to the mood or the feeling of the sender. It does so usually by the means of punctuation marks. Emoticons are widely used in SMS's where generally there is very less liberty with the number of characters that is allowed in a single message.

These emoticons can be used to send some hidden message. The proposed method assigns one alphabet or number to each emoticons that are available to a general user using SMS services. The alphabets and numbers assigned are

Table1 · Al	nhabate and	Numbers	assigned to	each E	Imoticone
Table1: AI	phabets and	numbers	assigned to	each E	emoticons

Emoticons	Alphabets/Numbers Assigned
:-)	А
:-(	В
;-)	С
:-P	D
=-O	Е
:-*	F
:0	G
B-)	Н
:-\$	Ι
:-!	J
:-[	K
O:-)	L
:-\	М
:'(	Ν
:-X	0
:-D	Р
o_0	Q
:-/	R
х-(	S
:-	Т

<3	U
:-V	V
XD	W
:-Q	X
:-@	Y
:-C	Z
:-0	1
:-S	2
:-B	3
:-#	4
X(	5
0:)	6
@-}	7
:*)	8
-:)	9
>:)	0

These emoticons can be used in a single or multiple messages, so that no suspicion arises, to transmit a hidden message. In a very simple way it is possible to hide an alphabet or a number with the help of the emoticons, when used effectively. That is, 8 bits of data in a single emoticons.

#### 4. ANALYSIS AND ADVANTAGES

- a. Very simple to understand.
- b. The implementation of the system is hassle free compared to other sms text steganography systems.
- c. This message can be used as a cover document to the abbreviation and/or enhanced abbreviation technique. Where instead of giving the abbreviation directly emoticons can be used to express the abbreviation. For example, for the above table instead of writing gr8 for great we can use the emoticons :O :-/ :\*) in a sentence which does not arise any suspicion. This will further enhance the security of the abbreviation or the enhanced abbreviation technique.
- d. As compared to system proposed in [13], where only one bit information is hidden, the proposed system helps in hiding 8 bits or information with a single emoticons.
- e. To keep the method fresh the alphabets and numbers assigned to a particular emoticons can be changed from time to time without much of an effort.
- f. This method can be easily be used and implemented for the fast growing instant messaging as well.

#### 5. CONCLUSION

The paper proposes a very easy method of hiding information in a very widely used communication medium, the Short Messaging Service, with the help of emoticons. Each emoticons carry hidden alphabets with it, unknown to a person to whom the message is not intended.

This method can be easily coupled with other SMS or chat text steganography techniques that have been proposed enhancing the security of those techniques. Also, the proposed method can be used in instant messaging services as well.

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### Hybrid Technique for Data Cleaning

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#### ABSTRACT

Data warehouse contains large volume of data. Data quality is an important issue in data warehousing projects. Many business decision processes are based on the data entered in the data warehouse. Hence for accurate data, improving the data quality is necessary. Data may include text errors, quantitative errors or even duplication of the data. There are several ways to remove such errors and inconsistencies from the data. Data cleaning is a process of detecting and correcting inaccurate data. Different types of algorithms such as PNRS algorithm, Quantitative algorithm and Transitive algorithm are used for the data cleaning process. In this paper an attempt has been made to clean the data in the data warehouse by combining different approaches of data cleaning. Text data will be cleaned by PNRS algorithm, Quantitative data will be cleaned by special rules i.e. Enhanced technique. And lastly duplication of the data will be removed by Transitive closure algorithm. By applying these algorithms one after other on data sets, the accuracy level of the dataset will get increased.

#### Keywords

Data cleaning, PNRS, Improved PNRS, Enhance Technique, Transitive.

#### **1. INTRODUCTION**

Data warehouse is important for storing the large amount of data which plays important role in management's decision support system. This data is stored in the data warehouse should be correctly entered, accurate and relevant. Because incorrect or inaccurate data i.e. dirty data may cause to create various problems like taking incorrect decisions or actions based on that dirty data. Many times incorrect data can be costly. For instance many companies may require sending mails repeatedly due to incorrectly entered address of the Ms. Seema Kolkur Assistant Professor, Department of Computer Engineering, Thadomal Shahani Engineering College, Bandra, Mumbai, India kolkur.seema@gmail.com

customer. Further it may also cause to loosing the customer [3].

Data quality is an important issue in the data warehousing projects. The quality of data can be improved by using different methods where dirty data can be detected and corrected. Data cleaning, data cleansing or data scrubbing is the process of detecting and correcting (or removing) corrupt or inaccurate records from a record set, table, or database. Used mainly in databases, the term refers to identifying incomplete, incorrect, inaccurate, irrelevant, etc. parts of the data and then replacing, modifying, or deleting this dirty data [9].

Data cleansing is the first step and most critical, in a Business Intelligence (BI) or Data Warehousing (DW) projects, yet easily the most underestimated. T. Redman suggests that the cost associated with poor quality data is about 8-12% of the revenue of a typical organization. Thus, it is very significant to perform data cleaning process for building any enterprise data warehouse [1]. After cleaning, a data set will be consistent with other similar data sets in the system. The inconsistencies detected or removed may have been originally caused by user entry errors, by corruption in transmission or storage, or by different data dictionary definitions of similar entities in different stores.

This paper presents a hybrid (integrated) technique to perform data cleaning process for building any enterprise data warehouse by using algorithms that detect and correct most of the error types and expected problems.

• Text data will be cleaned by improved PNRS algorithm

• Quantitative data will be clean by special rules i.e. Enhanced Technique.

• Duplication of the data will be removed by Transitive closure algorithm.

So that by applying these algorithms one after other on data sets, the accuracy level of the dataset will be increased.

#### 2. RELATED WORK

Many methods are proposed by researchers for data cleaning. Dictionary based data cleaning is widely used technique. In this the dictionary has been maintained for the mapping incorrect word and correcting it according to the dictionary word. Dictionary used for the data cleansing process can be both real world dictionary as well as organization level dictionary.

C.varol et al. [4] have proposed PNRS algorithm i.e. Personal Name Recognizing strategy. This algorithm works on text based entries. PNRS include Near-Miss strategy and Phonetic algorithm. This algorithm detects and corrects textual words using standard verbal vocal dictionaries. Arindam Paul et al. [1] have given approach for PNRS by using organization specific dictionary along with the real world dictionary. M.M. Hamad [2] has proposed data cleaning technique for quantitative data. Quantitative data can be detected and corrected by applying some special rules. This enhanced technique can be used for quantitative data that has limited values.

Many researchers have worked on the transitive closer algorithm for cleaning the data. M.A. Hernandez, et al. [5] has worked on transitive closure algorithm that helps in finding the duplicates in the data. R. Bheemavarm et al. [7] have proposed approach to group related data records together using the transitive closure. W.N. Li et al. [8] have used transitive closure algorithm in filling of missing records, removing data redundancies and grouping of similar records together.

#### **3. BACKGROUND**

This paper propose the Hybrid technique for the data cleaning system. Hybrid technique is grouping of data cleaning algorithms like PNRS algorithm, Enhanced Technique, Transitive algorithm. In this process, first Improved PNRS algorithm will be applied which corrects text Enhanced Technique will be applied to correct quantitative data. And after correcting Text and quantitative data, lastly duplication of records will be removed and missing values will be filled by applying Transitive algorithm.

#### 3.1 PNRS Algorithm:

C.Varol et al. [4] Have proposed the PNRS Algorithm for Data Cleaning. It corrects the phonetic and typographical errors present in the data set using standard dictionaries. PNRS algorithm mainly includes two Algorithms-

i) Near-Miss Strategy – This approach works on the technique where two words are found identical by interchanging, inserting, or by deleting two letters. If valid word is generated by applying this technique; it is added to the temporary suggestion list. This can be reviewed and corrected in the original data by automatic or some manual intervention.

ii) Phonetic Algorithm:

When the word is truly miss-spelled, Near-Miss doesn't work efficiently as it's unable to give best list of suggestions. In Phonetic Algorithm phonetic code is calculated for Miss-Spelled word which has to be compared with the phonetic codes of the word list in dictionary. When it gets matched the word is added to the temporary suggestion list and which can be reviewed and corrected by automatic or some manual intervention.

As per A. Paul et al. [1], in the PNRS Algorithm, an organization specific dictionary is being used along with the standard dictionary for checking the spelling mistakes.

#### 3.2 Enhanced Technique:

M. Hamad at el. [2] has attempted to solve all errors and problems that are expected in the quantitative data. An enhanced technique to clean data in the data warehouse uses a new algorithm to detect and correct most of the error types and expected problems, such as lexical errors, domain format errors, irregularities, integrity constraint violation. Here is presented a solution to handle data cleaning process by using an enhanced technique for data cleaning [2].

#### 3.3 Transitive Closure Algorithm:

A. Paul et al. [1], have proposed the Transitive Closure Algorithm which works in fully automated way. This approach is based on using more than one key to match the records into same group.

This technique works at two levels. At the first level, it divides keys in three categories i.e. into primary, secondary, and territory. Then at second level inside the categories order the keys based on decreasing priority of Uniqueness/importance. Then proper rules on records are applied depending upon number of keys matches which will find related records. And accordingly duplicate records get deleted from the dataset automatically and also missing values gets filled by this technique.

#### 4. PRAPOSED DATACLEANING TECHNIQUE

#### 4.1 Improved PNRS:

The modification done in the PNRS Algorithm in this paper is, Using some predefined characteristics on some attributes; it will give more accurate and less number of suggested words in the suggestion list. That means it will avoid some non-relevant suggestions so that it will help user to choose the correct word easily from the suggestion list.

For example, if we apply this modified version of Near-Miss Strategy in PNRS algorithm on the 'NAME' attribute. if we have specified characteristic of 'AMIT' as 'MALE' and 'AMITA' AS 'FEMALE' in the dictionary itself; then while correcting the incorrectly entered word say 'AMI' whose Gender attribute is having value as MALE; will get 'AMIT' as a suggestion in the list. It will simply avoid 'AMITA' suggestion in the list even though it is present in the dictionary.

Taking another example, if we apply this modified version of Phonetic Algorithm in PNRS algorithm on the 'CITY' attribute. If we have specified characteristic of 'AHMEDABAD' as 'GUJRATH' and 'AHMEDNAGAR' AS 'MAHARASHTRA' in the dictionary itself; then while correcting the incorrectly entered word say 'AHAMED' whose State attribute is having value as GUJRATH; will get 'AHMEDABAD' as a suggestion in the list. It will simply avoid 'AHMEDNAGAR' suggestion in the list even though it is present in the dictionary.

#### 4.2 Enhanced Technique:

The PNRS Algorithm which includes Near-Miss Strategy and Phonetic algorithm works efficiently on the 'Text Data'. i.e. this algorithm detects and corrects all textual errors effectively. These algorithms when works on the data set for data cleaning, the Quantitative data is completely ignored in these approaches. Hence in this paper we have proposed an enhanced technique for data cleaning; which will work on the quantitative data so that incorrectly entered numerical values will get identified and corrected.

M. Hamad at el. [2] has attempted to solve all errors and problems that are expected in the quantitative data. They have presented some rules needed in the data cleaning system.

Enhanced technique algorithm is applied on the quantitative attributes for example Date of birth and age. Which corrects wrongly corrected data.

If the entry of attribute Birthday incorrectly entered as '19992',

Then applying special rule {Age = Current Date – Birthday; 0 < age < 120; no negative}

The entry will be corrected as '1992' and age will be calculated as 21.

#### 4.3 Hybrid Approach:

Proposed data cleaning technique used here is Hybrid system for the data scrubbing. The improved PNRS algorithm is used to correct the textual data then modified enhanced technique is used to detect and correct quantitative data. So that, data cleaning system can handles 'Text' as well as 'Quantitative' data. After applying these algorithms i.e. PNRS and Enhanced technique; The Transitive closure algorithm can be applied on the data. So that it will remove redundant data and fill missing values. Applying transitive algorithm at the end of the hybrid system will give more accuracy than applying it directly on the unclean dataset. And also, while filling missing values after removal of the duplication; it will take newly corrected data (Text/Numerical).

Hence rather than using these algorithms separately i.e. only to correct text data or quantitative data or to avoid duplicate records, this proposed hybrid technique covers all areas of the data i.e. Text fields, Quantitative fields and then removal of duplication and filling missing values. So this Hybrid approach gives best data cleaning system to scrub the data in the dataset.

Fig. 1 shows overall system flowchart.



Fig1: System Flowchart

#### **5. RESULTS AND ANALYSIS**

I able	: Unclean	Dataset				
Stu_ID	Religion	Nationality	State	Mothertoung	DOB	A
1000	Hind	Indian	M ahar ash	Marathi	11/5/1992	1
1001	Jian		Gujarath	Guajarathi	18/10/1991	2
1002	Christian	British	Kerala	English	24/10/1991	2
1003	Sikh	Indian	Lanjab	Panjabi	13/3/1988	1
1004	Islam	Bangladesh	Maharashtra	Hindi	17/7/19992	1
1005	Hindu	British	Madras	Englis	10/8/1990	1
1006	Hindu	Indian	Karnataka	Kannada	21/4/1990	1
1007	Hindu	Bangaldeshi	Maharashtra		28/3/1992	1
1008	Christian	Indian	Madras	English	15/15/1791	1
1001	Jain	India	Gujrath	Gujrathi	18/10/1991	1
1007	Hindu	Bangladeshi	Maharashtra	Hindi	28/3/1992	1

								Stu_ID	Religion	Nationality	State	Mothertoung	DOB	Age
Tab	le 2: Res	ult by app	lying Improv	ed PNRS Algo	orithm			1000	Hindu	Indian	Maharashtra	Marathi	11/5/1992	21
	Stu_ID	Religion	Nationality	State	Mothertoung	DOB	A	1001	Jain		Gujarath	Guajarathi	18/10/1991	22
	1000	Hindu	Indian	Maharashtra	Marathi	11/5/1992	2	1002	Christian	British	Kerala	English	24/10/1991	22
	1001	Jain		Gujarath	Guajarathi	18/10/1991	2	1003	Sikh	Indian	Panjab	Panjabi	13/3/1988	25
	1002	Christian	British	Kerala	English	24/10/1991	2	1004	Islam	Bangladeshi	Maharashtra	Hindi	17/7/1992	21
	1003	Sikh	Indian	Panjab	Panjabi	13/3/1988	2	1005	Hindu	British	Madras	English	10/8/1990	23
	1004	Islam	Bangladeshi	Maharashtra	Hindi	17/7/19992	2	1006	Hindu	Indian	Karnataka	Kannada	21/4/1990	23
	1005	Hindu	British	Madras	English	10/8/1990	2	1007	Hindu	Bangaldeshi	Maharashtra		28/3/1992	22
	1006	Hindu	Indian	Karnataka	Kannada	21/4/1990	2	1008	Christian	Indian	Madras	English	15/15/1991	22
	1007	Hindu	Bangaldeshi	Maharashtra		28/3/1992	2	1001	Jain	Indian	Gujrath	Gujrathi	18/10/1991	23
	1008	Christian	Indian	Madras	English	15/15/1791	2	1007	Hindu	Bangladeshi	Maharashtra	Hindi	28/3/1992	22
	1001	Jain	Indian	Gujrath	Gujrathi	18/10/1991	2	3	I					
	1007	Hindu	Bangladeshi	Maharashtra	Hindi	28/3/1992	a	<mark>१</mark> ।e 4:	Result by	/ applying	Hybrid app	broach		

(Improved PNRS, Enhanced technique,

Transitive)

Stu_ID	Religion	Nationality	State	Mothertoung	DOB	Age
1000	Hindu	Indian	<u>Maharashtra</u>	Marathi	11/5/1992	21
<u>1001</u>	<u>Jain</u>	<u>Indian</u>	Gujarath	Guajarathi	18/10/1991	22
1002	Christian	British	Kerala	English	24/10/1991	22
1003	Sikh	Indian	<u>Panjab</u>	Panjabi	13/3/1988	25
1004	Islam	<u>Bangladeshi</u>	Maharashtra	Hindi	17/7/ <u>1992</u>	21
1005	Hindu	British	Madras	English	10/8/1990	23
1006	Hindu	Indian	Karnataka	Kannada	21/4/1990	23
1007	Hindu	Bangladeshi	Maharashtra	Hindi	28/3/1992	22
1008	Christian	Indian	Madras	English	15/12/ <u>1991</u>	22

#### Table 3: Result by applying Improved PNRS

algorithm and Enhance technique.

Table 1 shows some attributes with wrongly entered data. This is considered as unclean dataset required as input for this system. Here hybrid approach is applied to clean this data in which algorithms like near-miss strategy, phonetic algorithm, enhanced technique with special rules and Transitive algorithm is applied on the dataset. Table 2 shows result by applying only Improved PNRS Algorithm on the text data. Table 3 shows result by applying only Improved PNRS Algorithm on the text data. Table 4 shows result by applying Improved PNRS Algorithm on the text data, enhanced technique on the quantitative data. Table 4 shows result by applying Improved PNRS Algorithm on the text data, enhanced technique on the quantitative data and lastly Transitive algorithm to remove duplication of records. After applying this hybrid approach; as an outcome it will give the dataset with all correct entries.

Taking some examples from above tables we can show how each algorithm works on the data:

#### 5.1 Near-miss strategy:

Near-miss strategy is applied on the attributes Religion and Nationality.

For example: If the entry of attribute Religion is incorrectly entered as 'Jian' instead of 'Jain' then applying near miss strategy two nearer letters 'i' and 'a' will be interchanged and the word will be corrected as 'Jain'.

#### **5.2 Phonetic algorithm:**

Phonetic algorithm is applied on the attributes State and Mothertoung.

For example : If the entry of attribute State is incorrectly entered as 'Maharatr' whose phonetic code is M-636 then it will be matched with dictionary phonetic code M-623 as shown in fig. 2. Then the word will be corrected as 'Maharashtra'.



Fig 2 working of phonetic Technique

#### **5.3 Enhanced technique:**

Enhanced technique algorithm is applied on the quantitative attributes Date of birth and age.

For example: If the entry of attribute Birthday is incorrectly entered as '19992',

Then applying special rule {Age = Current Date - Birthday; 0< age <120; no negative}

The entry will be corrected as '1992' and age will be calculated as 21.

#### 5.4 Transitive algorithm:

Transitive algorithm is applied on the dataset to remove duplicate records and fill missing values.

For example: Stud\_Id 1001 which is entered two times in dataset will be merged as a one record by feeling missing values if any [8].

#### 6. CONCLUSION

The Hybrid System for data cleaning has been proposed which includes PNRS algorithm, Enhanced Technique and Transitive Closure Algorithm. PNRS algorithm detects and corrects unclean Textual data. An Enhanced technique detects and corrects unclean quantitative data. And Transitive Closure Algorithm removes duplication of data and fills missing values.

Experiment has been performed on sample dataset. Comparison between each algorithm applied separately and applying this hybrid data cleaning system shows that, applying hybrid system on the unclean data, system gives more accuracy than applying each algorithm separately.

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### **Feature Extraction and Ranking for Sentiment Analysis**

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#### ABSTRACT

With the rapid expansion of e-commerce over the past 10 years, more products are sold on the Web. More and more people are buying products online. In order to enhance customer shopping experience, it has become a common practice for online merchants to enable their customers to write reviews on products that they have purchased. Some popular products can get hundreds of reviews or more at some large merchant sites. Manual analysis of customer opinions is only possible to a certain extent and very time-consuming due to the multitude of contributions. From the e-commerce perspective, receiving consumer's feedback can greatly improve its strategies in order to increase products of the sector. This research work will present feature wise sentiment analysis of subjective sentences of customer review. Feature extraction will be performed using HAC algorithm. Feature ranking will be done using opinion score obtained from SentiWordNet.

Keywords—Sentiment analysis, Opinion mining, Feature ranking, Natural language processing.

#### INTRODUCTION

Opinion Mining is a field of Web Content Mining that aims to find valuable information out of users opinions. Mining opinions on the web is a fairly new area, and its importance has grown significantly mainly due to the fast growth of ecommerce, blogs and forums. The World Wide Web has grown exponentially in recent years both in terms of size and diversity of the contents provided [1]. It has contributed a very large amount of data termed as user generated content. These new contents include customer reviews, blogs, and discussion forums which expresses customer satisfaction/dissatisfaction on the product and its features explicitly.

Most of the time the customer does not directly indicate the choice in a straight forward manner but does so in sentences which contain the actual reviews along with lines Management Science, Springer US, vol. 132, pp. 39-75, 2010.

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which are general in nature and has nothing to do about the product or opinion. Such sentences are challenging due to many reasons like, user not writing the features explicitly, writing incorrect sentences, omitting punctuation marks and writing grammatical incorrect language. As customer feedback influences other customer decisions about buying the product, these feedbacks have become an important source of information for businesses when developing marketing

strategies and segmenting the customers. The difficulty lies in the fact that majority of the customer reviews are very long and their numbers are also very high which makes the process of distillation of knowledge a very difficult task. Most of the times a user will read a few reviews and will try to make a decision about the product. The chances that a user will end up taking a biased decision about the product are not ruled out. Similarly, manufacturers want to read the reviews to identify what elements of a product affect sales most and what are the features the customer likes or dislikes so that the manufacture can target on those areas. More importantly, the large number of reviews makes it hard for product manufacturers or business to keep track of customer's opinions and sentiments on their products and services.

There are many areas where sentiment analysis can be used as following:

- A company is interested in customer's perceptions about its products and the information may be used to improve products and identifying new marketing strategies. Sentiment Analysis is used to find these customer's perception about product from the thousands of review.
- ii. Tourists want to know the best places or famous restaurants to visit. Sentiment analysis can be used to obtained relevant information for planning a trip.
- By applying sentiment analysis we can detect the user's opinion from the posted movie reviews on specialized sites.

#### **1.1 Sentiment Classification**

There are three types of opinion mining approaches [5].

[1] Feature level or Phrase level

In this, for the product, the particular features are classified and for those features, the comments or reviews are taken separately.

[2] Sentence level

In this, the comments or reviews are opinionated. The benefit of this approach is in this, the customer can come to know about so many different types of customer's reviews. In this approach, it mainly differentiates between the subjective and objective information. The subjective information is the opinion, which can be negative or positive and the objective information is the fact.

[3] Document level

In this the whole document is written for the product, it is written by only one person. So, it is not as useful because the customer will come to know the review of only one customer.

#### **2. DATA SOURCE**

User's opinion is a major criterion for the improvement of the quality of services rendered and enhancement of the deliverables. Blogs, review sites, data and micro blogs provide a good understanding of the reception level of the products and services [4].

#### 2.1. Blogs

With an increasing usage of the internet, blogging and blog pages are growing rapidly. Blog pages have become the most popular means to express one's personal opinions. Bloggers record the daily events in their lives and express their opinions, feelings, and emotions in a blog (Chau & Xu, 2007). Many of these blogs contain reviews on many products, issues, etc. Blogs are used as a source of opinion in many of the studies related to sentiment analysis (Martin, 2005; Murphy, 2006; Tang et al., 2009).

#### 2.2. Review Sites

For any user in making a purchasing decision, the opinions of others can be an important factor. A large and growing body of user-generated reviews is available on the Internet. The reviews for products or services are usually based on opinions expressed in much unstructured format. The reviewer's data used in most of the sentiment classification studies are collected like the e-commerce websites from (product reviews), www.amazon.com www.yelp.com (restaurant reviews), www.CNET download.com (product reviews) and www.reviewcentre.com, which hosts millions of product reviews by consumers. Other than these the available are professional review sites such as www.dpreview.com , www.zdnet.com and consumer opinion sites on broad topics and products such as www .consumerreview.com, www.epinions.com, www.bizrate.com (Popescu& Etzioni ,2005 ; Hu,B.Liu ,2006 ; Qinliang Mia, 2009; Gamgaran Somprasertsi, 2010).

#### 2.3. Dataset

Most of the work in the field uses movie reviews data for classification. Movie review data's are available as dataset http:// www.cs.cornell.edu/People/pabo/movie-review-dat a). Other dataset which is available online is multi-domain sentiment (MDS) dataset. (http:// www.cs.jhu.edu/mdredze/datasets/sentiment). The MDS dataset contains four different types of product reviews extracted from Amazon.com including Books, DVDs, Electronics and Kitchen appliances, with 1000 positive and 1000 negative reviews for each domain. Another review available dataset is http://www.cs.uic.edu/liub/FBS/CustomerReviewData.zip. This dataset consists of reviews of five electronics products downloaded from Amazon and Cnet (Hu and Liu, 2006; Konig & Brill, 2006; Long Sheng, 2011; Zhu Jian, 2010; Pang and Lee, 2004; Bai et al., 2005; Kennedy and Inkpen, 2006; Zhou and Chaovalit, 2008; Yulan He 2010; Rudy Prabowo, 2009; Rui Xia, 2011).

#### 2.4. Micro-blogging

Twitter is a popular micro blogging service where users create status messages called "tweets". These tweets sometimes express opinions about different topics. Twitter messages are also used as data source for classifying sentiment.

#### 3. PROPOSED SENTIMENT ANALYSIS SYSTEM.

The system consists of five major modules shown in fig. 1. The working principles of these modules are explained in the following sub-sections.



Fig-1: Architecture of the proposed opinion mining system

#### **3.1 Document Preprocessor**

The data from the data set is preprocessed so as to set the data in the format which is acceptable to the data processing algorithms. For example, each review is divided into sentences. Sentence wise database is prepared for each review. **3.2 Document Parser** 

All sentences are parsed using Stanford Parser [6], which assigns Parts-Of- Speech (POS) tags to English words based on the context in which they appear. The POS information is used to locate different types of information of interest inside the text documents. For example, generally noun phrases correspond to product features, adjectives represent opinions, and adverbs are used as modifiers.

#### 3.3 Subjectivity/Objectivity Analyzer

According to Pang and Lee [7] subjective sentences are expressive of the reviewer's sentiment about the product, and objective sentences do not have any direct or obvious bearing on or support of that sentiment. Therefore, the idea of subjectivity analysis [8] is used to retain segments (sentences) of a review that are more subjective in nature and filter out those that are more objective. This increases the system performance both in terms of efficiency and accuracy. The system divide the review into subjective sentence and objective sentence using objective score obtained from SentiwordNet [3].

#### 3.4 Feature and Opinion Extractor

The system uses High Adjective Count (HAC) algorithm to identify potential features[2].The main idea behind the algorithm is that the nouns for which reviewers express a lot of opinions are most likely to be the important and distinguishing features than those for which users don't express such opinions.

# 3.5 Review Summarizer and Feature Ranker

- 1. The polarity of extracted opinions for each feature is classified using SentiwordNet [3].
- 2. A table is maintained for all the features along with their positive opinion words with their positive polarity values. Similar table is maintained for negative features also but with negative polarity values [1].
- 3. The overall weight of a feature is calculated by multiplying the polarity value of the opinion word with the number of sentences which contain that opinion.

#### 4. EXPERIMENTAL RESULTS

In this section, we present the experimental details of the proposed sentiment analysis system. For subjectivity analysis, we used dataset [9] available from http://www.cs.uic.edu/~liub/FBS/sentiment-analysis.html.The dataset consists of 1100 reviews of 11 different products. In dataset each product consists of 200 reviews. Subjectivity/objectivity analysis is done using SentiWordNet. Objective sore of each opinion word is calculated using positive score and negative score obtained from SentiWordNet.

Objective score = 1 - (positive score + negative score)

A Java program is written to calculate objective score of each opinion. Objective score of each sentence is the average of opinion words present in sentence. It is in the range of 0 to 1.Subjectivity/objectivity analysis is done using following observations -

If (Objective score of sentence > 0.5) Then sentence is Objective. Else if (Objective score of sentence <= 0.5) Then sentence is Subjective.

The HAC algorithm is implemented using Java to mine features and opinionated words from the subjective review sentences. To evaluate the efficiency of our feature extraction system we compare our frequent pattern mining algorithm results with HAC algorithm that has been used by [3].A comparative study of system is shown in table 1. Table 1 is maintained for all the features along with their positive opinion words with their positive polarity values and for negative opinion words with negative polarity values.HAC algorithm is used to find out potential features from subjective and objective sentences both, while our proposed system is used to extract potential features using HAC algorithm for subjective sentences only.

The overall weight of a feature is calculated by multiplying the polarity value of the opinion word with the number of sentences which contain that opinion. It is given by the following formula.

Total weight = 
$$\sum_{n=1}^{a}$$
 Weight of features

Here d is number of documents containing feature.

Polarity value is score value obtained by SentiwordNet [3]. A table 2 is maintained to calculate weight of feature. For example for a product Canon-G3, weight of image quality feature is-

W (image quality) = (3.0\*1) + (3.0\*1) = 6.0

Table 2: Score value for image quality feature of Canon-G3

Feature	Opinion word	Score	No. sentences	of
image	best	3.0	1	
quality	outstanding	3.0	1	

#### 5. EVALUATION METHOD

Manual evaluation has been performed to judge the overall performance of the system. For evaluation of the experimental results, following standard IR performance measures are used [1]. True positive **TP** (number of correct feature-opinion pairs the system identifies as correct).

False positive **FP** (number of incorrect feature-opinion pairs the system identifies as correct).

True negative **TN** (number of incorrect feature-opinion pairs the system identifies as incorrect).

False negatives **FN** (number of correct feature-opinion pairs the system fails to identify as correct).

By using these values we calculate the following performance measures:

Table 1: Comparative study of 11 product's features.

**Precision** ( $\pi$ ): the ratio of true positives among all retrieved instances.

$$\pi = \frac{TP}{TP + FP}$$

**Recall** ( $\rho$ ): the ratio of true positives among all positive instances.

$$\rho = \frac{TP}{TP + FN}$$

Sr.	Product	Subjective and Objective	tive sentences both	Subjective sentences	ices only	
No.	name	Positive features	Negative features	Positive features	Negative	
					features	
		camera 14.5	lens unit -1.5	camera 12.5	lens unit -1.5	
		quality 6.5	shooting -2.0	design 6.5	period -2.0	
1	Canon-G3	design 6.5	period -2.0	image quality 6.0		
		image quality 6.0	strap -2.5	quality 3.0		
		resolution 4.0		resolution 2.5		
		control 1.5	array 0 5	control 1.5	improvement -0.5	
		software 4 5	improvement -0.5	software 3.0	array -0 5	
2	Jukebox	sound quality 3.5	battery replacement -1.5	sound quality 2.5	product -1.0	
		display 2.5	5 1	display 2.5	battery	
		size 2.5		1 5	replacement -1.5	
		quality 26.5	noise -0.5	quality 23.5	test -1.5	
	Canon-	camera 23.5	test -1.5	camera 21.5		
3	PowerShot-	quality picture 4.0	photographer -2.61	quality picture 4.0		
	SD500	sound 4.0		sound 4.0		
		image quality 4.0	1	image quality 4.0		
		camera 21.5	diameter -0.5	camera 12.0		
4	Nikon-	quality 11.0 battery life 5.5	Julik -0.5 adjust feature 1.0	quality 7.0 battery life 5.5	-	
7	Coolpix-4300	size 4 5	system -3.0	resolution 4.0		
		resolution 4.0	system -5.0	size 0.0		
		machine 7.5	diameter -0.5	machine 7.5	diameter -0.5	
	<b>TT</b> , <b>1</b>	speed control 6.0	junk -0.5	adjustment 4.5	adjust feature -1.0	
5	Hitachi-	depth 5.0	adjust feature -1.0	speed control 4.0	system -3.0	
	Router	adjustment 4.5	system -3.0	visibility 4.0		
		visibility 4.0		depth 2.5		
		documentation 3.5	setup -1.0	documentation 3.5	setup -1.0	
6	Linksys-	state device 3.5	hole -1.0	state device 3.5	hole -1.0	
	Router	tech support 2.5	support -2.0	tech support 2.5		
		security 2.5		security 2.5	plue 0.5	
		hattery 10.0	plus -0.5	card 9.0	pius -0.5 sort -2 5	
7	Micro-MP3	card 9.0	software -2 5	battery 7 5	5011-2.5	
		size 3.5	sort -2.5	sound 1.0		
		screen 2.5		player 0.5		
		quality 16.5	battery -0.5	quality 16.5	model -0.5	
		product 10.5	surface -1.5	product 7.0	value -1.0	
8	iPod	player 6.5		player 5.5	surface -1.5	
Ŭ	n ou	music 6.0		music 5.0	battery -4.0	
		design 5.0		sound 4.0		
		sound 4.0	array_0.5	uesigii 1.5	array 0.5	
		mality 15 5	series -1.0	screen 9.0	habit $-1.0$	
		screen 9.0	habit -1.0	quality 9.0	series -1.0	
9	Nokia-6610	design 7.0		design 7.0		
		radio 4.0		signal strength 4.0		
		signal strength 4.0		radio 2.0		
		speakerphone 1.5		speakerphone 1.5		
		camera 18.0	start -1.5	quality 5.0	metal case -0.5	
		battery 11.0	choice -3.0	camera 4.5	start -1.5	
10	Canon-S100	quality 6.5		picture quality 4.0	choice -2.5	
		resolution 5.5		memory 3.0		
		memory 4.5		battery 1.5	Justice 1.5	
		pnone 30.0	price -0.5	phone 19.0	design -1.5	
		reception 8 5	uesign -1.5	camera 6 5		
11	Nokia-6600	look 4 0		look 4 0		
		quality 3.5		quality 3.5		
		battery life 2.5		battery life 2.5		

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of the

The values

above performance measures are calculated for canon-G3 product. Table 3 and table 4 summarize the performance measure values for our system. From the above experiments, it is clear that the propose sentiment analysis system provide better precision and recall values compare to HAC algorithm.

The recall value is lower than precision indicating that certain correct feature-opinion pairs could not be recognized by the system correctly. This is justified since most of the reviewers do not follow the grammatical rules while writing reviews due to which the parser fails to assign correct POS tag and thereby correct dependency relations between word pairs. However, most of the identified featureconcept pairs are correct, which leaves scope for enhancing our grammar to accommodate more dependency relations. After analyzing the review documents manually we also found that some review documents contain junk sentences too which opens a new direction of research on how to eliminate these spam review and improve the performance of the system.

Table 3: Precision value of 200 reviews of Canon -G3.

Product	Feature	Precision	
name		HAC	Proposed
		algorithm	system
Canon-	design	33	50
G3	resolution	50	66
	control	50	66

Table 4: Recall	value of 200	reviews of	Canon -G3.
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Product	Feature	Recall	
name		HAC	Proposed
		algorithm	system
Canon-	design	100	50
G3	resolution	60	50
	control	50	50

#### **6. CONCLUSION**

Sentiment detection has a wide variety of applications in information systems, including classifying reviews, Summarizing review and other real time applications.

In future, more work is needed on further improving the performance measures. Sentiment analysis can be applied for new applications. Although the techniques and algorithms used for sentiment analysis are advancing fast, however, a lot of problems in this field of study remain unsolved. The main challenging aspects exist in use of other languages, dealing with negation expressions; produce a summary of opinions based on product features/attributes, complexity of sentence document, handling of implicit product features, etc. More future research could be dedicated to these challenges.

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# Cloud Computing Security Issues and Vulnerabilities & solution

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#### ABSTRACT

Cloud computing is a concept used to describe a variety of computing concepts that involve a large number of computers connected through a real-time communication network such as the Internet. Cloud computing in science is a synonym for distributed computing over a network, and means the ability to run a program or application on many connected computers at the same time. Software as a Service, Platform as a Service, and Infrastructure as a Service are the various cloud computing services. This survey paper analyzes the various unresolved security threats in cloud computing which are affecting the various stake-holders linked to it. It also narrates the pros and cons of the existing security strategy and also introduces the security issues in cloud computing such as Virtualization, Network Security, Policy and Compliance, Data location, Data integrity. This paper also includes vulnerabilities of cloud computing like Session Hijacking, SQL injection Insecure Cryptographic storage, and so on.

Keywords: Cloud Computing, data integrity, segregation and security

#### **1. INTRODUCTION**

The term "cloud" was coined from the computer network diagrams which use it to hide the complexity of infrastructure involved. In the last few years, cloud computing has grown from being a promising business concept to one of the fast growing segments of the IT industry. [1] But when more and more information on individuals and companies are placed in the cloud, concerns are beginning to grow about just how safe an environment it is. Despite of all the hype surrounding the cloud, customers are still reluctant to deploy their business in the cloud. Security issues in cloud computing has played a major role in slowing down its acceptance, in fact security ranked first as the greatest challenge issue of cloud computing.[1] The overall framework of cloud computing is shown in figure 1.



Fig. 1: overall framework of cloud computing

In this paper, we propose the following standards for maintaining security in an unsafe cloud computing environment. Main characteristics include:[2]

- On-demand self-service. The ability for an end user to sign up and receive • services without the long delays that have characterized traditional IT.
- Broad network access. Ability to access the service via standard platforms • (desktop, laptop, mobile etc)
- Resource pooling. Resources are pooled across multiple customers.
- Rapid elasticity. Capability can scale to cope with demand peaks.
- Measured Service. Billing is metered and delivered as a utility service.

The Cloud Computing stack – it contains three distinct categories within Cloud Computing: [1]

I. Software as a Service,

II. Platform as a Service and

III. Infrastructure as a Service.

SaaS applications are designed for end-users, delivered over the web.[2]

<u>PaaS</u> is the set of tools and services designed to make coding and deploying those applications quick and efficient. [2]

<u>IaaS</u> is the hardware and software that powers it all – servers, storage, networks, operating systems.[2]



Fig. 2: Cloud service models

Clouds are broadly classified as follows:

**PERSONAL CLOUDS**: Such clouds are especially operated by single organization. [4]

**GENERAL CLOUDS**: These clouds are used for providing services to common people[4].

**DOMAIN-SPECIFIC CLOUDS:** These clouds are maintained for specific requirements by a group of organizations.[4]

**MIXED CLOUDS OR HYBRID CLOUD**: These clouds are a mixture of above said three clouds which can share data to achieve fulfill a specific requirement.[4]

# 2. SECURITY ISSUES IN CLOUD COMPUTING

Even though there is many advantage concerned in cloud computing, the organization are slow in accepting it due to security issues associated with it. Security is one of the primary issues in cloud environment. Here there are various security concerns given below which are applicable in cloud computing environment [13]

- Virtualization
- Network Security
- Policy and Compliance
- Data location
- Data integrity

#### 2.1 Virtualization:

Virtualization implement some kind of virtual machine which contain the creation of a virtual i.e not actual version of something like hardware platform, operating system, a storage device or network resources. Virtualization is one of the main components of a cloud. Virtual machines are dynamic in nature so it gives some security issues .Virtual machine face main issue about maintaining the security state for a given time.[13]

#### 2.2 Network Security:

Networks lead to more security problem such as DNS attacks, Sniffer attacks,etc.

#### 2.2.1 DNS attack:

DNS stand for <u>domain name system server</u> which translates a name which was easily read by human (such as example.com)

into a numerical <u>IP</u> address that is used to <u>route</u> communications between <u>nodes</u>. In case if the server doesn't know a requested translation it will ask another server, and the process continues recursively. To increase performance, a server will typically remember (cache) these translations for a certain amount of time, so that, if it receives another request for the same translation, it can reply without having to ask the other server again. When a DNS server has received a false translation and caches then it is considered poisoned, and it supplies the false data to clients. If a DNS server is poisoned so it may return an incorrect IP address, diverting traffic to another computer or send the data to incorrect computers (often an attacker's).[13]

#### 2.2.2 Sniffer attack:

A sniffer attack can capture network packets. Sniffers are also known as network protocol analyzers. While protocol analyzers are really network troubleshooting tools, but they are also used by hackers for attempt the hacking in network. In case if the network packets are not encrypted, the data within the network packet can be read using a sniffer. Attackers used Sniffing process to capture network traffic using. Once the packet is captured using a sniffer, the contents of packets can be analyzed and used by attacker. Hackers used Sniffers to capture sensitive network information, such as passwords, account information, ip address, etc.[5]

#### 2.3 Policy and Compliance:

Cloud providers have some policy to ensure that the customer's data won't be breach any regulations even when they left the organization.[5]

#### 2.4 Data location

Data location is always hidden. Clients might never understand where the data is stored.[14]

#### 2.5 Data Integrity

Data integrity is very important in cloud storage. At any level of storage and any type of media the data corruption can happen. Bit rot (loss of bits of data on storage media), controller failures, reduplication, metadata corruption, and tape failures are all examples of different media types causing corruption.

# 3. VULNERABILITIES OF CLOUD COMPUTING

"Vulnerability" in the cloud environment refers to the unauthorized access to the resources. It may be a service running on a server, unmatched applications or operating system software, or an unsecured physical entrance. There are several vulnerabilities that should be considered when an organization is ready to move their critical applications and data to a cloud computing environment, these vulnerabilities are described as follows [5]

#### 3.1 Session Hijacking:

TCP session hijacking is when a hacker takes over a TCP session is performed between two machines. Since most authentication only occurs at the start of a TCP session, which easily allows the hacker to gain access to a machine. A popular method is using source-routed IP packets. This allows a hacker at point A on the network to participate in a conversation between B and C by encouraging the IP packets to pass through its machine. In case if source-routing is turned off, the hacker can use "blind" hijacking, whereby it guesses the responses of the two machines. Thus, the hacker can send a command, but can never see the response. However, a common would be to set a password allowing access from somewhere else on the net. Session hijacking occurs when the attacker steals the user's session id to gain unauthorized access for the information or services residing on a computer system. The diagrammatic representation of session hijacking is shown in figure 3.[5]





Fig. 3: Diagrammatic representation of Session hijacking attack

#### **3.2 SQL injection:**

SQL can give attackers direct access to the database and allow them to leak/alter confidential information or to even execute any malicious code. [16]

#### 3.3 Denial of Service Attacks:

Denial of service means making the resources unavailable for the users. Usually this type of attack temporarily or infinitely stops a service of the host. [5]

#### 3.4 Insecure Cryptographic storage:

Some websites that need to store sensitive information, such as usernames, passwords, credit card information or other personal details, must use strong encryption to secure the data. In secure cryptographic storage sensitive data isn't stored securely. If malicious users can access insecurely stored data, they can get sensitive information easily. [5]

# 4. SECURITY FOR CRYPTOGRAPHIC STORAGE

#### 4.1 Homomorphic encryption:

A solution to Insecure Cryptographic storage problem is homomorphic encryption, which permits computing on encrypted data. Homomorphic encryption is the conversion of data into <u>ciphertext</u> that can be analyzed and worked with as if it were still in its original form. [17]

A very simple example of how a homomorphic encryption scheme might work in cloud computing is:

- Business ABC has a *very important data set* (VIDS) that consists of the numbers 5 and 10. To encrypt the data set, Business ABC multiplies each element in the set by 2, creating a new set whose members are 10 and 20.
- Business ABC sends the encrypted VIDS set to the cloud for safe storage. A few months later, the government contacts Business ABC and requests the sum of VIDS elements.
- Business ABC is very busy, so it asks the cloud provider to perform the operation. The cloud provider, who only has access to the encrypted data set, finds the sum of 10 + 20 and returns the answer 30.
- Business ABC decrypts the cloud provider's reply and provides the government with the decrypted answer, 15.

#### 4.2 Algorithm:

#### Homomorphic encryption

(Input: Sensitive and confidential information.

Output: Encrypted data set)

- 1. BEGIN
- 2. COLLECT very important data set OR
  - Sensitive and confidential information.
- 3. GENERATE Key
- 4. **APPLY** Key On data set and create new data set. (i.e. Encrypted data set)
- 5. STORE to the cloud(Encrypted data set ) {

ALLOW to access only Encrypted data set

- 6. **RETRIVE** data set when required.
- 7. **APPLY** key to decrypt data set.
- 8. STOP.

# 5. PROPOSED ENHANCEMENT IN HOMOMORPHIC ENCRYPTION

In future we can provide the better fully homomorphic encryption systems, as well as new algebraic mechanisms to improve the overall efficiency of cloud computing or cryptographic storage. Also provide enhancement in various application as follows

#### Protection of mobile agents:

The protection of mobile agents by homomorphic encryption can be used in two ways: (i) computing with encrypted functions and (ii) computing with encrypted data.

#### Multiparty computation:

In multi-party computation protocols, the function that should be computed is publicly known, whereas in the area of computing with encrypted data it is a private input of one party.

#### Secret sharing scheme:

In secret sharing schemes, parties share a secret so that no individual party can reconstruct the secret form the information available to it. However, if some parties cooperate with each other, they may be able toreconstruct the secret. In this scenario, the homomorphic property implies that the composition of the shares of the secret is equivalent to the shares of the composition of the secrets.

#### Election schemes:

In election schemes, the homomorphic property provides a tool to obtain the tally given the encrypted votes without decrypting the individual votes.

#### Commitment schemes:

Commitment schemes are some fundamental cryptographic primitives. In a commitment scheme, a player makes a commitment. She is able to choose a value from some set and commit to her choice such that she can no longer change her mind. She does not have to reveal her choice although she may do so at some point later. Some commitment schemes can be efficiently implemented using homomorphicproperty.[18]

#### 6. CONCULSION

Cloud computing offers great potential to improve productivity and reduces costs. It also poses many new security risks. This paper describes the survey of the various unresolved security threats in cloud computing. We believe that due to the complexity of cloud system, it is very difficult to achieve security. New security techniques need to be developed and older security techniques needed to be radically twisted to be able to work with the clouds architecture. In this paper we also try to focus on security for cryptographic storage using Homomorphic encryption.

#### 7. ACKNOWLEDGMENTS

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## Sales Prediction Using Apriori in Distributed Environment-A Survey

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#### ABSTRACT

Our application is designed to find the most frequent itemsets. It is used for predicting the sales in marketing. Market Basket analysis is used for computing frequent item sets. In association rule mining, we use apriori algorithm for implementing the application. This application predicts sales in user level distributed environment. This technique will help in marketing and sales. The analyst then can perform the data mining and extraction and finally conclude the result and make appropriate decision.

#### **General Terms**

Data mining, Apriori Algorithm, Compute Frequent item sets.

#### Keywords

Association rule mining, Apriori algorithm, Market Basket analysis, Distributed Environment.

#### **1. INTRODUCTION**

This system is a useful tool for predicting sales customer purchasing frequent items by extracting associations from transactional databases. It also tracks the sales using the market basket technique, It analyses the combinations of products the customers buy frequently.[1]This application is used for marketing purpose, for eg, in supermarket basically an applications' used which helps to calculate final amount which will get on purchasing the normal product, But here we will try to implement an application which is useful in supermarket to predict the sales on the basis of frequent items eg .bread-butter, chips-ketchup etc. and we try to implement this application in user level distributed environment.[4] If we are having more than one branches of any supermarket then by using user level distributed environment from main branch we are able to calculate the saling amount of frequent items of any branch. Because of that admin or sale manager fastly and easily predict the sales of frequent items. [6]The idea behind this system is to examine the orders for products that have been purchased together. For example using a tracking system you might uncover the fact that customers tend to buy bread and butter together. [8]Using this information you might organize the store so that bread and

butter are next to each other. In ecommerce environment you might create a cross check rule to offer the shopper bread whenever they place butter in their shopping cart [2].The better we analyze the use of customer purchasing behavior, better will be profit and sales to the enterprises [5].Knowing what products people purchase as a group can be very helpful to a retailer or to any other company. A store could use this information to place products frequently sold together into the same area. Direct marketers could use the sales tracking results to determine what new products to offer to their prior customers [3] The strength of this system is that by using computer data mining tools, it's not necessary for a person to think of what products consumers would logically buy together, instead the customers' sales data is allowed to speak for itself.[11]This is a good example of data-driven marketing.. The system satisfies the following objectives:-[7]

· To make more informed decisions about product

Placement, pricing, promotion and profitability.

• To learn more about customer behavior.

• To find out which products perform similarly to each Other.

• To determine which products should be placed near each other.

• To find out if there are any successful products that have no significant related elements.

This system identifies customers purchasing habits. It provides insight into the combination of products within a

Customer's 'basket' .By using term market basket analysis retailer easily gets a result about ordering of items.

#### **2. LITERATURE REVIEW**

Data mining applications are becoming increasingly popular for many applications across a set of very divergent fields. Analysis of crash data is no exception. There are many data mining methodologies that have been applied to crash data in the recent past.[9] However, one particular application conspicuously missing from the traffic safety literature until recently is association analysis or market basket analysis. The methodology is used by retailers all over the world to determine which items are purchased together.[11] In this study, crashes are analyzed as supermarket transactions to detect interdependence among crash characteristics. With the existence of many large amount of transaction database, the huge amount of data, the high scalability of distributed systems, and the easy partition and distribution of the centralized database, it's important to know the efficient method for the data mining of association rules.[9] The association rules it is an important data mining model studied extensively by the database and data mining. For general purposes a database is a collection of data that is stored and maintained at one central location. A database is controlled by a *database* management system.[10] The user interacts with the database management system in order to utilize the database and transform data into information. Furthermore, a database offers many advantages compared to a simple file system with regard to speed, accuracy, and accessibility such as: shared access, minimal redundancy, data consistency, data integrity, and controlled access.[11]

#### **3. ALGORITHMS**

#### Apriori Algorithm

Apriori is designed to operate on databases containing transactions for example, collections of items bought by customers or details of a website frequentation. As is common in association rule mining, given a set of itemsets (for instance, sets of retail transactions, each listing individual items purchased), the algorithm attempts to find subsets which are common to at least a minimum number C of the itemsets. Apriori uses a "bottom up" approach, where frequent subsets are extended one item at a time (a step known as candidate generation) and groups of candidates are tested against the data. Apriori uses breadthfirst search and a tree structure to count candidate item sets efficient candidate item sets of length k from item set Then it prunes the candidates which have a pattern. According to the downward close candidate set contains all frequent klength that, it scans the transaction database to frequent item sets among the candidates. Apriori suffers from a number of inefficiencies. Candidate generation generates large number of subset (the algorithm attempts to load up the candidate many as possible before each scan).exploration (essentially a breadth-first traver lattice) finds any maximal subset S only after proper subsets.

#### APRIORI:

It uses a generate-and-test approach generate candidate itemsets and tests if they are frequent an Candidate itemsets is expensive (in both space and time) •Join Step: Ck is generated by joining Lk-1with itself

•Prune Step: Any (k-1)-itemset that is not frequent cannot be a subset of a frequent k-itemset

•Pseudo-code:

Ck: Candidate itemset of size k

Lk: frequent itemset of size k

L1= {frequent items};

for  $(k=1; Lk!=\emptyset; k++)$  do begin

Ck+1= candidates generated from Lk;

For each transaction tin database do

Increment the count of all candidates in  $Ck\!+\!1\text{that}$  are contained in t

Lk+1= candidates in Ck+1 with min\_support

End

Return  $\cup$  k Lk;

#### 4. CONCEPT

Our paper is based on association rule mining; day to day sales in supermarkets are predicted using apriori algorithm. This helps the retailers to know which products are buyed in combination frequently.

#### 4.1 Concepts in Association Rule Mining 1) Item - It is a field of the transaction database. [11]

2) Transaction- It is corresponding to a record of the database. Transaction usually is marked as small letter t to mark item i.  $ti=\{i1,i2,...,ip\}$ . Each transaction has an only identifier called TID. The whole set of transaction ti constitutes a database D. D=  $\{t1, t2,...,tn\}$ 

3) Support -The support of association rule X-> Y in transaction database is a ratio. The ratio is between the count of item set which contains X and Y, and the count of all of item set. That marks support(X->Y). That is the percent of the item set containing X and Y at the same time in the transaction database.

4) Confidence - It is the ratio between the count of transaction containing X and Y and the count of transaction containing X. That is marked as confidence(X - >Y). Confidence is the percent of the transaction sets containing X and Y at the same time in the transaction database.

5) Frequent Item set-The item set, whose support is not lower than the minimum support (Min Sup).

6) Strong rule and Weak rule -f support(X -> Y) >=MinSupport and Confidence (X->Y)>=MinConf, then mark association rule X-> Y as a strong rule, otherwise mark it as a weak rule.



5. Figures

Fig 1: Architecture of distributed mining



Fig 2. Flowchart

#### 6. ACKNOWLEDGMENTS

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### Text to Speech and Speech to Text System

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#### ABSTRACT

This paper represents a text to speech and speech to text system which eases one to listen to the text written at also one can speak and write a message. This system typically makes use of text synthesis and text recognition mechanism, which helps to perform both the operations on a single stand alone application

#### Keywords

Text to Speech, Speech to Text, Speech Recognition, Text Synthesis, Cued Speech, Auditory Speech, Automatic Recognition, Continuous Phoneme Recognition, Spoken Language, Telephone Communication Technology, Visual-Speech to Text Conversion.

#### INTRODUCTION

The access to communication technologies has become a necessary factor for the handicapped or disabled individuals. This proposed paper introduces the initial step of an automatic translation system that is able to translate visual speech used by deaf individuals (or the handicapped) to text, or auditory speech [1] [9]. This system enables deaf users to communicate with other person and with normal-hearing people through telephone networks or through Internet by only using various telephone devices equipped with simple cameras [2]. This paper introduces automatic recognition and conversion to text of Cued Speech for English.

In the deaf society cued speech is a visual mode used for communication. High recognition rates for both isolated word and continuous phoneme recognition experiments are clearly observed in the proposed system.

A prototype Speech to Text Conversion System in English language using Language Synthesizer is also proposed by the current paper. The Linear Predictive Coding features are extracted so that isolated phonemes of English language can also be recognized [5].

This paper proposes the combination of both the techniques i.e. text to speech and also speech to text. In this process instead of using Matlab commands to recognize speech and synthesize it in the form of text and vice-versa ,paper proposes to program the same content in C# and make both the functionalities work on the same stand alone platform, Tatwadarshi Nagarhalli VIVA Institute of Technology, Virar Mumbai, India tatwadarshipn@gmail.com

enabling the user to perform the two tasks as per user's convenience. The given system can not only benefit the handicap students the most but it will also facilitate one to type is message simply by dictating the message without even physically typing the message with the use of keyboard, this will definitely save time. This application can also be used for educational purposes in order to make students pronounce the words correctly and also find out the mistakes pronounced in a wrong way or typed wrong, thereby improving the English of students.

#### RELATED WORKS

As far as related works are concerned for this paper, earlier in the research was converged to either text to speech or speech to text. Both of these features were implemented in an intercepted manner. Especially the normalization of nonstandard words was focused in order to improvise the computer speech and language synthesizing [4].

Also the speech recognition engine was used to record and modify the buffered signal into any regional language. It was also used for interpreting the speech [8] [6].

These systems faced a drawback that both were a separate individual i.e. they were atomic and were availing only one feature that is either text to speech or speech to text, so in order to overcome this, the paper proposes the idea of including both these features in on single GUI.

#### TOOLS

For the proposed system one needs to make the system platform independent and object oriented, which is user friendly. So in order to satisfy various efficiency protocols we prefer C#.

C# is a multi-paradigm programming language encompassing strong typing, generic, functional, procedural, imperative, declarative, object-oriented, and component-oriented programming disciplines also it supports .NET. Eventually .NET framework smoothly works on IDE like Microsoft Visual Studio, which is programmer friendly and is also a standardized IDE used to program in C#. The C# language is intended to be robust, portable, multithreaded, distributed and durable as it implements garbage collection mechanism which boosts the memory management of a particular system. In Proposed system speech synthesis n recognition plays the most critical part, it can be regarded as the backbone of the complete system thus namespace Speech in used which is only available in the .NET framework 4.0 and above.

#### PROPOSED SYSTEM

The proposed system emphasis on developing an application which includes both text to speech and speech to text conversion mechanism, thus for achieving this goal .NET Framework 4.0 is selected since the said feature is only available in this framework. After selecting this framework a special namespace which allows using speech synthesis and recognition is to be included into the form code. Later for better and faster performance Prompt Builder is invoked which eases the recording and output deliverance work.

Now the form is designed, elements like textbox and buttons are used. Later each element is modified and coded separately. At the time of speech recognition we include a Load Grammar() function which makes sure that the recorded text is as per the defined grammar syntax later the audio device is connected and text is set to append mode, so that the recorded text will append to very last word spoken.

#### Algorithm

Step 1: Start

Step 2: Include Speech namespace.

Step 3: Initialize Speech Synthesizer, Speech Recognition Engine and Prompt Builder.

Step 4: Design Form by adding Speech text button and Start - Stop Button.

Step 5: Implement Speak Text button using the inbuilt Speak method of Speech Namespace.

Step6: Implement the Start and Stop buttons

- Step 6.1: Connect the dictionary in form of choice lists.
- Step 6.2: Set a default Input Audio Device as enabled.

Step 6.3: Load Grammar

Step 6.4: Set Recognized Mode to Multiple

Step 7: Stop

#### Implementation

Since it's a windows based application firstly a form is to create which includes the basic blue print of the application layout. Here the form design is kept simple which includes three buttons and a text box.

The text box is an data field where the user can either write text and use the Speak text button to listen to the text or can see the reflected text in this field when pressed Start button. The three buttons are:

- 1. Speak text
- 2. Start

3. Stop

The significance of Speak text button is that after pressing this button the written text in the text box is read out by the Text synthesizer [3]. Similarly the Start buttons enables the User to commence the recording of the speech which is later converted into text and is reflected in the text box. Stop Button is used to stop the recording the speech.

The proposed application is divided into modules while coding for the system. The module consists of:

- 1. Speech Synthesis
- 2. Speech Recognition Engine
- 3. Prompt Builder

Speech Synthesis is used in order to synthesize the speech which is about to be spoken by the system using Speak method. An object of Speech Recognition Engine is made so that one can recognize the speech and generate the text accordingly in the text field [7]. However this work is supposed to be done quickly without any delay the processing should be as fast as possible thus we also make use of Prompt Builder, which handles the available resources efficiently and gives best result. These are also known as the initialization components. We also make use of grammar clause so the grammatical errors are avoided and one will get a proper result. The Speech being recoded and being simultaneously typed in the text in the text box, it shows that the text is being recorded as it highlights the Stop button.

#### **RESULT AND ANALYSIS**

On the basis of described algorithm the proposed system can be designed and is fully executable. The snapshot of the system clearly shows that the written text can be clearly spoken and at the same time one can speak and write the text. This enables the end user to perform both text to speech and speech to text operation on a single GUI.



Figure 5. Final Proposed system

#### CONCLUSION

This paper describes the successful implementation of a simple text to speech and speech to text conversion by simple C# coding in Visual Studio. Hence this method is very easy and efficient to implement unlike other methods which involve many complex algorithms and techniques. The next step in improving this application would be implementing this system which will perform the same for complete Operating System, this will facilitate the disabled or even can be used by ordinary people perform all tasks by just speaking and performing tasks there by reducing the peripherals like keyboard and mouse or performing tasks by just typing the commands.

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## Traveling Salesman Problem using Ant Colony Optimizing Algorithm

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#### ABSTRACT

Data mining is a process that uses technology to bridge the gap between data and logical decision making. The terminology itself provides a promising view of systematic data manipulation for extracting useful information and knowledge from high volume of data. Numerous techniques are developed to fulfill this goal. This paper describes the data mining terminology, outlines the colony optimization algorithm which is used newly in data mining mostly aiming solve data-clustering and data-classification problems and developed from imitating the technique of real ants finding the shortest way from their nests and the food source.

#### Keywords

Data mining, Data clustering, knowledge discovery in databases, colony optimization, traveling salesman problem.

#### INTRODUCTION

Knowledge Discovery in Databases (KDD)[1] is an automatic, exploratory analysis and modeling of large data repositories. KDD is the organized process of identifying valid, novel, useful, and understandable patterns from large and complex data sets. Data Mining (DM)[2] is the core of the KDD process, involving the inferring of algorithms that explore the data, develop the model and discover previously unknown patterns. Data clustering is a method in which we make cluster of objects that are somehow similar in characteristics.

Ants exhibit complex social behaviors that have long since attracted the attention of human beings. Probably one of the most noticeable behaviors visible to us is the formation of socalled ant streets. When we were young, several of us may have stepped on such an ant highway or may have placed some obstacle in its way just to see how the ants would react to such disturbances. We may have also wondered where these ant highways lead to or even how they are formed. This type of question may become less urgent for most of us as we grow older and go to university, studying other subjects like computer science, mathematics, and so on. However, there are a considerable number of researchers, mainly biologists, who study the behavior of ants in detail. The criterion for checking the similarity is implementation dependent\*.Ant colony optimization (ACO)[3] is a heuristic algorithm which has been proven a successful technique and applied to a number of combinatorial optimization problems and is taken as one of the high performance computing methods for Traveling salesman problem (TSP)[4]. TSP is one of the most famous combinatorial optimization (CO) problems and which has wide application background. ACO has very good search capability for optimization problems, but it still remains a computational bottleneck that the ACO algorithm costs too much time to convergence and traps in local optima in order to find an optimal solution for TSP problems.

Initially, three different versions of AS were proposed (Dorigo et al., 1991a; Colorni, Dorigo, Maniezzo, 1992a; Dorigo, 1992). These were called ant-density, antquantity, and ant-cycle. Whereas in the ant-density and antquantity versions the ants updated the pheromone directly after a move from one city to an adjacent city, in the antcycle version the pheromone update was only done after all the ants had constructed the tours and the amount of pheromone deposited by each ant was set to be a function of the tour quality. Nowadays, when referring to AS, one actually refers to ant-cycle since the two other variants were abandoned because of their inferior performance.

#### ANT COLONY OPTIMIZATION

Ant colony optimization (ACO) mimics the way real ants find the shortest route between a food source and their nest. As shown in Figure 1-a, ants start from their nest and goes along a linear path through the food source.



Figure 1. Behavior of ants between their nest and food source

Actually, if there exists a difficulty on the path while going to the food source (Figure 1-b), ant lying in front of this difficulty cannot continue and has to account a preference for the new outgoing path. In the present case, selection probability of the new direction alternatives of ants is equal. In other words, if ant can select anyone of the right and left directions, the selection chance of these directions is equal (Figure 1-c). Namely, two ants start from their nest in the search of food source at the same time to these two directions. One of them chooses the path that turns out to be shorter while the other takes the longer path. But it is observed that following ants mostly select the shorter path because of the pheromone concentration deposited mostly on the shorter one

The ant moving in the shorter path returns to the nest earlier and the pheromone deposited in this path is obviously more than what is deposited in the longer path. Other ants in the nest thus have high probability of following the shorter route. These ants also deposit their own pheromone on this path. More and more ants are soon attracted to this path and hence the optimal route from the nest to the food source and back is very quickly established. Such a pheromone- meditated cooperative search process leads to the intelligent swarm behavior.

The instrument of ants uses to find the shortest path is pheromone. Pheromone is a chemical secretion used by some animals to affect their own species. Ant deposit some pheromone while moving, they deposit some amount of pheromone and they prefer the way deposited more pheromone than the other one with a method based on probability. Ants leave the pheromone on the selected path while going to the food source, so they help following ants on the selection of the path (Figure 1d).

#### Pseudo code:

Type1:

Initialize the base attractiveness,  $\tau,$  and visibility,  $\eta,$  for each edge;

for i < IterationMax do:

for each ant do:

choose probabilistically (based on previous equation) the next state to move

into;

add that move to the tabu list for each ant;

repeat until each ant completed a solution;

end;

for each ant that completed a solution do:

update attractiveness  $\tau$  for each edge that the ant traversed;

end;

if (local best solution better than global solution)

save local best solution as global solution;

end;

end;

#### Type2:

- 1: Create construction graph
- 2: Initialize pheromone values
- 3: while not stop-condition do
- 4: Create solutions for free scouts
- 5: Divide onlookers proportionally and create solutions
- 6: Perform local search
- 7: Find new employed ants & best-so-far tour
- 8: Update pheromone values

9: Stop exploitation of exhausted food sources

10: end while

#### APPLICATIONS

Ant colony optimization algorithms have been applied to many combinatorial optimization problems, ranging from quadratic assignment to protein folding or routing vehicles and a lot of derived methods have been adapted to dynamic problems in real variables, stochastic problems, multi-targets and parallel implementations. It has also been used to produce near-optimal solutions to the travelling salesman problem. They have an advantage over simulated annealing and genetic algorithm approaches of similar problems when the graph may change dynamically; the ant colony algorithm can be run continuously and adapt to changes in real time. This is of interest in network routing and urban transportation systems.

The first ACO algorithm was called the Ant system[6] and it was aimed to solve the travelling salesman problem, in which the goal is to find the shortest round-trip to link a series of cities. The general algorithm is relatively simple and based on a set of ants, each making one of the possible round-trips along the cities. At each stage, the ant chooses to move from one city to another according to some rules:

- 1. It must visit each city exactly once;
- A distant city has less chance of being chosen (the visibility);
- The more intense the pheromone trail laid out on an edge between two cities, the greater the probability that that edge will be chosen;
- Having completed its journey, the ant deposits more pheromones on all edges it traversed, if the journey is short;

5. After each iteration, trails of pheromones evaporate. Scheduling problem

- Job-shop scheduling problem (JSP)[7]
- Open-shop scheduling problem (OSP)[8] [9]
- Permutation flow shop problem (PFSP)[10]
- Single machine total tardiness problem (SMTTP)[11]
- Single machine total weighted tardiness problem (SMTWTP) [12][13][14]
- Resource-constrained project scheduling problem (RCPSP) [15]
- Group-shop scheduling problem (GSP)[16]
- Single-machine total tardiness problem with sequence dependent setup times (SMTTPDST) [17]

- Multistage Flowshop Scheduling Problem (MFSP) with sequence dependent setup/changeover times)[18] Vehicle routing problem
- Capacitated vehicle routing problem (CVRP) [19][20][21]
- Multi-depot vehicle routing problem (MDVRP)[22]
- Period vehicle routing problem (PVRP) [23]
- Traveling Salesman Problem (TSP)[4]
- Split delivery vehicle routing problem (SDVRP)[24]
- Stochastic vehicle routing problem (SVRP) [25]
- Vehicle routing problem with pick-up and delivery (VRPPD) [26][27]
- Vehicle routing problem with time windows (VRPTW) [28][29][30]
- Time Dependent Vehicle Routing Problem with Time Windows (TDVRPTW)[31]
- Vehicle Routing Problem with Time Windows and Multiple Service Workers (VRPTWMS)

Assignment problem

- Quadratic assignment problem (QAP) [32]
- Generalized assignment problem (GAP) [33][34]
- Frequency assignment problem (FAP) [35]

• Redundancy allocation problem (RAP)[36]

#### Set problem

- Set cover problem (SCP) [37][38]
- Partition problem (SPP) [39]
- Weight constrained graph tree partition problem (WCGTPP)[40]
- Arc-weighted l-cardinality tree problem (AWICTP)[41]
- Multiple knapsack problem (MKP)[42]
- Maximum independent set problem (MIS)[43]

#### Others

- Classification[44]
- Connection-oriented network routing[45]
- Connectionless network routing[46][47]
- Data mining[44][48][49][50]
- Discounted cash flows in project scheduling[51]
- Distributed Information Retrieval[52][53]
- Grid Workflow Scheduling Problem[54]
- Image processing[55][56]

- Intelligent testing system[57]
- System identification[58][59]
- Protein Folding[60][61][62]
- Power Electronic Circuit Design[63]

#### TRAVELING SALESMAN PROBLEM

Intuitively, the TSP is the problem of a salesman who, starting from his hometown, wants to find a shortest tour that takes him through a given set of customer cities and then back home, visiting each customer city exactly once.

The traveling salesman problem is an extensively studied problem in the literature and for a long time has attracted a considerable amount of research effort. The TSP also plays an important role in ACO research: the first ACO algorithm, called Ant System, as well as many of the ACO algorithms proposed subsequently, was first tested on the TSP.

There are several reasons for the choice of the TSP as the problem to explain the working of ACO algorithms: it is an important N P-hard optimization problem that arises in several applications; it is a problem to which ACO algorithms are easily applied; it is easily understandable, so that the algorithm behavior is not obscured by too many technicalities; and it is a standard test bed for new algorithmic ideas- a good performance on the TSP is often taken as a proof of their usefulness. Additionally, the history of ACO shows that very often the most efficient ACO algorithms for the TSP were also found to be among the most efficient ones for a wide variety of other problems.

The flow of algorithm is shown below:



#### ALGORITHM

- 1) Initialize Ants with Random Trails
- 2) Determine best Trail
- 3) Initialize Pheromones
- 4) Update Ants

Do for every ant

1) pick a random city

2) Build Trail

5) Update Pheromones

Do for every ant

1) length = Get the Length of Trail

2) pheromone = (1.0 - rho) \* pheromone + (dp) amount of pheromone deposited by  $k^{th}$  ant

3) Edge in Trail

are city x and y adjacent to each other in

the trail

dp = Q/length

6) Find Best Trail and Length

7) if Length < BestLenth

BestLength = Length

Repeat 4-7

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### WORKDAY SCHEDULER

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#### ABSTRACT

The Work Day Scheduler (WDS) is the interactive cloud service developed for employee management.

The platform utilizes the hierarchical structure of employees and transforms leave requests of an employee in suitable blocks of overtime and distributes them to the other employees according to their ability to deliver equivalent or near equivalent services as the applicant. This eliminates the extra effort the applicant has to explicitly put in in-order to find employees wiling to partake and perform.

It also provides a visual indicator for the hours of work an employee has delivered in a month, thereby indicating whether the employee is in red (lagging in terms of required amount of work hours to be delivered) or in green (required work hours plus overtime), this feature subliminally motivates an employee to work better.

There is an inherent notification service which keeps the employees updated about the leave & overtime acceptance & distribution, respectively.

The leave management concept of Work Day Scheduler will ensure the minimum attendance of the employees required at any given time and thereby completion of goals in time.

#### Keyword

Cloud Computing, Software as a Service, Human Resource Management, Workday Scheduler.

#### g. INTRODUCTION

Workday Schedule refers to the legislation to limit the working hours per day, per week, per month or per year. If an employee needs to work overtime, the employer will need to pay overtime payments to employees as required in the law. Generally speaking, standard working hours of countries worldwide are around 40 to 44 hours per week, and the additional overtime payments are around 25% to 50% to the normal hourly payments. Maximum working hours refers to the maximum working hours of an employee. The employee

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cannot work more than the level specified in the maximum working hours law.

The Work Day Scheduler (WDS) is the interactive cloud service intentionally developed for employee management. [1]

#### h. WORKDAY SCHEDULER

#### 2.1. Problem Definition

At present, many organizations face the problems of improper management of employee work hours & holidays which mostly ends up in biased leave allocation & delay in timelines.

#### 2.2 Issues In Existing System

Every other provider provides some of them but a seamless integration like ours is not present. The Comprehensive & Integrated Services provided by us are not available.

The existing system is non-intuitive and mechanical.

The existing system doesn't track the work hours of the employees nor does it provide a centralized notification area where the employees can manage and glance at their current status.

In existing system, there lacks proper interaction between employees. Also the rescheduling is not done dynamically. There are good chances of occurrence of above problems. To work on these issues Work Day Scheduler is designed.

Every organization follows its own rules for management but common problems seen in most of the organizations are

- a) Manual work:-
  - Every module of system is first scheduled and then implemented.
  - But most of the modules are never completed according to their pre-schedule due to some problems.

- Rescheduling of such modules is required which is done manually.
- b) System inefficiency:-
  - The current system inefficiency can be due to many causes.
  - The most is due manual process of scheduling and rescheduling.
  - Inadequate interaction between employees.
  - · Improper overtime & holiday management.

#### **Our System**

To develop a cloud application that automates the rescheduling of employees work.

- We have made an attempt to provide the automated way of rescheduling the employees work by managing overtimes of employees.
- The dashboard module is mostly serves as a notice area where all the major events are displayed thus keeping employee up-to-date.
- The notification module notifies the employee about the events happening in his working area.
- To provide leaves and holidays management.
- The leaves & holidays contribute to major portion of the reasons behind delaying the module.
- The leave & holiday management modules try to reduce this delay as much as possible by dynamic & post-scheduling the work.
- To provide a user friendly interface.
- The GUI will be user friendly.
- Extra knowledge or briefing on use of this application will not be necessary.
- The current system works on SMS-notifications which takes a lot of time for proper and consistent delivery and processing, our system takes advantage of the omnipresent cloud and delivery, retrieval, processing are just a click away.

#### **INFERENCE PROCESS**



Fig 1.1

- We came up with two main management modules.
- The first module is the Overtime Management Module.[2]
- The Overtime management module will reduce the time delay factor in the project.
- It will achieve this by generating overtimes against leaves and holidays. [2]
- The second module is the Leave & Holiday Management Module. [2]
- The leave & Holiday management module will resolve the problems of leave clashes & ensure fair allotment of holidays. [2]
- The outcome of this module will be minimum attendance of employees required at any given time.
- It will achieve this by tracking, maintaining & referring the activities related to leaves and holidays. [2]
- The Project Manager overlooks the growth execution of the entire project. [2]
- The Project team leader directs and collectively contributes towards the project development.
- The project team is the backbone or more appropriately the driving force of the project.
- The Organization carries out its operations locally from its Headquarters at Mumbai.
- Although The Enterprise has its roots in India ,its has a global presence.
- The Modules are present on the Elastic Deployment Tier(Heroku) where they have a continuous process time.
- These modules have a fairly large capacity to handle requests, however they can be up scaled dynamically.
- These modules are available everywhere and all the time.
- The application is available in two versions a desktop version and a mobile version, which are accessed automatically as per the device.
- The application receives a request, processes the request as leave request/vacation request(extended leave).Generates appropriate overtime packages, routes these packages finally on overall acceptance of the packages, its updates relevant fileds in the database.

## **TECHNOLOGY USED**

Ruby

• Ruby is a language of careful balance. Its creator, Yukihiro "Matz" Matsumoto, blended parts of his favorite languages (Perl, Smalltalk, Eiffel, Ada, and Lisp) to form a new language that balanced functional programming with imperative programming.

Rails Framework

- Rails is a web application development framework written in the Ruby language. It is designed to make programming web applications easier by making assumptions about what every developer needs to get started. It allows you to write less code while accomplishing more than many other languages and frameworks. Experienced Rails developers also report that it makes web application development more fun.
- The Rails philosophy includes two major guiding principles:
- DRY "Don't Repeat Yourself" suggests that writing the same code over and over again is a bad thing.
- Convention Over Configuration means that Rails makes assumptions about what you want to do and how you're going to do it, rather than requiring you to specify every little thing through endless configuration files.

## CONCLUSION

The Benefits of WDS System are,

- Monitoring and Tracking of Employee active participation becomes easier.
- Employee Payments are generated on fair share policy and on basis of their total working time per month.
- Projects delays are reduced by managing the time through overtime leading to completion of project close to the timelines.

- Also auto rescheduling of the project contributes largely to reduction of the time delays.
- Leave Management handles the single day leaves & Holiday management handles the long term leaves both ensuring effective management leading to winwin conditions.
- Attendance Monitoring & Tracking.
- Payment Management System.
- Overtime Management System.
- Leave & Holiday Management System
- i. SNAPSHOT

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# NYMBLE: Denying Access To Misbehaving Users In Anonymizing Network

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Abstract - In today's world internet has become a vital part in everyone's life. Internet has its own impact on an individual and society, but privacy is a major issue. Network is "collection of connections". Anonymizing network such as TOR [5]allow users to access internet services privately using a series of routers to hide the client's IP address from the server. TOR's success, however, has been limited by users employing this anonymity for abusive purposes, such as defacing the website. Wikipedia -is one of the example of defacement of website. Website administrators rely on IP address blocking for disabling access to the misbehaving users , but this is not practical if the misbehaving user routes through TOR. As a result, administrators block all the TOR exit nodes denying anonymous access to honest and dishonest users alike. To address this problem, we present a system in which:

(1) Honest users remain anonymous and their requests unlinkable.

(2) A server can complain about a particular anonymous user and gain the ability to blacklist the user for future connections.

(3) User's are aware of their blacklist status before accessing a service.

As a result of these properties, our system is resistant to different servers' definitions of misbehavior.

#### I. INTRODUCTION

Anonymizing networks such as CROWDS and TOR route traffic through independent nodes in separate administrative domains to hide the originating IP address. Unfortunately, misuse has limited the acceptance of deployed anonymizing networks. The anonymity provided by such network prevents website administrators from blacklisting individual malicious user's. IP addresses; to thwart further abuse, they blacklist the entire anonymizing network. Such measures eliminate malicious activity through anonymizing networks at the cost of denying anonymous access to honest users. Websites used an assigned pseudonym (ticket), thus assuring a level of accountability. Unfortunately, this approach results in pseudonymity for all users-ideally, honest users should enjoy full anonymity, and misbehaving users should be blocked. To this end, we present a secure system in which users acquire an ordered collection nymbles, a special type of pseudonym, to of connect to websites. Without additional data, these nymbles are computationally hard to link, and hence using the stream of nymbles simulates anonymous access to services. Websites, however, can blacklist users by obtaining a trapdoor for a particular nymble , allowing them to link future nymbles from the same user-those used before the complaint remain unlinkable. Servers can therefore blacklist anonymous users without knowledge of their IP addresses while allowing honest users to connect anonymously. Our system ensures that users are aware of their blacklist status before they present a nymble, and disconnect immediately if they are blacklisted. Furthermore, websites avoid the problem of having to prove misbehavior: they are free to establish their own independent blacklisting policies. Although our work applies to anonymizing networks in general, we consider TOR for purposes of exposition. In fact, any number of anonymizing networks can rely on the same Nymble system, blacklisting anonymous users regardless of their anonymizing networks of choice.

## II. LITERATURE SURVEY

At present, there are various algorithms being implemented for network security. The following are research papers presented in order to achieve network security.

• Sybil Attack [1], J.R.Douceur: Large-scale peerto-peer systems face security threats from faulty or hostile remote computing elements. To resist these threats, many such systems employ redundancy. This algorithm traps attacker with different identities. Sybil attack is an attack when the attacker tries to attack the website using different identities.

Group Signatures [4] [7], E.Breson and J.Stern: In group signatures various members can anonymously sign a message on behalf of the group. A group manager is in-charge of adding group members and has the abilityto reveal the original signer.

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nonymous Credentials[2], J. Camenish and A. Lysyanskaya: Web applications dealing with personal data in privacy friendly way have a need for anonymizing credentials. While protocols, libraries are available to implement such applications, credential computing cannot built a credential infrastructure and vice-versa. Initial cost is reduced for both the parties in the business.

•

he Onion Routing [5], R. Dingledine , N. Mathewson and P. Syverson: It is a circuit based anonymous communication service. Address the limitations in previous design by perfect forward secrecy congestion control directory servers and integrity checking. It works on real world internet, requires more special privileges or kernel modifications. It provides a reasonable tradeoff between anonymity usability and efficiency.

 Pseudonym Credential System, R.Rivest, Kapadia: Credential System is a system in which the users are identified and authorized by a third party which is trusted. In Pseudonym Credential system the users are identified and authorized using pseudo-names(false names). This system eliminates the use of generation of public keys, private keys secret keys etc. which is a tedious process. This system uses encryption techniques and digitally signed certificates.

Nymble: Blocking Misbehaving Users using IP Address[3], P.C.Johnson: In this system, misbehaving users usually try to deface a website or hack a system. These users use TOR or CROWDS to reach the destination website. Hence ,this system takes their IP Address and blocks the users on the basis of this information. Hence different techniques and algorithms have been implemented to protect the networks and make them more secure. Although these improved algorithms and techniques can reduce number of error and improve the security but these too have some loop holes in them. Above papers shows that the existing system uses different algorithms or technologies for example, digitally signed certificates, encryptions and decryption techniques, generation of different keys, blocking based on IP Address etc. Therefore we are proposing a system in Ayhich we try to eliminate the above loop holes and limitations and provide a more secure and reliable system.

- III. LIMITATION OF EXISTING SYSTEM AND IT'S LOWER VERSIONS
- To overcome the Sybil attack certificates are used. But validation of the certificates is a tedious work. If there are multiple certificates which are to be validated, the system crashes.
- In group signatures members sign in anonymously on behalf of the group. To reveal the original signer generation of secrete keys by the group manager is important. But generating this keys is difficult.
- In anonymous credential system the time is wasted, since anonymous authentication is done in friendly way.
- In TOR, if one node breaks down all its circuit connected to it must break. Therefore, the users abundant the system because of its brittleness. If the broken node is fixed after failure the assurance cannot be given whether the anonymity is lost or not.
- For blocking misbehaving users in anonymizing network, IP(Internet Protocol) was used. The misbehaving users would route through series of router in order to hide the IP address which was being blocked by the servers. Therefore the misbehaving users were able to access the server even if they were blocked.
- The honest users in the anonymizing network would be affected by the behavior of illegal users, since the server blocked the exiting nodes of the network.

IV.OVERCOME BY PROPOSED SYSTEM

- The NYMBLE system uses IP as well as MAC address in order to block the misbehaving users in anonymizing network.
- The user cannot posses multiple identities VI. due to MAC address. Hence Sybil attack is prevented.
- Tickets are generated based on the host name present in IP address. These generated tickets provide the means of authentication between the servers.
- The use of certificates and credential systems are avoided.
- Subjective blacklisting is provided i.e., the servers can have their own blacklisting policies.
- The system provides quick and real time response.
- The timestamp of one day is issued if the user misbehaves.

## V. CONCLUSION

The paper addresses the importance of network security using MAC address from the client. It also gives an overview of existing system which used IP address for blocking misbehaving users in anonymizing networks and its flaws in which honest users are blocked. This paper proposes a new improved method in which MAC address is used with a main motive of blocking only misbehaving users and giving full access rights to the honest users.

More over certificates are not used. Instead tickets generated from IP address are used. Sybil attack is also prevented. The users are well aware of the blacklisting status before accessing the server. The administrator can login from the client side and can delete the files or content present on server side .Tthe anonymous credentials systems are not used since tickets plays a vital role in the authentication Proposed system therefore overcomes the drawbacks present in existing system and its previous versions.

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## LIVE VOICE TRANSLATOR FOR BUISNESS COMMUNICATION

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## Abstract:

Language has always been the basis of any form of written or speech communication. However, the presence of multiple language and dialects has been a hindrance to effective communication [1]. Especially in a nation like India where the language and dialect changes with region, the requirement of a middle translation layer that can eliminate the linguistic barriers becomes essential. Speakers from different regional identities should be able to interact with one another without the need to understand individual languages. This project is aimed at computer users who can then communicate with other users, irrespective of the other user's ability to understand the speaker's language. This project can find varied applications in businesses, teaching and voice response systems.

Existing System lack of quality of service attributes in the voice translation services.

It is possible to implement voice translation services. However, such services are few and slow.

This is because most of these models concentrate mainly on language interpretation and language generation.

They fail to take into consideration the large amount of backend processing that takes place while translation.

Most translation methods make use of customized dictionaries to find the translated words.

However, searching for relevant words and synonyms from such large dictionaries is slow and time-consuming.

More so it also depends on the content of the sentence being translated.

## **Keywords:**

SpeechSynthesis, NLU, Parsing

#### **1. INTRODUCTION:**

An Optimized Approach to Voice Translation onComputer is a system which mainly concerned to voice translation.

Some systems are already available which uses this concept but they do not consider the processing time which is important when user deals with such system. Maximum throughput and minimum turnaround time is required in this system

The concept of speech recognition started somewhere in 1940s, practically the first speech recognition program was appeared in 1952 at the bell labs, that was about recognition of a digit in a noise free environment

Language structures were addressed. The key invention of this era were hidden Markova model (HMM) and the stochastic language model, which together enabled powerful new methods for handling continuous speech recognition problem efficiently and with high performance.

In 1990s the key technologies developed during this period were the methods for stochastic languageunderstanding, statistical learning of acoustic and language models, and the methods for implementation of large vocabulary speech understanding systems.

#### 2. Proposed system:

Faster than existing product in market. Runtime translation. Mainly usable & helpful for businesses, teaching business communication purpose

## 2.1 Speech recognition:

Speech recognition is a technology that able a computer to capture the words spoken by a human with a help of microphone. These words are later on recognized by speech recognizer, and in the end, system outputs the recognized words[2]. The process of speech recognition consists of different steps that will be discussed in the following sections one by one. An ideal situation in the process of speech recognizes all words uttered by a human but, practically the performance of a speech recognition engine depends on number of factors. Vocabularies, multiple users and noisy environment are the major factors that are counted in as the depending factors for a speech recognition engine



Fig .1 Architecture Diagram of Voice Translation

Text-based translation services mainly focus around capturing words and converting them to target language. However, voice based translation services have remained few and slow. This is because most of these models concentrate mainly on language interpretation and language generation. They fail to take into consideration the large amount of back-end processing that takes place while translation. Most translation methods make use of customized dictionaries to find the translated words. However, searching for relevant words and synonyms from such large dictionaries is slow and time-consuming. More so it also depends on the content of the sentence being translated [5].

#### 3. Conclusion:

There is clear evidence prior to this project that a voice translation process does not limited up to an institutional level. We will be able to demonstrate that it is possible how easily differ language will no longer the communication barrier, which is cost effective. One such service example will be the develop model of voice translation operating at viva and highlighted in the Outputs section.

It could be the next best thing to learning a new language. We will demonstrate software that translates spoken English into

spoken Chinese almost instantly, while preserving the unique cadence of the speaker's voice a trick that could make conversation more effective and personal.

The performance of speech translator systems is usually evaluated in terms of accuracy and speed. It will be the realtime processing product

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## **Integrated Online Examination Platform**

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## ABSTRACT

As the requirement of Certification in various Computer Programming Languages is in demand, everyone is looking for a certification. The current certification system provides Online Multiple choice questions. It doesn't provide anything else. Our system provides Tutorials, Mock test,Discussion forum along with the Certification exam on a single platform,which will help the candidate in preparation of exam & clear their doubt about any topic related to certification exam.

## Keywords

Online certification, Mock Test, Tutorials, Discussion forum, Courses.

#### INTRODUCTION

Online Examination System fulfills the requirements of the institutes to conduct the exams online. Students can give exam without the need of going to any physical destination. They can view the result at the same time. Thus the purpose of the system is to provide a system that saves the efforts and time of both the institutes and the students[1].

Online Examination System assesses students by conducting certification exams. The tests are highly customizable. This system is used by educational institutes to conduct test and have automated checking of answers based on the response by the candidates.

The teachers of the system are allowed for contributing questions and viewing profile of candidates. Administrators of the system access the system to sign up to a new test, manage questions, accounts and view profile of the candidates.

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# ONLINE CERTIFICATION EXAM **2.1 Certification system**

The certification exams have MCQ type questions with 4 possible answer & candidate have to select 1 correct answer according to him /her.The certification in a particular course or language suggest that the candidate is having a basic knowledge in the subject & has passed all the test in the course. Since certification exam tests candidates knowledge about language's technical part as syntax, Program's output etc. & language's core concepts[1].

## 2.2 Issues in current system

In current system the certification sites donot provide anykind of study material for candidates. So it becomes quite difficult for a candidate who wants to get certification in a course about which he don't have even basic knowledge.

Secondly the doubts are not cleared if any queries arise in mind of candidates. Students have to consult someone from outside to solve it.

The candidates are unaware of how the examination atmosphere will be? Because certification exam is quite valuable & their results are just a click away, one hesitating move in choosing the option & the answer is incorrect.

## 2.3 Proposed system

The proposed system provides Certification exams Tutorials, Mock tests & Discussion forum on a single platform.

Tutorials will provide information about course for which candidate is applying. Candidate can access tutorial section to gain knowledge.

Mock tests are like net practice before the real test.Mock test will provide candidate an atmosphere in which he/she will be giving the certification exam.

#### PROPOSED SYSTEM

#### **Certification exam**

Our system is cross browser compatible. Certification exam consist of various question related to the course the candidate

#### **Tutorials**

Tutorials provide information to candidates about the course that is chosen by him/her. Tutorial section consist of theory &programs which will give more than enough material to have a glance of subject.Eg. For C++ basic knowledge of language,Syntax, Theory of subject &Programs related to it are provided so the candidate is getting information about all aspects of course he is willing to take.

#### **Mock Test**

The factors affecting result in certification exams are timemanagement, quick decision & fluency about the topics of subjects in certification. Mock tests provide a good experience before going into actual exam. Candidates seems to be fumbling to solve even a simple problem when time is running out & it also happens that few questions remain unattempted. To avoid such scenarios Mock tests are very helpful. It gives result on the spot.

#### **Discussion forum**

The Discussion forum section provides a platform to users who have doubts about the topics, here hey get their doubts solved & in the process information is also shared. They can share information & gain new knowledge about different subject from different perspective. They can share information & gain new knowledge about different subject from different perspective.

#### PROCESSES

4.1 Registration/login

is pursuing& candidate have to pass the exam to become a certified individual in respective course.Certification exam will be having time limit. It will be MCQ type exam. Questions will be different every time a candidate applies for the exam. The results are send to candidates email id as soon as the evaluation of result is completed.

Candidate have to first register to use the services provided by the system.After registration the information is stored in database from there login is required for certification exam.Admin has the power to remove any user if he finds the user violating any rules.

In login process the data is retrieved & matched from database to authenticate the user.

## 4.2 Examination

AFTER LOGIN WHEN THE CANDIDATE STARTS THE CERTIFICATION EXAM THE TIMER STARTS. THE QUESTION PAPER ALONG WITH ANSWERS IS SEND TO USER'S BROWSER IN THE FORM OF TEXT FILE. SIMILAR PROCESS IS USED IN MOCK TESTS.

The evaluation of result is done in seconds as the timer is over the exam closes & result is send to candidate's mail address which is taken at the time of registration.



Fig:1 shows MCQ question with timer and assessed results

## CONCLUSION

There are various Online examination system, certification exams, tutorials sites, sites for mock test & discussion forum but no platform provides all this facilities on a single platform which we have here tried to achieve.

We have used Netbeans IDE as a framework. MySQL for backhand. HTML & PHP as front hand.

The essential requirement of the project is high speed and continuous internet connections.

The system is made up of 4 main partsTutorial, discussion forum, Mock test & Certification exam. Each having its own value in providing service to user. It may become a useful option for people who live in remote areas & can't afford to be at particular place physically.

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Fig:2 Shows the site mapping diagram of proposed system

Mock Tests

## **BOTNET DETECTION AND SUPPRESSION TECHNIQUES**

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## Abstract

These days malicious attempts are made to get financial benefits through compromised hosts, software robots or "bots". Group of bots called Botnet is remotely controllable by server called Botmaster. Botnets have become biggest threat to cyber security and have been used as an infrastructure to carry out nearly every type of Cyber Attack. They have dynamic and flexible nature. So it is necessary to detect these Botnets and suppress them. This paper basically discusses various Botnet Detection Techniques and a Suppression Technique called as Garlic. This system can collect network traffic from Botnet in a distributed mode, and then process these huge data. Garlic system will generate and distribute rules when Botnets are detected in Data Analysis.

## **Keywords**

Botnet, Botmaster, Bots, Garlic

## 1. Introduction

The term "botnet" denotes a collection of infected computers connected to the Internet (also known as 'bots'). When a computer becomes infected by Trojans or malware, it becomes a member of a botnet, manager of this Botnet will be called Botmaster. Most of the botmasters usually don't use their PC to control botnet, because that would be very unsafe, instead, they find a public server to transfer command and control to every bot. this server is called command and control server (C&C). Generally, the architecture of botnets is either centralized or distributed. The centralized botnets have one or more command and control(C&C) servers, and the distributed include all the botnets that do not operate in a centralized manner, which can hide Botmaster very well. Peer-to-Peer botnet is a well-known example of the distributed type. The new infrastructure enjoy increased efficiency over the traditional C&C botnets, but at the same time, they are largely limited by the total number of bots they could control at one time, Because of the lack of the central server, the Botmaster cannot directly control all the bots. In fact, in terms of the communication speed, the distributed type is slower than centralized type. Most of the botnets are usually controlled via protocols such as Internet Relay Chat (IRC) and Hypertext Transport Protocol (HTTP). IRC is a wide-used botnets protocol, because IRC servers are extremely popular so that botmaster can easily find a public IRC server for use . However, the disadvantage of IRC is also obvious, once the botnet is detected, the IRC server can be easily found and taken down, in addition, the port of the IRC protocol always run on 6667/TCP and nearby port numbers. A better option for the botmaster is use HTTP, because the port of HTTP is almost always permitted by firewalls. Whatever for the C&C server or normally bot, there always has huge HTTP traffic, its very hard to find something in this lager data.[1][3][7]

## 2. Life Cycle of Botnet :



## 2.1 Infection and Propagation:

The lifecycle of a botnet begins with the infection process where the botmasters use different methods and techniques to infect new targets (eg. Computers, mobile devices) and convert them into bots. Infected codes attached to spam emails or instant messages, malicious URLS, P2P file sharing networks and even other botnets can be listed as sample of vectors to propagate the bots in target devices. The most common targets of botmaster are less-monitored computers with high-bandwidth connectivity, university servers and home computers. In general, botmasters take advantage of those who have low awareness or lack of knowledge of network security to gain unauthorised access to their devices and keep their bots alive for a long time without being detected.[3]

## 2.2 Rallying :

This refers to the first time that bots connect to C&C Server to show the botmaster that it has already established a zombie, successfully. In addition, bots receive updates with essential information such as lists of relative C & C server's IP Address.[3]

## 2.3 Commands & Reports :

During this stage, the bots listen to C&C server or connect to them periodically to get new commands from botmaster. A new command, when detected by bots is treated as an order; they execute the order and the results are reported to the C&C server, the bots then wait for new commands.[3]

## 2.4 Abandon :

When a bot is no longer usable or the botmaster decides that particular bot is no longer suitable it may be abandoned by the botmaster. In case any single bot is disabled the botnet is still available. A botnet is entirely destroyed when all its bots are detected or abandoned or when C&C servers are detected and blocked.[3]

#### **3. Botnet Detection Techniques :**

Methods for detecting bots can generally be divided into two categories— those that involve *static analysis*, or checking computers' characteristics against a list of known threats, and those that involve *behavioural analysis*, or monitoring communications in a network for behaviours that are known to be exhibited by botnets. Static analysis results in more reliable judgments, but requires threat signatures that are current and available. Behavioural analysis potentially allows for much broader detection methods (especially by aggregating information from multiple sources), but is more likely to result in false positives. Effective botnet detection strategies generally involve aspects of both static analysis and behavioural analysis.[3][2]

#### 3.1 Static Analysis :

#### 3.1.1 Honeynets :

Two or more honeypots on a network form a *honeynet*. Typically, a honeynet is used for monitoring a larger and/or more diverse network in which one honeypot may not be sufficient. Honeynets and honeypots are usually implemented as parts of larger network intrusion detection systems. A *honeyfarm* is a centralized collection of honeypots and analysis tools.

A honeynet is a network of high interaction honeypots that simulates a production network and configured such that all activity is monitored, recorded and in a degree, discreetly regulated."[3]

## 3.2 Behavioural Analysis :

## 3.2.1 Signature Based Monitoring :

It monitors the network traffic to capture the details of types of attacks occurring in the network and the output will be stored in some database or log file for future reference. Based on the available signatures, alerts will be generated corresponding to the various attacks occurring in the network.[3]

#### 3.2.2 Anamoly Based Monitoring :

Detect botnet using following anomalies:

a)High network latency

b)High volume of traffic

c)Traffic on unusual port

d)Unusual system behaviour

#### 3.2.3 DNS Based Monitoring :

Analyzes DNS traffic generated by botnetsMaintains blacklist of botnet c&c host names. Has a watch on DNS query logs in real-time.Uses sampling function to reduce false positives.[3][2]

## 4..Botnet Suppressing System: GARLIC

Botnets suppressing system named "Garlic", whose structure is very similar to that of garlic, whose cloves is a distributed architecture. A key feature that distinguishes modern botnets from earlier counterparts is their increasing use of structured overlay topologies . So we have to use distributed technology. "Garlic" system can be automatic and distributed collect network traffic that comes from the controlled internal network, and then process these huge data using cloud computing technology, Once botnets are detected, rules are generated and uploaded. Moreover, Garlic can gather feedback of rules and process them, regenerate rules to completely suppress botnets.[1][3]

## 4.1 Garlic Architecture :



#### Fig 4.1 GARLIC Architecture[1]

The control node connects with four terminal nodes. The terminal node is based on the Unified Threat Management (UTM) system [5] which has four functional modules: the firewall module, the protocol filter module, the recording module and the communication module. The firewall module can pass or block network traffic according to firewall rules. Similarly, the protocol filter module filters network traffic

based on regular expressions of rules. The recording module can be set to record all of the traffic or just partial traffic of each connection, this module use technology of TIFA . Communication module exchanges information with the control node. Central control node is a server that has three functional modules, feedback module, detection module and communication module. The central control node collects traffic from all the terminal nodes controlled by itself, process the traffic using detection module, which is based on cloud computing technology, generally, when botnets are detected, the detection module will report IP address and port, according to these information, rules can be generated.

Then central control node distributes rules to all the terminals. After distribution, Garlic checks whether the rules have feedback indicating the rules are effective or not. Garlic system will continuously collect feedback for each rule, according to these, it can regenerate rules and distribute them, and these second-generation rules can also produce feedbacks, forming a recursive process.[1]

## 5. Workflow of GARLIC :



Fig 5.1 : Workflow of Garlic [1]

[1]Step 1 indicates terminal node transfers traffic data to central control node, traffic data is recorded at the terminal node. When the traffic load is low, the recording module can be set to record all the traffic; when the network is overloaded, it can be set to just record the first 10-20 KB of each connection. However, this header should contain the essential information . In step 2, the control node processes huge traffic which is collected in Step 1. Due to the burst nature of network traffic and the fact that most networks can produce

thousands and even millions of packets per second, in addition, we have known traffic of botnet must be huge, it is very challenging to process the data in real time, which is solved by LARX. LARX is a cloud computing platform that can process multiple tasks in parallel, on this basis, we load botnet detection module on LARX.[9][4] When the system detects the existence of a botnet, it will produce a rule. Following is the format of rule :

Field Name	Example
Traffic Blocker	1 or 0
Protocol	TCP,UDP or any
Src Address	192.168.1.2/192.168.*.* or
	any
Dst Address	22.11.33.44
	22.11.33.1-254
Src Port	80 or any
Dst Port	6667 or any
Description	This is a bot

#### Table 5.1 : Rule Format[1]

[1]The format of rules has seven fields, "Traffic Blocker" field means that the rule is used to block and records the matched traffic or only records it. Protocol field can classify the traffic into three kinds: TCP, UDP or any. The following four fields specify the details of the packets, the source and destination addresses, the source port and destination port. The final field is used to mark the rules, facilitate feedback for viewing. Then the third step is to load the rules to each terminal node, so the advantage of this approach is combining prevention, control and sharing rules together. In addition, we also assign a lifetime for each rule, e.g. currently the lifetime is 7 days, which means that, if one rule be loaded to one terminal node, and then it does not work for 7 days, it will be automatically get expired. By this way it can solve the problem of firewall rules getting overloaded. After rules are loaded into the terminal node, we get to the final and crucial step, which is to check if the rule is valid or not, whether the botnet changes the C&C server or not. We can get the answer from the feedback. "Garlic" gathers all feedbacks from every node, by analyzing them, we can know frequency of botnet communication. Following is the format of feedback :

Table 5.2 : Format of Feedback [1]

Field Name	Example
Timestamp	2012-02-01 22:10:12:456
Protocol	TCP or UDP
Src Address	192.168.1.2
Dst Address	59.77.172.20
Src Port	80 or any
Dst Port	6667 or any
Description	Describe of rule
Log ID	Name of rule
Туре	Firewall/protocol

## 6. Conclusion :

It is necessary to provide appropriate countermeasure for botnet which becomes one of the biggest threat of network security and major contributor to unwanted network traffic. Therefore we studied two different methods of detecting Botnets And after detecting the Botnets it is necessary to suppress them so we studied method called as Garlic which suppresses the detected Botnets using feedbacks.

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# Improving Web Usage Mining Using D-APRIORI and DFP Algorithms

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## ABSTRACT

Web Usage Mining is a branch of web mining. The data assembled from web access results in awfully large information represented in binary form. The data is grouped using divisive clustering method. The divisive analysis is one of the types of hierarchical method of clustering , the divisive analysis is used to separate each dataset from the clustered dataset. Here the algorithms D-Apriori and DFP are proposed to find the frequently accessed webpage from web log

database and they will be comparatively analysed for the implementation of web usage mining and signifying which algorithm is more efficient than the other in terms of computational and scanning time.

## **Keywords**

Apriori, Clustering, D-Apriori, DFP Algorithm, FP Algorithm and Web Usage Mining.

#### INTRODUCTION

Data mining is a technique used to deduce useful and relevant information to guide professional decisions and other scientific research. It is a cost-effective way of analyzing large amounts of data, especially when a human could not analyze such datasets.

Massification of the use the internet has made automatic knowledge extraction from Web log files a necessity. Information providers are interested in techniques that could learn Web users' information needs and preferences. This can improve the effectiveness of their Web sites by adapting the information structure of the sites to the users' behavior.

Recently, the advent of data mining techniques for discovering usage pattern from Web data (Web Usage Mining) indicates that these techniques can be a viable alternative to traditional decision making tools. Web Usage Mining is the process of applying data mining techniques to the discovery of usage patterns from Web data and is targeted towards applications.

This project explores the use of Web Usage Mining techniques to analyze Web log records. We have identified several web access pattern by applying well known data mining techniques (D-Apriori and DFP Algorithm) to the access logs. This includes descriptive statistic and Association Rules for the portal including support and confidence to represent the Web usage and user behavior for that portal. The results and findings of this experimental analysis can be used by the Web administration in order to plan the upgrading and enhancement of the portal presentation. This project comparatively analyses both the data mining techniques namely D-Apriori and DFP algorithms.

#### HIERARCHIAL CLUSTERING

Hierarchical clustering is a process of cluster analysis which seeks to assemble a hierarchy of clusters. Strategies for hierarchical clustering are of two types namely Agglomerative analysis and divisive analysis.

In this study we use the Divisive analysis method to perform clustering of the web log file.

#### **Divisive Analysis**

This is a "top down" approach. All explanation start in one cluster and splits are performed recursively as one move down the hierarchy. Here the datasets are clustered using divisive analysis, the clustered datasets are split into a single cluster.



Figure 1: Divisive Analysis

#### D-APRIORI ALGORITHM

D-APRIORI stands for Divisive APRIORI algorithm. The output of the divisive analysis is given to the APRIORI algorithm, The algorithm attempts to find subsets which are common to at least a minimum number C (the cut off, or Confidence threshold) of the item sets. The system

- operates in the following three modules.
  - Pre-processing module
  - > Apriori or FP Growth Algorithm Module
  - Association Rule Generation
  - Results

The pre-processing module converts the log file, which normally is in ASCII format, into a database like format, which can be processed by the Apriori algorithm.

- The second module is performed in two steps.
  - Frequent Item set generation
  - Rules derivation



Figure 2: APRIORI Example

# Advantages and Disadvantages of APRIORI algorithm

Advantages:-

- Uses large Item set property
- Easy to implement
- Easily parallelized

Disadvantages:-

- > IT IS COSTLY TO HANDLE LARGE NUMBER OF ITEM SETS
- It is tedious to repeatedly scan the database and check a large set of candidates by pattern matching, which is especially true for mining long patterns.

#### DFP ALGORITHM

The DFP algorithm stands for Divisive FP growth algorithm. The FP Growth algorithm operates in the following four modules.

- Pre-processing module
- > FP Tree an FP Growth Module
- Association Rule Generation
- > Results

The pre-processing modules convert the log file, which normally is in ASCII format, into a database like format, which can be processed by the FP Growth algorithm. The 2nd module is performed in two steps.

- FP Tree generation
- > Applying FP Growth to generate association rules

FP tree is a compact data structure that stores important, crucial and quantitative information about frequent patterns.

The main components of FP tree are:

- It consists of one root labelled as "root", a set of item prefix sub-trees as the children of the root, and a frequent-item header table.
- Each node in the item prefix sub-tree consists of three fields: item-name, count, and node-link, where item-name registers which item this node represents,
  - count registers the number of transactions represented by the portion of the path reaching this node, and node-link links to the next node in the FP tree carrying the same item-name, or null if there is none.
  - Each entry in the frequent-item header table consists of two fields, (1) item-name and (2) head of node link, which points to the first node in the FP-tree carrying the item-name.

Second, an FP-tree-based pattern-fragment growth mining method is developed, which starts from a frequent length-1 pattern (as an initial suffix pattern), examines only its conditional-pattern base (a "sub-database" which consists of the set of frequent items co-occurring with the suffix pattern), constructs its (conditional) FP-tree, and performs mining recursively with such a tree. The pattern growth is achieved via concatenation of the suffix pattern with the new ones generated from a conditional FP-tree. Since the frequent item set in any transaction is always encoded in the corresponding path of the frequent-pattern trees, pattern growth ensures the completeness of the result.





## Advantages and Disadvantages of FP-GROWTH Algorithm

Advantages:-

- Uses compact data structure
- Eliminates repeated database scan
- FP-growth is an order of magnitude faster than other association mining algorithms and is also faster than tree-Researching

Disadvantages:-

The main drawback of FP-growth algorithm is the explosive quantity of lacks a good candidate generation method.

#### RESULTS

The main objective of any system is the generation of reports. It has various uses. Some of them are,

- For the users, reports provide source of information required.
- They provide permanent hard copy of the results of transactions.

Careful consideration is being given in the designing of the reports as it helps in decision-making process. In the present work, the performance of the system is judged using two metrics. The first one is the amount of memory used and the second one is the time taken for the algorithm to create the association rules.

#### CONCLUSION

In this work the D-Apriori and DFP is proposed to analyse Web log records. The D-Apriori and DFP will provide useful information such as the user's browser behaviour and that can be used by the web administrator to incorporate content that is looked up by a number of users.

In our study, the results of both the algorithms will be comparatively analysed to see which of the two algorithms is more efficient.

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# EDGE Detection of Weldment Using Image Processing Approach

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#### ABSTRACT

This paper highlight the fundamental concepts of various filters and apply these filters in identifying a edge detection in weld images which is taken as a case study. In this paper the edge detection techniques are taken for consideration. The software is implemented using MATLAB. The main two edge detectors in image processing are Gradient and Laplacian operators. The case study deals with observation of detecting edges in weldment images to find the flaw through image processing using the various filters which are mainly gradient based Roberts, Sobel and Prewitt edge detection operators and Canny edge detector. The advantages and disadvantages of these filters are comprehensively explained in this study.

#### **Keywords**

Canny, Edge detection, Prewitt, Roberts, Sobel, zero-cross and various Edge detection methods.

## 1. INTRODUCTION

Edge is defined as a boundary between two regions of relatively uniform intensity indicated by a strong gradient or discontinuity in intensity function. Edge is a set of connected pixels that lie on boundary between two regions. The edges form the outline of an object.

Edge detection is the process of localizing pixel intensity transitions. The edge detection have been used by object recognition, target tracking, segmentation, and etc. Therefore, the edge detection is one of the most important parts of image processing. There mainly exists several edge detection methods (Sobel [1,2], Prewitt [3], Roberts [4], Canny [5]). These methods have been proposed for detecting transitions in images. Early methods determined the best gradient operator to detect sharp intensity variations [6]. Commonly used method for detecting edges is to apply derivative operators on images. Derivative based approaches can be categorized into two groups, namely first and second order derivative methods. First order derivative based techniques depend on computing the gradient several directions and combining the result of each gradient. The value of the gradient magnitude and orientation is estimated using two differentiation masks.

In this work, Sobel which is an edge detection method is considered. Because of the simplicity and common Dr.Vijay Rathod

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uses, this method is preferred by the others methods in this work. The Sobel edge detector uses two masks, one vertical and one horizontal. These masks are generally used  $3\times3$  matrices. Especially, the matrices which have  $3\times3$ dimensions are used in matlab. The masks of the Sobel edge detection are extended to  $5\times5$  dimensions are constructed in this work.

Proposed methods for edge detection are:

- 1. The **Sobel method** finds edges using the Sobel approximation to the derivative. It returns edges at those points where the gradient of I is maximum.
- 2. The **Prewitt method** finds edges using the Prewitt approximation to the derivative. It returns edges at those points where the gradient of I is maximum.
- 3. The **Roberts method** finds edges using the Roberts approximation to the derivative. It returns edges at those points where the gradient of I is maximum.
- 4. The **Zero-Cross method** finds edges by looking for zero crossings after filtering I with a filter you specify.
- 5. The **Canny method** finds edges by looking for local maxima of the gradient of I. The gradient is calculated using the derivative of a Gaussian filter. The method uses two thresholds, to detect strong and weak edges, and includes the weak edges in the output only if they are connected to strong edges. This method is therefore less likely than the others to be fooled by noise, and more likely to detect true weak edges.

## 2. METHODOLOGY

## 2.1 Sobel/Prewitt Edge Detection

The Sobel operator performs a 2-D spatial gradient measurement on an image and so emphasizes regions of high spatial frequency that correspond to edges. Typically it is used to find the approximate absolute gradient magnitude at each point in an input grayscale image.

Using this kernel the approximate magnitude is given by:

# $$\begin{split} |G| &= |(P_1 + 2 \times P_2 + P_3) - (P_7 + 2 \times P_8 + P_9)| + |(P_3 + 2 \times P_6 + P_9) - (P_1 + 2 \times P_4 + P_7)| \end{split}$$

## 2.2 Roberts Cross Edge Detector

The Roberts Cross operator performs a simple, quick to compute, 2-D spatial gradient measurement on an image. It thus highlights regions of high spatial frequency which often correspond to edges. In its most common usage, the input to the operator is a grayscale image, as is the output. Pixel values at each point in the output represent the estimated absolute magnitude of the spatial gradient of the input image at that point.

How It Works: In theory, the operator consists of a pair of  $2\times 2$  convolution kernels as shown in Figure 1. One kernel is simply the other rotated by 90°. This is very similar to the Sobel operator.



Figure 3. Roberts Cross convolution kernels

These kernels are designed to respond maximally to edges running at  $45^{\circ}$  to the pixel grid, one kernel for each of the two perpendicular orientations. The kernels can be applied separately to the input image, to produce separate measurements of the gradient component in each orientation (call these *Gx* and *Gy*). These can then be combined together to find the absolute magnitude of the gradient at each point and the orientation of that gradient. The gradient magnitude is given by:

$$|G| = \sqrt{Gx^2 + Gy^2}$$

Although typically, an approximate magnitude is computed using:

$$|G| = |Gx| + |Gy|$$

This is much faster to compute the angle of orientation of the edge giving rise to the spatial gradient (relative to the pixel grid orientation) is given by:

$$\theta = \arctan(Gy/Gx) - 3\pi/4$$

In this case, orientation 0 is taken to mean that the direction of maximum contrast from black to white runs from left to right on the image, and other angles are measured clockwise from this.

#### How It Works

In theory at least, the operator consists of a pair of  $3\times3$  convolution kernels as shown in Figure 1. One kernel is simply the other rotated by 90°. This is very similar to the Roberts Cross operator.



Figure 1. Sobel convolution kernels

These kernels are designed to respond maximally to edges running vertically and horizontally relative to the pixel grid, one kernel for each of the two perpendicular orientations. The kernels can be applied separately to the input image, to produce separate measurements of the gradient component in each orientation (call these Gx and Gy). These can then be combined together to find the absolute magnitude of the gradient at each point and the orientation of that gradient. The gradient magnitude is given by:

$$|G| = \sqrt{Gx^2 + Gy^2}$$

Typically, an approximate magnitude is computed using:

$$|G| = |Gx| + |Gy|$$

which is much faster to compute.

The angle of orientation of the edge (relative to the pixel grid) giving rise to the spatial gradient is given by:

## $\theta = \arctan(Gy/Gx)$

In this case, orientation 0 is taken to mean that the direction of maximum contrast from black to white runs from left to right on the image, and other angles are measured anti-clockwise from this.

Often, this absolute magnitude is the only output the user sees the two components of the gradient are conveniently computed and added in a single pass over the input image using the pseudo-convolution operator shown in Figure 2.

P۱	P 2	P۹
P₄	P₅	P۴
P۶	P۰	P۹

**Figure 2.** Pseudo-convolution kernels used to quickly compute approximate gradient magnitude

Often, the absolute magnitude is the only output the user sees the two components of the gradient are conveniently computed and added in a single pass over the input image using the pseudo-convolution operator shown in Figure 4.

Figure 4. Pseudo-convolution kernels used to quickly compute approximate gradient magnitude

Using this kernel the approximate magnitude is given by:

$$|G| = |P_1 - P_4| + |P_2 - P_3|$$

#### 2.3 Zero Crossing Detector

The zero crossing detector looks for places in the Laplacian of an image where the value of the Laplacian passes through zero --- *i.e.* points where the Laplacian changes sign. Such points often occur at `edges' in images --- *i.e.* points where the intensity of the image changes rapidly, but they also occur at places that are not as easy to associate with edges. It is best to think of the zero crossing detector as some sort of feature detector rather than as a specific edge detector. Zero crossings always lie on closed contours, and so the output from the zero crossing detector is usually a binary image with single pixel thickness lines showing the positions of the zero crossing points.

The starting point for the zero crossing detector is an image which has been filtered using the Laplacian of Gaussian filter. The zero crossings that result are strongly influenced by the size of the Gaussian used for the smoothing stage of this operator. As the smoothing is increased then fewer and fewer zero crossing contours will be found, and those that do remain will correspond to features of larger and larger scale in the image.

**How it Works:** The core of the zero crossing detector is the Laplacian of Gaussian filter and so a knowledge of that operator is assumed here. As described there, `edges' in images give rise to zero crossings in the LoG output. For instance, Figure 1 shows the response of a 1-D LoG filter to a step edge in the image.



**Figure 5.** Response of 1-D LoG filter to a step edge. The left hand graph shows a 1-D image, 200 pixels long, containing a step edge. The right hand graph shows the response of a 1-D LoG filter with Gaussian standard deviation 3 pixels.

However, zero crossings also occur at any place where the image intensity gradient starts increasing or starts decreasing, and this may happen at places that are not obviously edges. Often zero crossings are found in regions of very low gradient where the intensity gradient wobbles up and down around zero.

Once the image has been LoG filtered, it only remains to detect the zero crossings. This can be done in several ways.

The simplest is to simply <u>threshold</u> the LoG output at zero, to produce a binary image where the boundaries between foreground and background regions represent the locations of zero crossing points. These boundaries can then be easily detected and marked in single pass, *e.g.* using some <u>morphological operator</u>. For instance, to locate all boundary points, we simply have to mark each foreground point that has at least one background neighbor.

The problem with this technique is that will tend to bias the location of the zero crossing edge to either the light side of the edge, or the dark side of the edge, depending on whether it is decided to look for the edges of foreground regions or for the edges of background regions.

A better technique is to consider points on both sides of the threshold boundary, and choose the one with the lowest absolute magnitude of the Laplacian, which will hopefully be closest to the zero crossing.

Since the zero crossings generally fall in between two pixels in the LoG filtered image, an alternative output representation is an image grid which is spatially shifted half a pixel across and half a pixel down, relative to the original image. Such a representation is known as a *dual lattice*. This does not actually localize the zero crossing any more accurately, of course.

A more accurate approach is to perform some kind of interpolation to estimate the position of the zero crossing to sub-pixel precision.

## 2.4 Canny Edge Detector

One problem with Laplacian zero-crossings as an edge detector is that it is simply adding the principal curvatures together—it doesn't really determine a maximum of gradient magnitude.

The Canny Edge Detector defines edges as zero-crossings of second derivatives in the direction of greatest first derivative.

Let's examine each of the parts of this definition:

**Zero Crossings of.** . As with the Marr-Hildreth edge detector, we'll use positive-negative transitions to "trap" zeroes. Thus, in gauge coordinates, the Canny detector is Lww = 0

In terms of x and y derivatives, this can be expanded to

$$L_{ww} = \frac{1}{L_x^2 + L_y^2} \begin{bmatrix} L_x & L_y \end{bmatrix} \begin{bmatrix} L_{xx} & L_{xy} \\ L_{yx} & L_{yy} \end{bmatrix} \begin{bmatrix} L_x \\ L_y \end{bmatrix} = 0 \qquad \dots (1)$$

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Zero-Crossings in this measure give connected edges much like the Laplacian operator but more accurately localize the edge.

#### Scale and the Canny Operator

The Canny algorithm also makes use of multiple scales to best detect the edges. In particular, it uses Gaussian blurring kernels of varying sizes  $(\sigma k)$  and selects the one that is most stable. The selection of the best scale at which to make the measurement is the subject of much research, including current research.

Your text writes this as

$$\frac{\partial}{\partial \overline{n}}(G * g) = 0$$

where g denotes the image, n denotes the edge normal (the gradient direction), and G denotes a Gaussian blurring kernel. Remember, though, this can be rewritten as

This is a nice, compact notation, but	$\partial G$
remember that $n$ is also determined	$\frac{\partial G}{\partial \overline{m}} * g = 0$
from the blurred image $G * g$ . This	On
notation also leaves out the details in above	ea.

If we use above Eq. to determine the edges, we can use Gaussian blurring by measuring each of the five derivatives in Eq. 1 using derivatives-of-Gaussians of the appropriate standard deviation.

## 3. COMPARISON OF THE VARIOUS EDGE DETECTORS

As edge detection is a fundamental step in computer vision, it is necessary to point out the true edges to get the best results from the matching process. That is why it is important to choose edge detectors. In this respect, we first present some advantages and disadvantages of Edge Detection Techniques, They are as follows:

## 3.1. Classical (Sobel, Prewitt)

The primary advantages of the classical operator are simplicity. The Roberts cross operator provides a simple approximation to the gradient magnitude. The second advantages of the classical operator are detecting edges and their orientations. In this cross operator, the detection of edges and their orientations is said to be simple due to the approximation of the gradient magnitude.

The disadvantages of these cross operator are sensitivity to the noise, in the detection of the edges and their orientations. The increase in the noise to the image will eventually degrade the magnitude of the edges. The major disadvantage is the inaccuracy, as the gradient magnitude of the edges decreases. Most probably the accuracy also decreases.

## **3.2.** Zero Crossing (Laplacian)

The advantages of the zero crossing operators are detecting edges and their orientations. In this cross operator detection of edges and their orientations is said to be simple due to the approximation of the gradient magnitude is simple. The second advantage is the fixed characteristics in all directions. The disadvantage is sensitivity to the noise. In detecting the edges and their orientations are increased in the noise to the image this will eventually degrade the magnitude of the edges. The second disadvantage is that, the operation gets diffracted by some of the existing edges in the noisy image.

## 4. RESULT



Figure 6. Weldment image



Figure 7. Sobel Edge detection

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Figure 8. Canny Edge detection

## 5. CONCLUSION

The edge detection is the primary step in identifying an image object, it is very essential to know the advantages and disadvantages of each edge detection filters. In this paper we dealt with study of edge detection techniques of Gradient-based and Laplacian based. Edge Detection Techniques are compared with case study of identifying Flaw in weld images. The software was implemented using MATLAB. Gradient-based algorithms have major drawbacks in sensitive to noise. The dimension of the kernel filter and its coefficients are static and it cannot be adapted to a given image. A novel edge-detection algorithm is necessary to provide an errorless solution that is adaptable to the different noise levels of these images to help in identifying the valid image contents produced by noise. The performance of the Canny algorithm relies mainly on the changing parameters which are standard deviation for the Gaussian filter, and its threshold values. The size of the Gaussian filter is controlled by the greater value and the larger size. The larger size produces more noise, which is necessary for noisy images, as well as detecting larger edges. We have lesser accuracy of the localization of the edge then the larger scale of the Gaussian. For the smaller values we need a new algorithm to adjust these parameters. The user can modify the algorithm by changing these parameters to suit the different environments. Canny's edge detection algorithm is more costly in comparing to Sobel, Prewitt and Robert's operator. Even though, the Canny's edge detection algorithm has a better performance. The evaluation of the images showed that under the noisy conditions, Canny, LoG, Sobel, Prewitt, Roberts's are exhibited better performance, respectively. The various methodologies of using edge detection techniques namely the Gradient and Laplacian transformation. It seems that although Laplacian does the better for some features (i.e. the fins), it still suffers from mismapping some of the lines.

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# Genetic Algorithms: Information Retrieval System's Effectiveness Improvement Technique

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Associate Professor Vidyalankar Institute of Technology Varsha.bhosale@vit.edu.in Lecturer Viva Institute of Technology akshataaari@gmail.com ABSTRACT

IR is a component of an information system. An information system must make sure that everybody it is meant to serve has the information needed to accomplish tasks, solve problems, and make decisions. IR system has two major problems. One is how to extract keywords precisely and the other is how to decide the weight of each keyword. IR systems are evaluated with a view to improvement or with view to selecting the best IR system for a given task. IR systems can be evaluated on system characteristics and on retrieval performance. GA's are robust in searching a multidimensional space to find optimal or near optimal solutions.

## **Keywords**

IR (information retrieval), IRS (Information retrieval system), GA (Genetic Algorithm).

#### INTRODUCTION

#### **Information Retrieval System**

An IR system must make an effort to interpret the semantic content of a document and rank the documents in relation to the user's query.

#### Preprocessing

These techniques are employed in many well-known IR systems and common approaches include stopword removal, stemming and thesaurus construction.

## **Document and Query Representation**

Typically, the specific model adopted utilizes established transforms within the -model to map the document and query into conceptual objects that can then be related in that model of relevance.

#### Comparison

At this stage the query and document have already been transformed into structures or objects under the operations available in the model.

#### Evaluation

Relevance assessments for specific queries are generated by experts in the specific subject (topic) of the query.

#### Feedback

Feedback in IR is concerned with improving the retrieval process by typically enabling the user to supply exemplars of relevant documents or other fragments of useful information following an initial retrieval run of the IR system.

#### LITERATURE REVIEW

Queries generally are less than perfect in two respects:

1. They retrieve some irrelevant documents.

2. They do not retrieve all the relevant documents.

The following two measures are usually used to evaluate the effectiveness of a retrieval method.

The first one, called the *precision rate*, is equal to the proportion of the retrieved documents that are actually relevant.

The second one, called the *recall rate*, is equal to the proportion of all relevant documents that are actually retrieved.

#### DIFFERENT INFORMATION RETRIEVAL MODELS



Fig 1.2 Different information retrieval models

## **BOOLEAN MODEL**

The Boolean model of IR (Rijsbergen, 1979) is a classical model which uses traditional Boolean logic and set theory to identify documents that match a Boolean type query. The standard logical operators 'AND', 'OR' and 'NOT' can be used to construct queries that in turn identify a set of documents. This model is common and easy to implement but it suffers from obvious drawbacks. There is no concept of a partial match, as a document is either contained in the returned set (deemed relevant) or not (deemed irrelevant).

Another disadvantage of this approach is that it places a burden on the user to attain the knowledge to construct good Boolean queries. The **extended Boolean model** attempts to overcome some of the limitations of the traditional Boolean model by introducing partial membership to the set of relevant documents. This is achieved by utilizing fuzzy (or non-crisp) set theory to determine the membership of each document to the set of relevant documents (determined by the query).

## **3.2 FUZZY INFORMATION RETRIEVAL**

The next model is the **generalized Boolean model** where fuzzy set theory allows the extension of the classical Boolean model to incorporate weights and partial matches, and adding the idea of document ranking. The index weights can be seen as fuzzy membership functions, mapping a document into the fuzzy subset of documents "about" the concepts represented by the query terms, indicating the relative importance of each term in the overall query. The similarity-based fuzzy relational model. It generalizes the model in two dimensions: permitting a set of values for an attribute rather than only atomic values, and the placement of the identity concept with similarity.

An original relational model restricts the attribute to atomic, that is, only atomic values are allowed for attributes in the relations. The similarity-based fuzzy model allows a set of values for a single attribute provided that all of the values are from the same domain.

## **VECTOR SPACE MODEL**

The vector space model represents the documents and queries as vectors in a multidimensional space, whose dimensions are the terms used to build an index to represent the documents. The creation of an index involves lexical scanning to identify the significant terms, where morphological analysis reduces different word forms to common "stems", and the occurrence of those stems is computed.

Query and document surrogates are compared by comparing their vectors, using, for example, the cosine similarity measure. In this model, the terms of a query surrogate can be weighted to take into account their importance, and they are computed by using the statistical distributions of the terms in the collection and in the documents. The vector space model can assign a high ranking score to a document that contains only a few of the query terms if these terms occur infrequently in the collection but frequently in the document.

#### LATENT SEMANTIC INDEXING

Several statistical and AI techniques have been used in association with domain semantics to extend the vector space model to help overcome some of the retrieval problems described above, such as the "dependence problem" or the "vocabulary problem". One such method is **Latent Semantic Indexing** (LSI). In LSI the associations among terms and documents are calculated and exploited in the retrieval process. An advantage of this approach is that queries can retrieve documents even if they have no words in common.

The LSI technique captures deeper associative structure than simple term-to-term correlations and is completely automatic. The only difference between LSI and vector space methods is that LSI represents terms and documents in a reduced dimensional space of the derived indexing dimensions.

LINGUISTIC AND KNOWLEDGE-BASED nonparametric theoretically sound basis for retrieval. APPROACHES

In the simplest form of automatic text retrieval, users enter a string of keywords that are used to search the inverted indexes of the document keywords. This approach retrieves documents based solely on the presence or absence of exact single word strings as specified by the logical representation of the query. Clearly this approach will miss many relevant documents because it does not capture the complete or deep meaning of the user's query. Linguistic and knowledge-based approaches have also been developed to address this problem by performing a morphological, syntactic and semantic analysis to retrieve documents more effectively. In a morphological analysis, roots and affixes are analyzed to determine the part of speech (noun, verb, adjective etc.) of the words. Next complete phrases have to be parse d uring some form of syntactic analysis.

#### **PROBABILISTIC MODEL**

The probabilistic model of retrieval is based on the probability ranking principle (PPR) which states that optimal performance is achieved when documents are ranked by their probability of relevance. This, in turn, is estimated based on the distribution of terms in relevant and non-relevant documents. Thus, these models are interested in providing an optimal ranking over the document set. The binary independence model (BIR) proves that an optimal weighting for terms, based on some underlying assumptions, can be achieved. Again, the terms are assumed to be independent of each other. It is an assumption that persists in many models of retrieval due to its simplicity and due to the difficulty and cost associated in gathering details of the interdependence and co-occurrence of terms. Another assumption made is that relevance is only based on the presence and absence of query terms in documents. These assumptions provide for a limited but workable model and provide an optimal weighting strategy under such assumptions.

#### LANGUAGE MODEL

The language model can be viewed as part of the probabilistic family of IR models as it utilizes probabilities regarding term occurrences. As not all of the language models (documents) contain all possible terms, smoothing techniques are used to provide a non-zero probability that a specific language model (document) contains a specific query term. The probabilities for each language model generating the specified query are used to rank the documents for the user. This model has shown comparable performance with the more traditional probabilistic model of retrieval but has the added advantage of providing a nonparametric theoretically sound basis for retrieval

## THE QUERY REWEIGHTING METHOD

In query reweighting method, it consists of two parts. The first part constructs the query vector formed by the weights of query terms and calculates the degree of similarity between each document vector and the query vector. The system retrieves the top h documents having higher degrees of similarity with respect to the user's query, and the user marks each of the top h0 retrieved documents as a relevant document or an irrelevant document, where the values of h and h0 are determined by the user and  $h \ge h0 \ge 1$ . Then, the relevant documents among the top h0 retrieved documents are used to form the \cluster center vector".



Fig 1.3. The query reweighting model

## **REWEIGHTING THE WEIGHTS OF QUERY TERMS USING NEURAL NETWORKS**

The back propagation neural networks are used to adjust the weights of query terms. The back propagation neural network is the most representative and most popular neural network model. It has one input layer, one hidden layer and one output layer (totally three layers). The back propagation neural network model could have multi-layers of hidden layers or no hidden layer, and the basic principle of its learning algorithm uses the concept of the gradient steepest descent method to minimize the value of the error function, where the training process of the back propagation neural network is to adjust the weights of links. The most common used learning algorithm is the least mean square method called delta rule.



Fig 1.4. The back propogation neural network

#### DIFFERENT INFORMATION RETRIEVAL MODELS WITH GENETIC ALGORITHM 4.1 **VECTOR SPACE MODEL:**

Within Vector space model, both documents and queries are represented by vector. A particular document is represented by vector of terms and a particular query is represented by vector of query terms.

A document vector (Doc) with n keywords and a query vector with m query terms can be represented as

Doc = (term1, term2, term3.... termn)

Query = (qterm1, qterm2, qterm3,.... qtermm)

We use binary term vector, so each termi (or qtermj) is either 0 or 1. Termi is set to zero when termi is not presented in document and set to one when termi is presented in document.

For example, user enters a query into our system that could retrieve 5 documents. These documents are :

Doc1 = {Relational Databases, Query, Data Retrieval, Computer Networks, DBMS}

Doc2 = {Artificial Intelligence, Internet, Indexing, Natural Language Processing}

Doc3 = {Databases, Expert System, Information Retrieval System, Multimedia}

Doc4 = {Fuzzy Logic, Neural Network, Computer Networks}

Doc5 = {Object-Oriented, DBMS, Query, Indexing}

All keywords of these documents can be arranged in the ascending order as:

Artificial Intelligence, Computer Networks, Data Retrieval, Databases, DBMS, Expert System, Fuzzy Logic, Indexing, Information Retrieval System, Internet, Multimedia, Natural Language Processing, Neural Network, Object-Oriented, Query, Relational Databases.

These chromosomes are called initial population that feed into genetic operator process.

The length of chromosome depends on number of keywords of documents retrieved from user query. From our example the length of each chromosome is 16 bits.

#### 4.2. BOOLEAN MODEL

Boolean retrieval is a special case of fuzzy retrieval, this type of modification permits the use of weights to be attached to Boolean request terms. Thus, instead of being limited to requests similar to (t, OR t3) AND t4, one can emphasize the relative importance of these terms by requests of this form: (tl [.5] OR t3[.7]) AND t4[1.0]. As a result, one can retrieve documents that are ranked according to predicted decreasing relevance. conjunctive (ANDed) queries may retrieve a document whose representation fails to use all ANDed terms, and queries involving ORed terms can favor those documents whose representations use more of those terms. Under this model, one is permitted to make requests resembling: (tl OR[.4] t3) AND[.6] t4. Weight query terms by importance, the most important being given weight 1.0, the next most important weight 0.8, etc. Or, the best mix for weighting ANDs and ORs is AND(.67), OR(.33).

#### 4.3. BOOLEAN METHOD WITH GA1

The genetic algorithm can be used with any retrieval model requiring adaptation of document descriptions, Boolean or not. This form of adaptation requires that a set of complete descriptions be associated with any one document. The data structure needed to support genetic adaptation with (modified or standard) Boolean retrieval is easily illustrated by example.

	$t_1$	$t_2$	$t_3$	$t_4$	t
$desc_{x1} =$	(1,	1,	0,	0,	0>
$desc_{x2} =$	(1,	0,	1,	0,	0>
$desc_{x3} =$	ζ١,	1,	1,	0,	0)
$desc_{r4} =$	(0,	1,	1,	0,	1)

Fig. 1.5 Data structure needed to support genetic adaption

The inverted list representations of the same descriptions would be similar to t1, = [desc,, , descXz, descXs 1, t2 = [desc,i, descX3, descX4), t3 = (descXz, descX3, descXd],t4 = {), ts = (descX4). Each element, desc, of any of these sets is actually a pointer to the text of (or, more probably, reference to) document, - just as it would be in a standard inverted file implementation. For genetic adaptation to take place, the text of (or reference to) document, must point (lead) to all complete descriptions of the document along with certain statistics for each of these descriptions statistics that are updated as in the example.

#### 4.4. A GENETIC ALGORITHM METHOD BASED ON A LATENT SEMANTIC MODEL (GAL) :

A genetic algorithm method based on a latent semantic model (GAL) for text clustering. Because the most straightforward and popular approach represents texts with the vector space model (VSM), that is, each unique term in the vocabulary represents one dimension. Latent semantic indexing (LSI) is a successful technology in information retrieval which attempts to explore the latent semantics implied by a query or a document through representing them in a dimension-reduced space.GA belongs to search techniques that can efficiently evolve the optimal solution in the reduced space. Genetic algorithm (GA) belongs to search techniques that mimic the principle of natural selection. GA performs a search in complex, large and multimode landscapes, and provides near-optimal solutions for objective or fitness function of an optimization problem.

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Models	Uses	Operators	Advantages	Disadvantages
Boolean Model	<ol> <li>Uses Boolean logic &amp; set theory to identify documents that match Boolean type query.</li> <li>Document that contain term or set of terms that satisfy a query, then that document is deemed relevant.</li> </ol>	The Standard logical Operators are 'AND', 'OR' & 'NOT'.	Common & Easy to implement.	There is no partial match, as a document is either contained in the returned set or not.
Extended Boolean Model	<ol> <li>It utilizes fuzzy set theory to determine the membership of each document to the set of relevant document.</li> <li>It introduces the concept of weighting on each of the query terms ranging between 0 &amp; 1.</li> </ol>	By using logical Operators are 'AND', 'OR' & 'NOT' you can effectively communicate	Overcome some limitations of traditional Boolean model. This partial matching also introduces the idea of ranking over the set of relevant documents.	With these standard language, user can express search request. Searches would be less effective & retrieving valuable information would be even more difficult.
Generalized Boolean Model (Fuzzy information Retrieval)	<ol> <li>The original relational model restricts the atomic values for attributes in the relation.</li> <li>The similarity based fuzzy model allows a set of values for a single attribute provided.</li> </ol>	The degree of closeness between two tuples in a fuzzy relation is called as conformance.	Flexible querying, Handling of imprecision, uncertainty or fuzzy data, Defining & using fuzzy dependencies.	It can generalize Boolean model to higher t-dimensional space using Euclidean distance.
Vector Space Model	<ol> <li>Represents documents &amp; queries as vectors in a multi- dimensional space, whose dimensions are the terms used to build an index to represents the documents.</li> <li>The creation of an index involves lexical scanning to identify the significant terms, where morphological analysis reduces different word forms to common "stems" &amp; the occurrence of those stems are computed.</li> </ol>	Query & terms are compared by comparing their vectors, for eg. Cosine similarity measure.	Vector space model can assign a high ranking score to a document that contains only a few of the query term if these terms occurs infrequently in the collection but frequently in document.	The words used to define the dimensions of the space are orthogonal independent.
Latent semantic Indexing	<ol> <li>Several statistical &amp; AI techniques have been used in associated with the domain semantics to extend the vector space model to help overcome some of the retrieval problem "dependence problem" or the "Vocabulary problem".</li> <li>LSI is the association among</li> </ol>	The assumption is that there is some latent structure in the pattern of word usage across documents & the statistical techniques can be used to estimate this latent	The advantage of this approach is that queries can retrieve documents even if they have no words in common.	It uses pattern of word of documents.

## COMPARISON OF VARIOUS INFORMATION RETRIEVAL MODELS ALONG WITH GENETIC ALGORITHMS.

	terms & documents are calculated & exploited in the retrieval process.	structure.		
Linguistic & Knowledge based approach	<ol> <li>The simplest form of automatic text retrieval, user enters a string of keywords that are used to search the inverted indexes of the document keywords.</li> <li>Retrieves documents based on the presence or absence of exact single word string as specified by the logical representation of query.</li> </ol>		It has to resolve word ambiguities and/or generate relevant synonyms or quasi-synonyms based on the semantic relationships between words.	It doesn't capture the complete or deep meaning of the user query. to address problem by performing a morphological, syntactic & semantic analysis to retrieve documents more effectively.
Probabilistic Model	<ol> <li>Based on probability ranking principle which states that optimal performance is achieved when documents are ranked by their probability of relevance.</li> <li>This is estimated based on the distribution of terms in relevant &amp; non-relevant documents.</li> </ol>	These models are interested in providing an optimal ranking over the document set.	Information on the probable relevance distribution must be estimated. Again, this is achieved using measures of term occurrences in the documents and collection as a whole. This estimation is typically achieved using a term- weighting scheme.	The probabilities for each language model generating the specified query are used to rank the documents for the user. This model has shown comparable performance with the more traditional probabilistic model of retrieval.
Language Models	<ol> <li>It utilizes probabilities regarding term occurrence.</li> <li>In IR, this model views documents as language models &amp; estimates the probability that a specific language model will generate the given query.</li> </ol>	As not all of the language models contains all possible terms, smoothing techniques are used to provide a non-zero probability that a specific language model contains a specific query term.	The probability for each language model generating the specified query are used to rank the documents for the user.	It depends on variable crossover and mutation probabilities so as to improve performance in an information retrieval.
Query Reweighting method	<ol> <li>The first part constructs the query vector formed by the weights of query terms &amp; calculate the degree of similarity between each document vector &amp; query vector.</li> <li>It could have multi-layers of hidden layer or no hidden layer.</li> </ol>	Basic principle of its learning algorithm uses the concept of gradient steepest descent method to minimize the value of error function. Training process of neural network is to adjust the weight of link.	query vector formed by the weights of query terms and calculates the degree of similarity between each document vector and the query vector. The system retrieves the top h documents having higher degrees of similarity with respect to the user's query	Need to adjust the weights of links.

## Wireless Surveillance through Android controlled Hexacopter

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#### ABSTRACT

This paper is regarding a proposal of idea of controlling a hexacopter in a different way. Normally a multicopter is controlled by radio communication through 6 channel radio transmitter and receiver. But this paper proposes a technique and design of a hexacopter that is controlled by a virtual joystick on an android smartphone. To achieve this many modifications are required in terms of hardware circuit boards and the related softwares. This paper also specifies name of certain microprocessor or microcontroller boards that are used to implement this particular idea. Keeping this paper in mind many future modifications can be made to achieve complex designs and additional functionalities regarding multicopters.

## **General Terms**

Multicopters, Inertial Measurement Unit, Flight Controller, Surveillance

## **Keywords**

IMU-Inertial Measurement Unit, ESC-Electronic Speed Controllers, KK 2.1, hexacopter, PWM- Pulse Width Modulation, VNC-Virtual Network Computing, SSH-Secure Shell

#### INTRODUCTION

Our world is going through many technological advancements and according to the need of the hour robotics and embedded technology is revolutionizing the world with many upcoming innovative ideas. In military applications, surveillance plays a very significant role in any mission they undertake. Here robotics come into picture and many innovative devices help the military for spying activities.

Ground controlled vehicles are often used for many missions in surveillance activities. They are used in identifying human encroachments, detecting explosive ground mines, diffusing explosives, clearing radioactive wastes, etc. But the Ground robotic vehicles have their limitations. Their coverage area in surveillance activities is very limited compared to aerial vehicles.

The revolution in aerial vehicles has begun and is reaching many higher levels. The aerial vehicles has many advantages over ground vehicles. For instance, Prof. Pallavi Vartak Assistant Professor Viva Institute of Technology

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- 1) Coverage area of aerial vehicles is very large compared to ground vehicles and the surveillance becomes more efficient.
- 2) When it comes to motion, the ground vehicles use wheels for their maneuvering. The wheels need to change their angle first and gain their velocities to move in the direction of the new angle whereas aerial vehicles can change its direction as and when it wants.

But aerial vehicles have their own complexities. The multicopters travel in space and they need different kind of measuring instruments to control and keep them stable at their position. Hence the overall concept of multicopters goes here:

- 1) The sensors that are mounted on the flight controller collect the readings from the environment.
- 2) Those readings are preprocessed, combined and calculated by a microcontroller. The preprocessed readings are utilized by several C functions in the native program of the flight controller.
- The flight controller reacts to this by providing control signals in the form of PWM signals (Pulse Width Modulation).
- 4) The PWM signals are utilized by the ESCs (Electronic Speed Controllers) installed on the six arms of the hexacopter which are attached to the brushless/brushed motors individually.
- 5) They independently take control signals from the microcontroller to react to one situation.
- 6) The situation is then compromised and the hexacopter is ready to take the next command from the user or from the AI of the system.

#### HEXACOPTER BUILD

The Hexacopter structure requires several devices and equipments for its setup. The main things that are mandatory for its setup are listed below: [1] [8]

- 1) Frame
- 2) Propellers
- 3) ESC-Electronic Speed Controllers
- 4) Batteries
- 5) Brushless motors
- 6) IMU-Inertial Measurement Unit
- 7) Flight Controller

Following are the description of each of the equipments that are listed above.

#### Frames

The frames of hexacopter should be such that it should integrate all the components together. Also it may be aerodynamically correct and lightweight. Frames are the basic structure of the hexacopter. Hence if the frames are not good enough to support other components or aerodynamically it becomes unstable, then the hexacopter won't get its desired flight.

The frames consist of: [1]

- 1) The center plate where all the electronic components are mounted
- 2) Six arms that are connected to the center plate
- 3) Six motor brackets connecting the motors to the end of the arms

The materials that are conducive for the build can be: [1]

- 1) Carbon fiber
- 2) Plywood
- 3) Aluminum

Carbon fiber is the most rigid and vibration absorbent out of the three materials but also the most expensive. Aluminum material is also good for building hexacopter. But hollow aluminum rails for building arms is not advised since it produces vibrations during flight and the net effect can give rise to resonance which can mess up to the sensor readings. Wood is a very lightweight material but is not rigid and can fail to hold on to all the electronic components

While building hexacopter, it is very important to note the "motor-to-motor distance", meaning the distance between the centers of one motor to the other. The motor-to-motor distance actually depends upon the size of the propellers.

## Propellers

Propellers are the equipment that are mounted on the brushless motors are very important to provide the adequate lift. Now, all the propellers should not be same. Three of the propellers are tilted to the right whereas three of the other propellers are tilted to the left. But they should be mounted alternatively according to the leading edge of the tilt which should cut the air. Hence adjacent motors should have the opposite rotations.

The selection of the propellers should include following considerations:

1) The larger diameter and pitch of the propellers the more thrust it can generate. Naturally, the power to drive the large propellers is also large but the advantage is it could carry larger payloads.

2) When high RPM (Revolutions per Minute) motors are used, smaller or mid-sized propellers are preferred. When low RPM motors are used larger propellers are preferred since smaller propellers won't be able to give the proper lift.

## **ESC - Electronic Speed Controllers**

The ESC (Electronic Speed Controllers) are the important circuits that are mounted on each arms and are connected to each motors. The brushless motors take control inputs as PWM signals and need 3 phase power supply. Hence normal DC supply from the batteries won't support the power needs of the brushless motors.

The ESCs generate three high frequency signals with different phases but controllable continuously to keep the motors running. Each ESC has a single DC input and a three phase output for the motors. Each ESC is controlled by PPM signal or PWM signals. When selecting ESC, the most important factor is source current. The ESC should always be selected with at least 10A or more which is the requirement of the motors to run.

#### **Batteries**

Now while giving power supply to the hexacopter, the lithium-Polymer batteries are the best since it is light and it meets the current ratings of our requirements.

When selecting appropriate batteries following things should be considered

- Battery Capacity: It is always measured in maH which means how much mill amperes can the battery give consistently up to certain time. For instance, with 10cm 45" propellers and 1000KV motor and 4000maH battery, 4 minutes of full throttle flight time can be achieved with a payload of 1kg and an average of 16 minutes to hover. [8]
- Battery Discharge Rate: The discharge rate is always given by the C-value. The C-value and the battery capacity together indicates how much power can be achieved from the battery. It can be calculated as : Max\_curent= Battery\_Discarge\_Rate X Battery

Capacity [1]

For instance, if a battery of 4000 maH and 20C discharge rate, the maximum current drawn from the battery can be 4000 X 20 = 80 A. Hence, it has to be made sure that the total current drawn by the motors won't exceed 80A.

#### **Brushless Motors**

Brushless motors run on 3 phase current. They run on coils and magnets which are used to drive the shafts. The brushless motors do not have brush on the shafts which takes care of switching the power direction of the coils and hence they are called brushless motors.

The brushless motors have three coils on the inner center of the coils which is fixed to the mounting. On the outer side it contains of number of magnets mounted to a cylinder that is attached to the rotating shaft. The brushless motors as compared to the normal DC motors give much higher RPM with less power usage at same speed. The advantage is that there is no power loss in brushless motors as there was in brush transition in normal DC motors.

## **IMU-Inertial Measurement Unit**

Inertial Measurement Unit is a sensors package which helps in measuring the velocity orientation and gravitational forces with respect to the hexacopter. Such measurements are necessary since it helps the hexacopter's flight controller electronics to calculate the changes in the motor speed.

The IMU is generally a combination of 3-axis gyroscope and 3-axis accelerometer, together they bring about a total of 6DOF. Additionally, for yaw stability 3-axis magnetometer can be attached to it to make a total of 9DOF.

#### Gyroscope:

Based on the principles of conservation of angular momentum, the gyroscope measures the angular velocity for maintaining the orientation of the moving vehicle.

It uses transistors to gain current, the gained current produces a small magnetic field around it and this magnetic field varies with a neutrally existing magnetic field of the Earth, the variation is then given out through an analog signal which deviates the Vcc of the sensors proportional to the orientation of the axis [9]



#### Fig 1: Working of a 3-axis Gyroscope [1]

#### Accelerometer:

Accelerometer is device which works similar to gyroscope but it has enough precision to measure angle between relative axis, the varying analog output can decoded between relative axis. The word relative axis is to clearly understand to analyze the working of an accelerometer. [9] The below diagram is to be referred:



Fig 2: Working of a 3-axis Accelerometer [1]

#### **Flight controller**

The flight controller is the actual microcontroller board which actually computes all the data coming from the sensors package and the receiver pins. The flight controller can be a separate microcontroller board and the IMU can be mounted on it. There are many flight controller boards which come premounted IMU on it. One such flight controller that are considered in this paper is KK 2.1 flight controller.

#### KK 2.1

KK 2.1 is a microcontroller flight electronics board consisting of 3-axis Invensense Gyroscope and 3-axis Accelerometer which makes a total of 6DOF. This board has got a LCD output and receiver pins for interfacing with the radio receiver pins for Throttle, Aileron, Elevation and Rudder motions. [5]

This board contains 8 pins for connecting servo motors or brushless motors or electronic Speed controllers. The firmware gives the choice of any configuration such as bicopter, tricopter, quadcopter, hexacopter, octocopter, etc. with + or X configuration of each. Hence there are many possibilities that can be built or controlled through this board. The Piezo output buzzer is given to indicate the arming or disarming of the board and also to turn on/off self-level settings.

The PI Editor settings can be changed in the firmware. The PI Editor settings generally are the values that are defined for Raw, Pitch and yaw motions. These are the values that determine the smoothness of the flight, landing and take-off intensity of the flight and the amount of power to be dissipated to the motors. These are the values that can be set through fine tuning and smooth flight can be achieved by appropriate tuning of the PI values.

This board has got ATMEGA644PA microcontroller which is loaded with firmware and has got self-level codes to gain extra stability for the hexacopters. The pictorial representation of the board and the block diagram are shown in fig 3 and fig 4 respectively. [5]



#### Fig 4: KK 2.1 block diagram

#### HEXACOPTER CONFIGURATION

The hexacopter contains 6 propellers mounted on the 6 brushless motors. But the motion of the hexacopter has to be defined, i.e., the '+' configuration or 'X' configuration. Both the configurations can be programmed in the flight controller and are selected according to the need of the user.



## Fig 5: Hexacopter X and + Configurations

## OUR PROPOSAL

Normally every hexacopter or any other multicopters that is built uses radio communication for its control. The remote control uses 6 channel or 9 channel radio communication for Throttle, Aileron, Aileron and Rudder motions. The receiver which is mounted on the hexacopter frame receives the commands through radio communication at 2.4GHz frequency. These commands are passed onto the receiver pins of the flight controller through PWM signals. This is how normally the hexacopter communication works.

Now our proposal is to control the hexacopter through android virtual remote control application on an android enabled smartphone. The communication will be conducted through WIFI technology instead of radio communication. This communication is kind of a relay setup which includes additional installation and additional electronic boards.

The architecture being developed by us includes a serial communication between a microprocessor board that will process the commands and the flight controller. Now the microprocessor board will act as a server that will process the input commands that will come from android app through WIFI and process the commands to generate PWM signals which will be forwarded to the flight controller. But the flight controller still remains the actual driver of the hexacopter. Here only the technology of remote control is modified and is conducted through virtual joystick.

The block diagram of the architecture is shown in fig 6. The additional components that are used in this architecture are:

- 1) Android enabled smartphone
- 2) Raspberry Pi (Microprocessor board)
- 3) WIFI Adapter
- 4) USB Servo Controller

## Working:

The android enabled smartphone is installed with android 4.1 Jelly Bean OS. The android application software which is a virtual 6 channel joystick for multicopter control is connected with the raspberry pi wirelessly through WIFI. This software has joystick movements for Throttle, Aileron, Elevation, and Rudder motions of the hexacopter. The user has to set the PI Editor values in the android software. These values should be the same as those entered in the firmware of the flight controller. If the values are not same then the synchronization won't be proper. Moreover, the IP address has to be set in the android software to get connected to the WIFI adapter with the Raspberry Pi. [6]



## Fig 6: The proposed Architecture [6]

The android enabled smartphone has a WIFI module premounted in it. The WIFI adapter inserted on to the raspberry pi has to be configured first. The drivers for the related WIFI adapter has to be installed onto the raspberry pi Operating System. Using the smartphone's WIFI connection can be established. Now the coding part has to be done in the raspberry pi.

The raspberry pi mainly recommends Python coding. The Operating System usually installed on the raspberry pi is Linux Operating System which is an open source OS. The python compiler is preinstalled in the Linux OS on the raspberry pi.

Now this system is basically a client-server system. The client is the one which passes the controls and gives the commands to control the robot. In this case, the android software acts as the client part. The raspberry pi acts as the server part which takes the commands from the remote and passes or relays to the servo controller. This is done by setting up a Virtual Network Computing on the raspberry pi. VNC basically connects computing systems over a private network by creating a remote server. It uses Remote Frame Buffer Protocol (RFB). The VNC will give us the IP Address and the protocol through which the connection can be setup wirelessly.

Now to boot the python code at startup in the raspberry pi, SSH protocol is needed over the VNC. The SSH client which supports SSH protocol will boot the wireless connection at startup and run the code that administers the controls of the hexacopter motions.

The raspberry pi is interfaced with the usb servo controller through USB. The USB servo controller has an inbuilt firmware loaded in its microcontroller. This firmware helps in interfacing with the KK2.1 board through the 3 pins 6 channel configuration. The PWM signals is generated by the firmware itself. This servo controller has USB and TTL input/output.

#### CAMERA STREAMING

The controls from the USB servo controller are passed onto the KK 2.1 board which actually drives the hexacopter. The wireless camera is setup on the hexacopter which streams the video wirelessly. The camera is tuned with the radio AV receiver. This AV receiver is connected with the TV Tuner stick that is put into laptop. The desktop application of the TV Tuner gives us the streamed video when tuned with the proper frequency. The pictorial representation of the camera and the desktop application are given below:



Fig 7: Pictorial representation of the streaming desktop software



Fig 8: Pictorial representation of the wireless camera

The wireless camera is mounted on a 2 axis robotic arm which is built by 2 servo motors and servo clamps. The robotic arm is programmed for pitch and roll motions for camera stabilization during the flight. This will help in streaming a steady video on the laptop even if the hexacopter is doing aileron and elevation motions.

#### FUTURE ENHANCEMENTS:

This architecture can be further enhanced by adding many possibilities of functionalities. Some of the functionalities that can be added are as follows:

- A USB camera can be interfaced with the raspberry pi. By acquiring the image and constructing a 3D map of the location area, a virtual 3D path can be constructed. This will help the hexacopter to make it an autonomous vehicle. The destination can be set the path will be calculated by the algorithm in the raspberry pi. [2]
- 2) GPS Navigation techniques are also preferred option for making the hexacopter autonomous. Then by determining its position and obtaining the coordinates of the destination, the path will be itself chosen by the microprocessor board through navigation process. [7]
- 3) Image processing software can also be developed that can detect heat signatures. The images captured by the camera is streamed to the desktop application and by using MATLAB Thresholding technique, the heat signatures can be calculated.

Many such ideas can be developed using this architecture. The architecture can be interfaced with other flight controllers as well. But here KK 2.1 is used since it is the cheapest of the flight controller boards and it has no serial inputs unlike other

flight controller boards. Hence there is a need of such an architecture which this paper has proposed.

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### Performance Analysis Of Confidential Information Over Cloud

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encrypted using RSA [1] algorithm and then it is delivered to the system. The system decrypts the data received from the user and then stores it into the cloud storage [2][3]. After that when user fire some query to the system in order to get the report, this query is also encrypted using the same RSA algorithm by the user browser and then given to the system; The system will decrypt this query message and then execute the query and perform the data mining to retrieve the requested data from the storage [4]. Ones the data is retrieved as per the query calculation and permutation are done to generate report. The report is then encrypted by the RSA algorithm [5] and then delivered back to the requested user.

The main goal of the system is to provide secure progress analysis report to the user any were any time. The system will generate reports, with the help of these report user will able to do analysis of the progress of particular year. All the mining and report generation job will be taken care by the software present over the cloud. User can be able to fire any type of request to the system, the system response with different reports. This entire task will be secured [6][7] by an encryption technique in order to provide security to the progress information.

### PROPOSED SYSTEM

The proposed system consists of the different levels of users i.e.; Top level, middle level and low level. They make use f login forms to interact with the system. They all are having the different roles in the system. Different levels of users are associated with different login name and password and according to their level of login they can access the system and do their work done [8].

The functional blocks are explained as follows [8]:

• Users a. Student(Low level User)

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### ABSTRACT

The most popular computing paradigm in the area of research due to its high availability, economic benefits, high flexibility of Applications and storage of mass data, increase in efficiency is the cloud computing paradigm. Although having these advantages cloud have some issues regarding security and data access in the cloud, and management of data and services. The data stored over cloud is public; this may leads to the leakage of data. So the information can be misused. Data retrieval has also become tedious because of large amount of data stored on the cloud. Security is also a big issue while transferring the data from cloud storage to the user; because data should be transferred to authentic user only.

We can enhance the security measures by using encryption algorithm in order to prevent from unauthorized access. Encryption algorithm provides secure channel for data transmission. Encryption of data also guarantees that the data is not being accessed by any unauthorized user and has not been misused. So we are going with RSA algorithm. RSA algorithm prevents the system from unauthorized access and also provides the secure channel for the data transmission. Hence the resulting system is protected and provides easily accessible data over cloud.

### **General Terms**

Report generation, Algorithm, Secure, Cloud Computing, Encryption, Decryption.

### Keywords

Cloud Computing, Security, RSA Algorithm, Analysis

### INTRODUCTION

A progress analysis system that generates reports for different user request is placed over the cloud as Saas. The users of the system are the staff of the organization. The user first simply stores its data over the cloud storage. The user data is The student is the person belonging to the organization that needs to enter his data into the cloud storage, wants to keep his data secure and to have full access over his own data.

### b. Staff(Middle level User)

The Staff is a person belonging to the organization who needs to do some mining on the cloud storage that is related to his business but he requires the report and his request to be secret.

### c. Administrator(Top level User)

The Administrator is a person belonging to the organization who needs to keep track over the entire data stored in the cloud.

#### Report Generator

Report generator generates report as per the request made by the users. It actually does the job of computations.

### Cloud Storage

The storage is nothing but the collection of data where the entire data of each student is stored. The Storage unit has the sub-functional units that are as follows:

- a. Input Datasets
- b. Encryption Decryption Unit
- c. Job Queue

### Web Browser

The browser is responsible to submit the users request in an encrypted format to the website and receive the secure forecasting report and provide it to the end user.

### • Website Interface

It is Web server instance that caters the request of the user and forwards it to the task queue and receives the resultant report and replies back to the user.

### ALGORITHM

The following algorithm is performed to extract a report from the Cloud Storage (see Figure 1):

- 1. User interacts with the Website interface through the browser that encrypts the request using RSA algorithm as shown in Figure 1.
- 2. Website interface put this job request into the job queue.
- 3. The requested job is decrypted by the encryption and decryption unit.
- 4. The encryption and decryption unit sends the decrypted request to the report generator for further processing.
- The different datasets are extracted then forwarded to the report generator.
- 6. The report generator generates the report and sends the report to the encryption unit.
- 7. The encryption unit generates an encrypted report using the same RSA algorithm and sends it to the website interface.
- 8. The browser then decrypt received report using the RSA algorithm.
- 9. Administrator can manage the report generator system in order to work as per expected.
- 10. Administrator keeps the website interface updated.
- 11. Administrator keep track on the cloud storage in order to maintain such a huge amount of data accurately.



### Fig 1: Proposed System Architecture

### RESULT

The Resulted image is showing the performance analysis of years in which the number of students that had been passed. In resulted graph we are analyzing the performance of the students who had successfully completed their course.



Fig 2: Evaluation of Performance of Years

The Resulted image is showing the performance of particular year.



Fig 3: Performance Analysis of Year

The Resulted image is showing the performance of particular Student.



### Fig 4: Performance Analysis of Student

### CONCLUSION

We have observed that in addition of high availability, confidentiality of the information is also very important for any institute. Here we are providing secure channel for the data transmission using RSA Algorithm. We are also focusing to create the system which is very easy to access for the naive users.

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### NETWORK MANAGEMENT AND REPORTING SYSTEM

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### ABSTRACT

Organizations are highly dependent on networks since it forms the foundation for their fundamental growth through device management, sharing information that is being accessed. It necessitates for fast and user friendly network management application that can be used to monitor and supervise the private networks. Incorporating a network management tool used by the network administrators to search and trace out IP address information will facilitate real time screening and decision making in any network. The proposed approach is able to allocate IP addresses and IP pool to the designated user and provides incident reports so that administrators can handle cases regularly.

### 1. INTRODUCTION

Network management denotes to the events, approaches, trials and various resources that are relevant to the maneuver, administration of network system. Information for network management is composed by means of efficient super visioning and logging of data travelled over the network. The exclusivity of network management is its ability to gain control over a vast network and reducing malicious data and security breaches. But there are some drawbacks such as redundancy in data and is greatly reliant on human manipulation, vulnerable to unauthorized fabrication and its adaptability with today's networking needs. Here, comes the need of a rationalization that can offer a complete IP space management along with the control of automation to reduce processing time and avoid expensive network idle time.

In this paper, the system architecture that has been proposed can be used by any organization for securing and providing their IPs over entire network and that will provide them secure reports for analysis of accidental or unintentional activities over network. The Network Management for FCAPS model deals with the following five levels. The five levels are listed as:

- Fault Management: At this level, network problems are found and fixed.
- Configuration Management: This level deals with monitoring and controlling of operations.
- Accounting Management: Here, optimal resource distribution is achieved.
- Performance Management: Overall performance and throughput of the network is examined by the performance management.
- Security Management: Unauthorized access is prevented to ensure confidentiality of data [1][2][4].

Our proposed system comprises all five categories of FCAPS model by allocating IPs to verified users only, detecting faults and providing security from unauthorized access.

### 2. EXISTING SYSTEM

Various organizations are highly dependent on static spreadsheets implemented through excel files which are maintained by hands. Tracking, managing, incident detection, handling and reporting is all manual and thus results in the issues of redundant and inconsistent data, integrity and atomicity problems as well as these systems lack in automation hence maintenance job becomes tedious.

Because of all above issues, there is a need for developing a system through which these issues can be handled in efficient manner.

### 3. PROPOSED SYSTEM

Here, comes the need to develop a Web application, which will be used to manage the network and associated subnets. Any network node has a valid public IP and can be traced to an I/O port. This application should serve as a network management tool which will be used by the network administrators to search and trace out IP information about any node. This tool should have provision for the department administrators to draw IPs from a pool and also should have provision to request a new IP pool from the network administrator. This tool should provide an interface to log network incidents and should generate incident reports as may be required. This tool should also generate necessary reports by the network administrators for surveillance and audit of network elements and network. Fig. 1 shows the block diagram of proposed system.

Proposed system consists of four major components: User Profiling, Search and Navigation of IP data, IP Management and Reporting Tool.



### Fig 1 : Block diagram of Network Management and Reporting system.

Legitimate users are authenticated and given access to the system. With the help of search and navigation, hardware traceability can be performed to the end node. Various search selection allows the user to search the desired information in various style and conveniently. IP allocation and IP pool allocation are key operations through which department administrator can allocate IP to the user and network administrator can provide IP pool to the requesting department after verifying the request. After performing a scheduled check, free IPs can be reclaimed via the IP Re-Blocking. There is a need to generate Incident reports and scheduled reports for discovering incidents on networks [3].

### 4. OBJECTIVES

This section deals with major functionalities of the proposed system. The main objectives are listed as:

### **4.1 IP Pool Allocation and Management**

Department Administrator can submit the mandatory information required about end usage of IPs. Once all mandatory data has been fed regarding the end use of IPs, this system will initiate the unblocking process of IP at firewall and subsequently will release the IP for end use. It will also ensure that relevant computer code of the end user could be put in for IPs drawn for personal use and that computer code will be cross linked to the database for authenticity verification. If unused, the IP will be reclaimed and reblocked.

### 4.2 New IP Pool Allocation

If the allocated IP pool is exhausted by the department, there has

### new IP pool and associate a VLAN with this.

### 4.3 Statistical Incident Reporting

The system should have ability to serve out incident related information and generate report with respect to the details of incident ID, short description of incident, date and time of the occurred incident and the frequency of incidents.

### 4.4 User Profiling/Role Implementation

Proposed solution provides different privileges base on three different profiles namely network administrator, department administrator and subnet administrator.

4.4.1 Network Administrator: Network administrator is responsible for gathering details of the IP and underlying network information & to facilitate hardware traceability to the end node. The network administrator facilitates automatic check for use of IPs drawn within 48 hours of drawing the IP to ensure that the IP is not unutilized in case the IP is not drawn for personal end use. Network administrator has topmost privileges as compared to department or subnet administrators.

4.4.2 Subnet Administrator: Subnet administrator is responsible for managing subnets where there is no qualified department administrator. She/he also has a facility to take control as a department administrator to serve as a proxy in case the department admin is not available.

4.4.3 Department Administrator: Department administrator is designated to be in-charge of a particular department. She/he facilitates release of IP's upon submission of necessary and mandatory details at the application. Department administrator also provides facility for automatic unblocking of IPs on request with logging and report generation.

### 4.5 Reporting

Reporting assures that the IPs listed as blocked by the system are in reality blocked. It also reports that there are no floating IPs in the assigned subnet range with scheduled scanning and checking of allocated IPs. There is a need to generate alert on free IPs for any department hitting a configurable low threshold level. Statistical graphs are represented as per the reports generated to provide ease in comprehension.

### 5. GENERIC APPLICATION FEATURES

- Classified information is served out at the interface to the user based on user profiling.
- Necessary web application security & IP based Access control is provided.
- All security considerations exist on the spectrum between convenience and protection.

- The interface will have proper authentication and authorization to act upon the data made available to them.
- The login will be through secure sessions and over https protocol. Use of Sessions will take care not to allow access to internal pages and hence data and information bypassing the authentication phase.

### 6. CONCLUSION

IP address space Management is most widespread but commonly ignored in large organizations. A number of studies were reviewed and some common issues in these methods were identified. The proposed system eliminates these issues by dividing the management work in different gears and among different profiles, and thus monitoring and management of network becomes trouble-free.

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### Improved Network Management System

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### ABSTRACT

Managing networks has become challenging due to the advances of network technology. There have been many previous proposals to make network management easier, yet these solutions amount to stop-gap solutions due to the constantly changing underlying infrastructure. Also for the users who do not belong to the 'networking world' but are still accessing it, understanding the networks becomes a tedious task. This paper proposes a system that introduces new possibilities for network management and configuration methods. The paper identifies the problems with the current state-of-the-art network configuration and management mechanisms and introduces mechanisms to improve various aspects of network management [1] [3].

### **Keywords**

VLAN, IP, ACL

### INTRODUCTION

The dynamism and complexity of computer networks makes them difficult to configure and manage. Network management refers to the activities, methods, procedures, and tools that pertain to the operation, administration, maintenance, and provisioning of networking systems [2]. Network configuration, enforcement of various high-level policies and monitoring the network related events is the responsibility of network administrators (operators). The proposed system is a web application that manages network addresses of an organization which is often divided into many sections and departments. The application will be maintained and managed by the network admin of the organization. She/he will have the highest authority to the system. The department admin(s) will work for their respective departments and will work under the authority of the network admin. The system also enables transparency among the individual departments of an organization. Figure 1 shows the sample network architecture of an organization including the firewall and the switches used in the network.



Fig. 1: Sample Organization Network

### EXISTING SYSTEM

Traditionally, still many organizations make use of spreadsheets to maintain the database such as end user information of connected network devices and the IP addresses allocated to these devices, the IP pool allocated to the departments, blocked IPs and other such network related information. The network administrator allocates a pool of IPs to every subnet manually. The department administrator can use IPs by informing the network team with some mandatory information regarding the end usage. The department admini then makes note of the allocated IP addresses in an excel sheet.

As a result the issues that these organizations face are:

• There is no information reaching out to the network administrator about the usage of end IPs.

- As the department admins updates the database through an excel sheets it leads to inconsistencies and outdated information.
- There are floating IPs in the assigned subnet range, which are randomly used by end user which leads to IP conflicts.

### PROPOSED SYSTEM

The proposed system will aim at overcoming the shortcomings faced by the existing systems. In the proposed system the network administrator will have ultimate control of the IP allocation to departments. The department admin will work only for his particular department and will be simultaneously monitored by the network admin. Thus, the system will provide transparency among the departments as well as security. The entire application will serve as an automated network management and reporting system for an organization. Following Table I shows the difference between the existing system and the proposed system

System		
Features	Existing system	Proposed system
IP information	$\checkmark$	$\checkmark$
IP pool allocation	√(Manual)	√(Automated)
Hardware traceability	x	$\checkmark$
Statistical reporting	x	$\checkmark$
Automatic IP		
blocking/ unblocking	×	$\checkmark$
Security	x	$\checkmark$
Report generation	x	$\checkmark$

Table I. Comparison of Existing System vs. Proposed System

### FEATURES OF PROPOSED SYSTEM

### **Interface Design**

The application will serve out information to the administrator based on his/her profile. Role implementation and user profiling will take care of the fact that there are network admins managing multiple subnets and also department admins managing their respective subnets. For a network administrator (IP Registrar), the information served out will include the detail on every subnet IP range, name of the network and the manager for the network. For a department administrator, the information served out will include the detail on every IP in the assigned subnet range, name of the end user / machine to which it is allocated to and the location. Figure 2 shows the user interface with login screen and Figure 3 shows the dashboard that will appear for the network admin.

Usemame	
Password	





Fig. 3 Network Admin Home Page

### **Hardware Traceability**

Network trace information to the node is direct dependent on the underlying network architecture. Every IP / IP range is bound to a set of identifiers. The system will be scalable to adopt more network architectures and take in corresponding identifiers if there is a need to do so to represent any other different network scheme. The hardware traceability to the node for a network will be represented by a corresponding table structure at the system which will give the information about end usage of IPs, which will include information such as department, username, IP address, etc. Figure 4 shows a sample hardware traceability table which indicates the details of all users in a particular (Math) department along with a provision to edit or delete the information of the users.

ADMIN HOME Logged In (Network Admin) : (H/W Traceability)							LOG	OUT			
SEARCH BY BLOCK											
BLOCK	BLOCK SELECT										
	Page 1 of 1										
Sub Block	Department	User Name	Room No	VLAN ID	Switch No	Switch Port	Jack	IP Address	Comments	Edit	Delete
C2	Maths	james	C234	111	1	4	4	192.168.45.1		Ø	×
C2	Maths	john	C234	12	1	1	1	192.168.47.3		Ø	×
C2	Maths	sachin	C234	111	2	5	2	192.168.47.4		Ø	×

#### Fig. 4: Hardware Traceability

### **IP** Allocation from an Existing Pool

Network administrator will have the ultimate control on the IP allocation to departments. The information regarding the existing IP pools allocated to individual departments will be fed into the system when the tool goes live. After the deployment, the system will check for unused IPs at the firewall, and will block them if found unused. Any future IP

allocation for end use will be initiated by the department administrator through the application.

The necessary end use details will be filled in by the department administrator and will be dynamically released at the firewall and released for use. IPs used for the department so released, will be checked by the tool for a usage after 48 hours and if found to be unused for a predefined number of scheduled tests on the day, it will be considered as unused, will be reclaimed and will be blocked at the firewall again. The list of IPs, not in use, has to be arrived at by a network scan in regular repetitive scheduled intervals for a day and blocked. Figure 5 shows the IP allocation form which will be submitted by the department admin for a new IP request.

ADMIN HOME	Logged In (Network Admin): (IP Allocation Request)	LOGOUT
IP ALLOCAII	ON FORM	
Department Name		
Block	•	
Sub-Block	•	
Room No.	•	
Subnet	•	
IP Address	•	
Jack No.		
Switch		
Switch Port		
VLAN ID		
User Name		
Previous IP		
Comments		
	SUBMIT	

#### Fig. 5: IP Allocation Form

### **Automatic IP Unblocking**

Whenever IP has to be unblocked, department admin fills in the mandatory information regarding the end usage of IPs along with an unblock request to the network admin. The application after ensuring that all mandatory details are entered will initiate the log in to the firewall and unblock the port thereby opening up the I/O for network connectivity. The application will update the database of IP allocation. All activities will be logged with timestamp.

### **IP Re-Blocking**

To discourage bulk drawing of IPs and to ensure that IPs drawn are used in reality, there will be a scheduled check by the tool to the IP. It could be as simple as a ping test. If the test reflects a no-use result, the IP will be automatically reclaimed. The said IP will be automatically blocked at the switch and firewall again. In case the requirement of IP is genuine, the department representative can draw the IPs again. Figure 6 shows the table which provides a provision to the network admin to confirm whether the IPs allocated by the admin are actually used, and if not so, the admin can block the IPs.

ADMIN HOME	Logged In (Network Admin	): (IP Block / Rebl	lock)	LOGOUT
IP AI	DDRESS	PING IP?	BLOCK IP?	
192.168.47.4	PIN	3	BLOCK	
192.168.67.4	PIN	3	BLOCK	
192.168.55.1	PIN	3	BLOCK	
192.168.10.2	PIN	3	BLOCK	

Fig. 6 IP Blocking Screen

### **IP Pool Allocation**

If the allocated IP pool is exhausted by the department, there will be a provision for the department admin to request a new IP pool and associate a VLAN with this. The tool will provide an interface wherein the network admin can see:

- Pending request for a new IP pool with necessary details.
- Input interface wherein the network admin can enter the new IP pool range and subnet and VLAN information for the same and associate it to the requested department.
- Complete logging and report generation regarding the new IP pool allocated.

The IP pool allocation form is similar to the IP allocation form.

### **IP** Auditing

IP auditing is required to ascertain that the IPs listed as blocked by the system are in reality blocked thus ensure that there are no floating IPs in the assigned subnet range with scheduled scan and check of allocated IPs. The whole of unused subnets are then blocked at the firewall.

Following are types of auditing mechanisms:

1) Audit for complete unused subnet blocking: To ensure that all unused IPs and IP ranges are blocked in the network the mechanism of IP range blocking has to be 100 % foolproof. The system has the information about the blocked IP ranges. The IP audit on the blocked subnet range ensures that whatever IP ranges are claimed as blocked by the system are blocked by any or all of the above mechanisms.

### Workflow:

Once in a year there will be a list generated from the router, firewall & L3 switch ACLs. The three log files from each of these devices will be analyzed and a comprehensive list of blocked IP ranges will be arrived at. This will be compared to the IP range blocked information served out by the application. Where there is a mismatch or deviation, the case will be alerted to the network management team. Facility for Report generation of the blocked IP range audit will be there.

2) Audit for unused Subnet IPs blocking: The mechanism of blocking the unused subnet IPs involves blocking at L3 switch port. The system will have the information about the blocked IPs in any subnet. The IP audit on the blocked IPs ensures that whatever IPs, claimed as blocked by the system is blocked at the switch. This audit will be more frequently done, since there is lot of IP dynamics involved in a subnet which is in use.

### Workflow:

Once in a span of 3 to 4 months a year, there will be a report generated on the L3 switch port blocked information. This will be compared to the blocked subnet IPs information served out by the application. Where there is a mismatch or deviation, the case will be alerted to the network management team and department manager(s).

### **Role Implementation**

Following are the roles involved:

1) Network Admin: The network admin is the central authority and has the following functions:

- Gathers details of the IP and underlying network information & facilitates hardware traceability to the end node.
- Facilitates automatic check for use of IPs drawn within 48(or as per the need) hours of drawing the IP to prevent wastage of IPs.
- Facilitates allocation of a new IP pool for a particular department and associates a subnet and VLAN along with it.
- Takes control as a department admin to serve as a proxy in case the department admin is not available. This role has to take charge as department admin.
- Reports logs of IP withdrawal & IP re-blocking.

2) Department Admin: Department Admin has control over one department and has following functions:

- Facilitates the release of IPs based upon submission of necessary and mandatory details.
- Facilitates automatic unblocking of IPs on request with logging and report generation.
- Reports incident arising from network nodes with necessary details to enable central data gathering regarding network incidents.
- Lists brief details and frequency of incidents originating from nodes for the subdomain or department concerned.

#### CONCLUSION

The proposed system is a powerful and comprehensive application that allows businesses to better control and maintain their IT networks by centralizing and automating all activities related to tracking, monitoring, servicing, and finetuning its components. They can thus more efficiently and effectively address the problems and issues faced by the users who are connected to those networks.

### ACKNOWLEDGMENT

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### IMAGE TRANSLATOR ON ANDROID USING IMAGE PROCESSING

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### ABSTRACT

Android powers hundreds of millions of mobile devices in more than 190 countries around the world. It's the largest installed base of any mobile platform and growing fasteveryday another million users power up their android devices for the first time and start looking for apps according to their convenience<sup>[1]</sup>. This paper presents a very useful and user friendly android application ITAIP. ITAIP stands for Image Translator on Android using Image Processing. This application is extremely helpful to tourists and travellers who possess android smartphones. It allows users to easily capture native country language signboards, book's pages, hotel menus, etc. Our application consists of a built-in Optical Character Recognition (OCR) which converts text embedded in a captured image into Unicode text format. There is no remote computing overhead because the application has built in OCR suite as well as Image Processing suite both installed in the Android device<sup>[2]</sup>.

### 4. INTRODUCTION

The main objective of our application is to enable Travellers and Tourists to easily capture the native country language Books pages, signboards, banners and hotel menus etc. The built-in OCR converts the text embedded in the captured image into Unicode text format. It has an additional feature that allows user to translate the Unicode text into desired language. This Application has an advanced search feature so that recognized as well as translated text can be used to copy, paste, share and search for travel related queries like museums, places, restaurants, books, hotel menus, etc. This would prove enormously beneficial with respect to the aspects about localization being a common phenomenon now-a-days. Also android platform has increasingly become common in accordance with its features like low-cost, customizable, lightweight operating system and more.

### 5. PROPOSED SYSTEM

### 5.1. Camera Capture Component

In this module with the help of built-in camera of smartphones to which the application is installed in the user can resize the image capture box by touching the

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corners on the screen so as to capture only the required text image from signboards, banner, book's pages, hence, focusing mostly the text region in the image in order to cover as much image text as possible in one click. Auto focusing of image is done throughout the session.The captured image is in binary form. When capture button is pressed, the image is captured and sent to the Tesseract OCR engine module using Tesseract Android Tools.



Figure 1: Block diagram of ITAIP

### 2.2 Tesseract OCR Engine Component

Today, Tesseract is considered one of the most accurate open source OCR engines available. Tesseract OCR Engine was one of the best 3 engines in 1995 UNLV Accuracy Test. Between 1995 and 2006 however; there was little activity in Tesseract, until it was open sourced by HP and UNLV in 2005. It was again re-released to the open source community in August of 2006 by Google<sup>[3]</sup>. Tesseract has ability to train for newer language and scripts as well<sup>[4]</sup>. A complete overview of Tesseract OCR engine can be found in<sup>[5]</sup>. While Tesseract was originally developed for English, it has since been extended to recognize French, Italian, Catalan, Czech, Danish, Polish, Bulgarian, Russian, Greek, Korean, Spanish, Japanese, Dutch, Chinese, Indonesian, Swedish, German, Thai, Arabic, and Hindi etc<sup>[6]</sup>. Training the Tesseract OCR Engine for Hindi language requires in-depth knowledge of Devanagari script in order to collect the character set. Moreover, Tesseract OCR Engine does not just require training of the collected dataset but also to tackle the character segmentation and clubbing issues based on the script specific features i.e. Shirorekha, maatra etc.

In this module, the binarization of Captured Image takes place, after that the text layout is analyzed, Blobs are detected and finally words and lines are detected. The words are sent to a number of passes. In these passes each word is chopped into characters and characters are checked for the need of joining the broken characters or the breaking of associated characters. Finally chopped characters are recognized with the help of inbuilt fuzzy features matched to language specific training data of Unicode characters. After each pass the words are matched back and forth with the Language specific Dictionary words<sup>[7]</sup>.



### Figure 2: OCR Engine

### 2.3 Language Specific Dictionary Module

In this module, each group of sequential characters is searched in the dictionary in order to identify a meaningful word rather than searching a meaningless word as result. Then this recognized text is sent to the Unicode text module for post processing.



Figure 3: Language Specific Dictionary Module

### 2.4 Unicode Text Module (Post Processing)

In this module, the output which came from the OCR engine is displayed as Unicode text in a text box and the user is allowed to translate the recognized text into his desired language available in the drop down list from settings. Moreover the user can use the advanced search feature to search the travel specific related queries like museums, books, videos, songs, culture, images, places and hotels etc. related to recognized or translated text.

#### 6. FEATURES

### THE FOLLOWING ARE THE FEATURES OF THE ITAIP APPLICATION,

### **3.1 Userfriendly UI**

A key feature is that the Graphical User Interface is simple and easy to use. The user only needs to provide the system with the query image. Thus the interface as a whole provides a very user friendly environment.

### **3.2 Overcomes Networking Delay**

It overcomes the existing problems with OCR technology i.e. limited memory and limited processing power challenge moreover also overcome the problem of networking delay

### **3.3 Direct Access to Camera and Gallery**

If the image is already stored in the android gallery, the image can be directly accessed. If not, the application allows for capturing the image using the camera.

### 3.4 Both Regional And International Languages Included

The application has a drop down list from which the user can select the desired language of his choice. Thus the application is multi-lingual.

### 3.5 Copy/ Paste Both Translated And Recognized Text To Search For Any Tourist Place

The application allows user to copy, paste and share the Translated Text as well as Recognized Text and thereby search for text related museums, songs, images, videos, hotels, restaurants, etc.

### 7. SYSTEM REQUIREMENTS 4.1 Hardware

- 1. 256 Mb RAM and 80 Gb HDD.
- 2. Intel 1.66 Ghz Processor Pentium 4
- 3. Gprs Enabled Mobile Phone With Android

### 4.2 Software

- 1. Windows XP
- 2. Android SDK

### 8. DESIGN DETAILS

### 8.1. Data Flow Diagram

A Data Flow Diagram is a graphical representation of the flow of the data through an information system. DFD shows what kinds of data will be input to and output from the system, where the data will come from and go to, and where the data will be stored. Following figures mentions some notations of the Dataflow.



### 8.1.1. Dataflow level-0 Diagram

It defines the high level view of the Application. It defines how system is divided into subsystems. It does not include the detail procedure of the any modules.







Figure 5: Level 1 DFD

5.1.3 Level 2



Figure 6: Level 3 DFD

### 8.2. Flow Chart



**Figure 7: Flow Chart** 

### 9. CONCLUSION

Image Translator on Android using Image Processing is thus a very beneficial application for tourism in any county, especially in a developing country like India. Our application provides an extremely fast, robust and high quality performance because of having improved Auto focus behavior, continuous dynamic preview, improved noise tolerance feature and no remote computing overhead<sup>[7]</sup>. It is a simple and user friendly application that can be used by tourists while they are vacationing in some other country.

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### Instant Medicare System

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### ABSTRACT

In recent times, many advances have been made in the field of mobile positioning system along with telecommunication system. This has given an impetus for development of location-aware healthcare applications. The goal of this project is to provide immediate medical assistance to people who have met with an accident and are not able to communicate vital information or their location verbally. The application alerts emergency care-units on just a single click on the interface from the victim. The emergency services would be able to track the patient's location through the application. The secondary features of the application include medical prescription reminders for patients, it also allows them to track medical facilities in their locality and fix appointments. On the other hand, the doctor can easily track medical history of patients through the application.

Keywords--- mobile positioning systems, telecommunication, location-aware, healthcare, medical assistance, emergency care-units, prescriptions.

### **1. INTRODUCTION**

In recent times Mobile communication has taken rapid strides into the day-to-day life of people. Mobile has become a massive means of delivering key information between two entities. One such use of mobile communication is depicted in this project; it deals with how improvement can be made in the field of Healthcare services. It is very common nowadays to hear about death-caused by accidents, more unfortunate is to know that the victim could have been saved had he/she had received medical attention on time. The primary objective of LOCATION-AWARE HEALTHCARE SYSTEM is to eradicate this discrepancy of delayed medical service to victims. Usually when a person meets with an accident he tries to inform his/her relatives, but they may not be able to do so due to the severity of the injuries making them unable to voice their problems or type an SMS. In such cases LOCATION-AWARE HEALTHCARE SYSTEM is the solution. The Main feature of the project is the one click based mobile application. It allows the victim to send an alert to the nearest medical emergency service as well as his closest relative (editable by the user). The alert message delivers the location of the victim to the service through GPS and Google maps. The additional features of the system include a Web interface for medical centre to manage patient data in a more

simplified manner. The medical centre can edit a patient's medical information according to his/her on-going treatment. Apart from this the mobile application provides patient's with a medicine prescription alarm system that reminds them of their timely medicinal needs. The patient can also book an appointment with a physician in his/her locality using the mobile application.

### 2. EXISTING SYSTEM

In recent years, wireless systems seem to be contributing more towards healthcare systems. With the complex tasks that need to be performed at hospitals and health centers, it requires mobility and coordination. Hospitals make use of artifacts such as whiteboard that helps in communicating information about patients and nurse.

Medical records consist of patients' clinical data. With the advancement of wireless communication system, electronic patient record systems were developed that provides access to clinical information and prevents the loss or misplacement of information. With the help of this system healthcare professionals can access patients' information by connecting to various institutions information or database department. Patients' information includes heart rate, blood pressure and other similar physiological aspects. It is important on part of physicians to know what patient requires, what is its current location to provide aide to the patient at his current location. But this system could not provide all these facilities. This system only reduces the paperwork.

This scenario was improved with the development of different system like wireless systems for elderly people with dementia, intelligent nurse call system and others. In wireless system for elderly people with dementia, the system keeps track of patients. And in intelligent nurse call system, this system is used to help patients at their home. As in some cases a nurse is assigned to take care of patients, this system replaces the nurse and thus reduces the cost. But these systems are not efficient in every aspect. The biggest drawback is that the existing systems are limited in space. These systems are only limited to a particular hospital or medical center or in best case to a small region. In these systems appointments cannot be directly made. Some of the system made use of RFID technologies but it is also limited in

space and user has to take care of RFID tags. In this way, many existing systems have improved the previous system but are still lacking in some of the aspect. Currently, there is no wireless system that covers all the properties over long distances.

### **3. PROPOSED SYSTEM**

From the above literature study we can conclude that it is difficult to provide efficient and quick performance in case of healthcare system over long distances. Our paper describes a location aware health care system that provides a solution in emergency situations in a reliable and efficient manner. In case of adverse situations like when someone is injured and the person is unable to communicate and provide vital information to others, in such situations medical authorities must sometimes treat patients without any provision to contact someone who can help them in emergency situations.

The health care system consists of a backend system that has a database for all patients. It stores information like patient's blood group, illness, drugs prescribed, allergies etc. The health care system consists of a website for managing patient's data which can only be done by the doctor. All the appointments will be managed using this website. It also provides a mobile application for patients. Using this application patient can make appointments, check their medical history. It provides an automatic alarm by which patients can take medicines on time. Before using this website all hospitals and medical centres must register. The website helps doctors to add patient's information in the database, update patient's information, drug information. Important information like allergies, blood group etc. are stored in database and sent to mobile application as medical history. The website will be designed in an efficient manner.

The mobile application has a special feature which will help the user in emergency situations. The application has an icon which the user can click when he cannot express his medical condition to others. On clicking this icon GPS location of the patient will be sent to the website .Also it will send messages to doctor and patient's friend. The application will show patient's data and in case of emergency surrounding people will know how to treat him. The mobile application also has a reminder which will help the patient to take prescriptions on time. Using the mobile application patient can book an appointment with doctor .Doctor can cancel appointment by sending message to the patient. This feature will help doctor to handle his daily appointments easily. The backend system will be used by the mobile application when it needs to update and retrieve information present in the database. The database will also store information related to the GPS parameters such as longitude and latitude. The main aim is to build a reliable health care system and help doctors and hospitals to manage patient's data in an efficient manner.

### 4. CONCLUSION

With the deployment of wireless networks, the role of wireless technologies is expected to increase in healthcare applications. The field of healthcare should keep up pace with the technology advancements so that doctors and nurses can effectively treat patients during emergency. Our article offer services such as a mobile application for patients using which they can get immediate attention during emergency and a website for doctors to effectively manage his or her patients. It is expected that implementation of our project will help to reach a step closer in realizing the idea of wireless healthcare.

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### FACE CONTROLLED MOUSE

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ABSTRACT

A simple prototype system for real time tracking of a human head has been proposed.

It uses a simple Face tracking algorithm.— it should be inexpensive, should possess the ability to perform in different environments and should be able to start and initialize itself with minimum knowledge about the environment, are well addressed by the elliptical head tracking algorithm.

The position of the head is tracked and converted into twodimensional coordinates on a computer screen; additionally, it is intended to enable the recognition of a deliberate blink in order that this could be considered as a command from a user.

### INTRODUCTION

People want to interact with computer in an natural way, instead of using hand-controlled input devices, e.g. mouse and keyboard.

To do this the computer has to accommodate to human's natural sensing and behavior which is not easy.

The face is the most studied for visual human tracking and perceptual user inter- face, because face appearance is more statistically consistent in color, shape and texture, and thus allow computer to detect and track with robustness and accuracy.

In this , we describe a graphical user interface navigation utility, similar in functionality to the traditional mouse pointing

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Movement of the pointer is achieved by tracking the motion of the head, while button-actions can be initiated by issuing a voice command.

Foremost in our mind was the goal to make our system easy to use and affordable, and provide users with disabilities with a tool that promotes their independence and social interaction.

### LITERATURE SURVEY

Through literature survey for this project, it has been discovered that a number of researchers are concentrating on the topic of computer vision. This field has a number of commercial applications in areas such as medicine, manufacturing and even toys. A brief survey follows.

### 2.1 Face detection:

The approach of face detection is distinguished in two main categories: feature-based and image-based. The former techniques are based on the common properties of human faces, such as geometry or skin color; the latter techniques instead consider face recognition as a more general pattern recognition problem.[1]

### 2.2 Feature-based approach:

These are based on the notion that the color of human skin is always between a certain range, regardless of the ethnic origin of a person.

The image is searched for contiguous pixels with a particular class of colour and, after

having determined the boundary of a face, it is extracted from the image.[2]

### 2.3 Image-based approach:

With the image based approach, the human face is considered as a pattern that can be learned from studying examples. Therefore, precise knowledge of facial characteristics is not required. This eliminates errors caused by the use of an inaccurate or incomplete face model.[3]

### EXISTING SYSTEM

In the modern world, computer use has become essential for many everyday tasks such as electronic communications, information gathering, and recreational activities. The current computer interface set up of a mouse and keyboard requires the user to have full use of his or her hands. Unfortunately, many people do not have sufficient use of their hands due to injury or illness and are thus unable to use a computer using traditional hardware.[4]

Some alternative interfaces have been developed using electroencephalograms (EEGs) and eye motion, however these require a great deal of expensive hardware, require significant processing time, and only give the user limited control.[5-8] More recently, development has focused on systems that monitor head motion either electromechanically or optically. These systems can provide faster speeds and more control, but they are often very expensive and difficult or awkward to use.[9]A system called Quick Glance monitors the location of a user's pupils using an infrared emitter/receiver. The problem with all of these systems is two fold: firstly, they all make use of some sort of non-standard hardware, which in some cases is expensive and for which there may be very limited support. Secondly, a user must wear pieces of hardware that can be considered invasive, such as an infrared emitter, reflectors, electrodes or helmets.

In contrast, an interface based on an image captured by a normal web-camera is completely 'transparent' to the user, who may use it without not even notice how it is working. Such hardware is now increasingly found in most of the personal computers configurations.[10]

### SCOPE

The project presents a simple and effective low cost optical system for implementing mouse operations using processed head motion.

The system consists of several basic, off the shelf components including a webcam, a headset and a computer.

Images from the webcam are analyzed using a combination of software in order to determine the position of the user's head. This head position data is then transformed using a non-linear transformation into a corresponding screen position that is used to control the mouse pointer.

CLICKING OPERATIONS CAN BE ACCOMPLISHED EITHER USING THE VOICE COMMANDS OR THE STILL FACE POSITION

### PROPOSED SYSTEM

Our proposed system is an alternative user interface uniquely using real time video of the user's face captured using an offthe-shelf web-camera.

Our proposed system will comprise of the following modules:

### **5.1]Graphical User Interface:**

This consist of creating a GUI of the systems in any higher level programming language like JAVA / .NET. It will be used to provide a User Interface in which the user will be able to initiate various functionalities & view the real time streaming from the web camera.

### 5.2] Audio / Video Enablement:

The user interface will give a native call to the core application written in c++. Here we would first enable the hardware device drivers for the Web Camera & Microphone. After this we will capture the live video from the camera.

### **5.3] Video Processing:**

The video captured will be processed. The details of the first frame will be captured stored either in a temporary file. This will be compared with the next frame & the details of the Face transition / movement will be stored & provided to the mouse scaling module.

### 5.4] Mouse Scaling

The position of the head would provide the coordinate value for the mouse cursor. Any transition to the head position would provide us with the mouse movement.

### 5.5] Speech Processing

We would try to use Speech / Voice Commands for performing Clicks. The voice being recognized would be mapped with the best matched commands and will perform the necessary operation.

### SYSTEM REQUIREMENTS

### 6.1 HARDWARE:

- 4. 256 MB RAM.
- 5. 80 GB HDD.
- 6. Intel 1.66 GHz Processor Pentium 4
- 7. Camera and Microphone

### 6.2 Software:

- 1. WINDOWS XP.
- 2. JAVA.
- 3. VISUAL C.
- 4. OPEN CV.

### DESIGN DETAILS

To elaborate the working of our face controlled mouse, and how it will actually work, we have designed the flow charts.



### Fig: Overall system

The overall system is as depicted in the block diagram given in fig above. The image acquisition module grabs frames from the video device which are fed into the tracking module. Now the tracking module checks if the grabbed frame is the first frame. A global search is performed for the first frame and the likelihood is computed. This way the tracking module automatically initializes the tracker by performing this global search on the first frame thus eliminating the need for any explicit knowledge of the environment before hand. For all the subsequent frames, the location of head is found by performing a local search in the search range. Finally the object which is tracked in real time is displayed on the Computer screen.

### ARCHITECTURE



Fig :Layer of the project

The two subsystems of the project are: the Tracking Layer and the Client Layer.

The Tracking Layer is designed as a procedural library[OpenCV], it receives the input from the web-camera which is interpreted and analysed. Only a subset of functions are exposed to the Client Layer, which are called using the Tracker Layer Wrapper.

The Client Layer is designed as ObjectOriented system in JAVA, it a employs the Wrapper in order to have an internal ObjectOriented representation of the library.

The user can interact with the Framework using the GUI (Graphical User Interface) provided.

There is minimal coupling between these two layers, the only dependency is the 'one way' relationship between Tracker Layer Wrapper and the functions exposed by the Tracking Layer.

Conceptual Mode:



Fig: Conceptual Mode

### Face Detection :

The system needs the ability to understand when it requires initialization i.e. whenever a user appears in front of the camera. The frames provided real-time by the camera are continuously scanned in order to

identify the number of faces in visual spectrum, each time a single face is detected its location is calculated and passed to the features identification algorithm.

The approach used is a image-based face recognition technique based on a neural network of Haarfaces

The network is trained using a set of frontal faces provided with the OpenCV library.

#### Feature Identification:

The technique created is based on four simple steps:

- Retrieve face location: the location of the face is retrieved thanks to the face detection algorithm from OpenCV.
- Identify eyes location: the location of the eyes is calculated relatively to the location of the face.
- Remove unwanted areas edges of the face
- Identify good features to track

### Movement Tracking:

A sequence of the operations performed as follows:

- The number and the initial position of the facial features are obtained from the previous step.
- The initial configuration of the features is stored in the memory.
- The real-time video clip provided by the camera is analyzed frame by frame by the tracker in order to detect the movements of each single feature.
- For each feature the difference between its current and initial location is calculated, then the average of all the differences is calculated. In this way the tracker detects a small movement when the head performs a roll.

Eye Blink Detection:

The technique used to detect the eye blinks is entirely based on the movements of the eyelids which, can be effectively detected using a USB camera (capable of achieving 30 fps).

### CONCLUSION

Our face controlled mouse is very beneficial for the differently abled people to manipulate the mouse pointer in the way they want. Our project provides an extremely fast, robust and high quality performance because of having added voice functions to it; thus making it more easy for the users to use it.

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### **Content Based Image Retrieval System**

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### Abstract

For years, we have referred to images as a reliable and a more accessible source of information. The main object of this paper is to propose an efficient way to process this large database of information with the approach of Content Based Image Retrieval. In this paper, we propose an approach to develop a system in which visual features of a specific image are extracted and stored as a "template". These templates are used as a measure of comparison to the query image and finally a list of exact or similar images is produced to the user based on the images present in the targeted database. Even if identical images are not present, the system retrieves similar images as well.

### 1. Introduction

The overall objective of any Content Based Image retrieval System is to extract the features of the query image and provide an output image that matches it visually. The extracted part of the image acts as a measure of similarity which in our case is in fact the template. Basically any part of an image that delivers a specific summary of its property can be counted as a feature. This can be the texture, colour, shape or even a part of the image. The main advantage of Image based retrieval is the fact that the user does not have to specify the requirement of the search like tags, links or text. The basis of matching and retrieval are in fact the explicit features of the image itself.

Comparison and matching is an integral and perhaps the most important stage of the process of the whole system. It is based on this stage that the nature of the result is determined. The list of images retrieved should have complete or partial resemblance to the input image. If the output produces a complete relevant result then the system is said to be fully efficient. Content Based Image Retrieval is rapidly gaining focus around the world due to the increasing size of image databases. It provides for an easy to use interface for users as well as efficient management of bulk image data.

### 2.Related Work

### 2.1Existing System

Systems previously introduced which are partially or completely similar to our proposed techniqueare as discussed below.

### 2.1.1.QBIC:

Query By Image Content (QBIC) is a image retrieval system developed by IBM, Almaden Research Centre. It is a system that provides a multi-feature extraction approach for filtering queries. It supports image queries as well as user-provided sketches making it highly user friendly.

### 2.1.2. VIRImage Engine:

Based on primitive features of an image such as structure, colour or texture, VIRImage Engine is an Image retrieval system developed by Virage Inc and performs its system process by a pixel driven method.

### 2.1.3.VisualSEEK:

This is a Content based Image Retrieval system developed by the Department of Electrical Engineering, Columbia University. Its functionality is based on colour feature of an image as well as the spatial position of pixels.

### 2.1.4.NeTra:

Developed by the Department of Electrical and Computer Engineering, University of California, it is a complicated retrieval system as it extracts the colour, texture, spatial position, shape of an image as well as supports image segmentation.

### 2.1.5.MARS

MARS or Multimedia Analysis and Retrieval System is an image retrieval system that supports the extraction of colour, shape, texture and spatial layout of an image. It was developed by Beckman Institute for Advanced Science and Technology, University of Illinois.

### 2.1.6. Viper:

Viper or Visual Information Processing for Enhanced Retrieval was developed at the Computer Vision Group, University of Geneva. It supports both colour as well as texture matching.

### **3.Proposed System**

### 3.1 Working

Content based Image Retrieval System requires implementation in two major parts i.e. user interface and core processing unit. As said before, for processing of the image we use template matching technique.



Fig. 1:Basic Concept of System

Template matching process is implemented using Normalized Cross Correlation (NCC). We use NCC as it provides for better processing when brightness or contrast of the input image is not feasible. As the process continues the images will be compared according to their spatial layout as well as their pixel position. In special cases, the extracted template is also scaled or rotated or both. Once the matching percentage is calculated, the indexed images are stored in the database and retrieved as the output. The result is a list of identical or similar images of the input image.

### **3.2 Features**

The following are the highlighted features of the Content Based Image Retrieval System proposed in this paper

### 3.2.1. Multi-Platform

We use OpenCV as our core development software which is majorly based on C/C++. Thus the Content Based Image Retrieval System will also run on any platform which can process C/C++ language.

### 3.2.2. Efficient

The proposed system uses normalized cross correlation as its core algorithm which decreases the dependability on features of an input image such as brightness, sharpness and contrast. This contributes to provide feasible results.

### 3.2.3. Accurate

Sometimes we see that the image may be similar but not identical. In this case we may also need to alternate the template image. This is implemented by providing the functionality of scaling or rotating the extracted feature to precisely match an image and thus give an accurate result.

#### 3.2.4. Output is based on Match Percentage

The retrieved result is stored and shown as an end result only when the match percentage obtained is either equal to or higher than a specified threshold value.

### **3.2.5. Simple Interface**

A key feature is that the Graphical User Interface is simple and easy to use. The user only needs to provide the system with the query image. Thus the interface as a

whole provides a very user friendly environment.

### 4.Implementation Details

The design of the system proposed in this paper involves implementation of the Graphical User Interface (GUI) or the

front end and the Core Image Processing phase or the backend.

### 4.1.Front End

The front end/GUI is developed using C#.Net software. The interfaces needed to be developed are mainly the initial window (where the user provides the query image), a confirmation window (to confirm whether the user wants to continue with the process or go back) and a result window (which shows the user the list of retrieved images). It is in this phase that the user provides the system with the query image.

### 4.2. Back End

This phase is the core algorithm implementation where the image is processed. The system needs to be programmed in such a way that it is initialized with a direct connection to one or more database(s) of images We use OpenCV software to process, compare and store the required images. It is here that we implement the template matching algorithm using NCC (Normalized Cross Correlation).[7]In this stage the query image as well as the database image are normalized and then correlated.

The image from the database is fetched. The query image is scaled accordingly and template matching is implemented. Template matching is basically the integration of a database manager to manage the fetched image and a matching process which determines the level of similarity of the two images based on the involved features. The result of the template matching stage is a similarity percentage which needs to be higher than a predefined limit or threshold. If the percentage of matching is higher than the limit, the image is retrieved as a resultant image else the image is either further scaled and rotated for more precision or rejected as a no match category. The system stores all the retrieved images through the database manager and displays a list of the retrieved images after completion.

We elaborate the design and working of our proposed Content Based Image Retrieval System with the following flowchart:



Fig.2: Flowchart for proposed system

### **5.Application**

Content Based Image Retrieval is deemed useful in many fields and is increasingly gaining popularity due to its efficiency and simplicity. It is used in medical and scientific field for reference in previous discoveries, military field, mug shot database reference, device for surveillance flights as well as entertainment. Content Based Image retrieval provides searches for any image comparison.

### 6. Conclusion & Future Scope

We have seen that Content based Image Retrieval is a popular and interesting topic but rather still in its research phase. In this paper, we have proposed a new and simple approach for the implementation of a Content Based Image Retrieval System so as to provide better usability, functionality and reliability.

No matter how good the software might be, there is always a room for improvement and the same thing is applicable for our software too. Since we have used a GUI based design, there is a lot of scope for future enhancement. If need arises the software can be connected to the internet easily without any major cost and thus the application can be shared and hosted on the internet.

The second feature which could be added in this system is that even blurred or distorted images can be processed

We can even modify the software to enable the user to retrieve a specific feature or a part of the image required rather than the image as a whole.

Support for images as well as tags combined for further specified retrieval.

### 7.Acknowledgement

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### **Enterprise Content Management System**

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### ABSTRACT

Enterprise Content Management Systems are highly in demand of the organizations handling manual and paper work. The system facilitates their day to day reports and ease of retrieval of logs with adequate security is the main objective. According to Association for Information and Image Management (AIIM), Enterprise Content Management System (ECMS) can be defined as the technologies used to capture, manage, store, deliver and preserve information to support business processes. Daily work done can be recorded as daily logs which can be used to generate reports about the progress of work done. These reports can prove useful for the higher management to keep track of work done. This log management can be a useful module in ECMS. ECMS is not a specific product but it is customized according to the business needs of the organization. It is a useful tool in regulating the manual or paper work in an organization. By adding a few components it could also be used as a project management tool to monitor the work progress.

### **General Terms**

Application development. Software engineering

### **Keywords**

SAP, content management system, log management, enterprise.

### INTRODUCTION

Log Management in ECMS denotes the management of daily work reports. Traditional CMS includes many technologies to capture the information, store the information, preserve it and provide timely reports. Log management makes use of manual entry of data from the user which is managed by one administrator. This entry is processed for spelling, grammar and format correction and stored as a MS-Word File which can facilitate enhancement of report when required. Some additional features like sending alert messages to higher management in absence of log entry can be implemented based on how critical the business requirements are. This feature in ECMS can be proved as useful tool for monitoring the progress in an organization. Such report generation can also help the employees during the time of formal inspection. In this paper, the system architecture that has been proposed can be used by any organization for their business workflow management.

### ENTERPRISE CONTENT MANAGEMENT ARCHITECHTURE

Business requirements influence the architecture of ECMS. The below image Figure 1 is a reference architecture for ECMS from previous projects [1].



### Figure 1: Reference architecture for Enterprise content management from previous projects [1]

There are many companies that provide ECM solution but a simple log management can be made using Java forms in presentation layer, workflow or process management layer below it, document assembly and publishing as your content middleware and finally the repository can be chosen based on business need.

ECMS can use layered architectural styles which are simple and familiar and reflect use of programming languages like java. The layered architecture is separated into ordered layers as shown in the Figure 1 and each layer might use the services from layer above or below itself. Before implementing ECMS we need to do some enterprise data planning. For Log management we need to identify key subject areas and its output will be a CRUD Matrix. CRUD stands for create, read, update and delete. This matrix gives us information for entity analysis so that we can define accessibility of documents by subjects in the organization. Figure 2 gives us an example of a matrix.

ENTITY NAME Subject area	EMPLOYEE	FACILITY	PROVIDER	CLAIM	BENEFICIARY	PLAN	ENTITLEMENT
BENEFICIARY					CRU	R	
ENROLLMENT					DA		
CLAIMS PROCESSING				CRUDA	R	R	R
SUPPLIER			U				
CERTIFICATION							
HUMAN RESOURCES		CRUDA					
RESEARCH STATISTICS	R	R	R	R	R	R	R
FACILITIES		CRUDA					
ADMINISTRATION							

### Figure 2: CRUD Matrix

### EXISTING SYSTEM

Various organizations are highly dependent on static spreadsheets implemented through excel files which are maintained by hands or paper work. Tracking, managing, incident detection, handling and reporting is all manual and thus results in the issues of redundant and inconsistent data, integrity and atomicity problems as well as these systems lack in automation hence management job becomes tedious. Web content management systems like joomla, jahia, wordpress cannot be used by organizations which do not use internet services within their premises for security reasons [2].Most popular commercial cms include SiteCore, EpiServe, Ektron, Amaxus [3]. But problem with these systems are that some are open source or a huge technical is required for its development which is not feasible for organization where secured activities needs to be carried out. These organizations either make use of intranet, simple client server or standalone mechanisms.

The traditional CMS content management system includes creating editing and publishing the text [4]. The various existing CMS are:

### Learning Content Management System

LCMS is the system which allows a user to manage, store and publish the documents allowing the users to store training content [5].

### Web Content Management System

WCMS is the systems which allow a user to manage the web content data, store them and lets a author publish its website content [5].

### **Document Management System**

DMS allows a user to access, store and manage the PDF's and word documents. It is also seen as a component of ECMS [5].

### **Component Content Management System**

CCMS is basically a system use to manage and store documents but at the smooth level, i.e. it stores the document in terms of component like a single entity for example link, images, table, graphics etc. [6]. As IT projects are subject to change their priorities, the CCMS have a low capability to adapt changes [7].

#### PROPOSED SYSTEM

Traditional application areas in CMS are document management, web content management, record management, collaboration, business process management. Here, comes the need to develop an application in ECMS, which will be used to manage the daily work logs. Most common problem faced is lack of time to maintain logs. A Simple and clean interface with helpful tools like spelling and grammar correction can speed up the process of logging. Some common mistakes made is that employees input lot of null entries thus leading to generation of null reports. There can be some default templates that system can use itself to update log. For example, on some public holiday system should log holiday in absence of any entry or whenever the next login occurs it should prompt that logs for previous dates are null or this could also prompt the higher management. A systematic input of fields should be taken from user while logging so that during report generation it's easy to set the granularity of report required. As a security measure the log management system can also track the user id that edited the document and manage different versions of log. The super user should have rights to add users, add new processes for which log is required. Figure 3 shows the block diagram of proposed system.



### Figure 3: Block diagram for Log management for Enterprise content management

Following listed are some of the features:

Improved alignment of strategies and operations. Access to daily reports without depending on any one. The main idea behind designing the ECMS is to regulate the paper work in terms of creation of logs and generation of reports in an efficient manner with respect to existing system. Implementation of text editor with new functionalities to ease documentation and to handle respective database entries of the work done. Updating the database entries is being eased by dynamicity using intuitive GUI, thereby reducing the overhead of manually updating the database with respect to existing system. A second compelling reason for incorporating an ECM solution into business continuity planning is time. Standard business processes can be instantly derailed in a business disruption when the content that drives them is gone or inaccessible[9].

### CONCLUSION

Enterprise Content Management System is most widespread but commonly ignored in large organizations. A number of studies were reviewed and some common issues in these methods were identified. ECMS solutions are good for easy regulation and maintenance of any organization. The existing web CMS cannot be used by enterprises handling sensitive data. ECMS solve this problem by providing solutions to business specific requirements. The proposed log management module is a universal for most of the organizations as they need to monitor the departmental progress and report it. This could be implemented as part of business process management or a separate application area in ECMS. Also it could prove to be an effective project management tool. Various open source this enterprise content management is expected to provide an IT solution business workflow reducing the overhead and improving the efficiency to work.

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### **Clustering Model based on Web Activity**

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### ABSTRACT

Web log mining is an evolving part of data mining. It provides invaluable information by discovering trends and regularities in web users' access patterns. Clustering based on access pattern is an important research topic of web usage mining. Knowledge obtained from web user clusters has been used in different fields of web mining technologies. This paper presents an algorithm for measuring similarities and automated segmentation of web users based on their past access patterns. The similarity measures are based on content extracted from users' browser data. It also provides a locality based clustering method.

### **Keywords**

Cluster, Model, Web, Activity, Report, Interest, Location, Compatibility, Matrix, Data Mining, Fuzzy Clustering, GeoIP ,LDA, Sessions, History, Snippet, Links, IP.

### 1. INTRODUCTION

CLUSTER MODEL BASED ON WEB ACTIVITY IS A USER CLUSTERING TECHNIQUE BASED ON USER'S BROWSER HISTORY. ANY BROWSER THE USER USES HAS THE FUNCTIONALITY TO STORE THE DATA IN THE FORM OF LINKS. USER CLUSTERING TECHNIQUES HAS BEEN APPLIED ON VARIOUS SOCIAL NETWORKING SITES BASED ON THE DATA STORED IN THE USER PROFILES. THE MAIN DISADVANTAGE OF THE CLUSTERING TECHNIQUE USED BY THESE SITES IS THAT THE DATA STORED IN THE USERS PROFILE IS EDITED BY THE USER ONLY. THE INFORMATION THE USER PROVIDES ON THE INTERNET CAN BE FAKED AND MAY LEAD TO CLUSTERING OF USERS WITH FAKE INFORMATION. THIS PROJECT PROVIDES A WAY TO AVOID SUCH CLUSTERING. THE PROJECT DEALS WITH THE USERS BROWSING PATTERN TO RECOGNIZE ITS INTEREST WHICH IS DIFFICULT TO FAKE [8].

### 2. EXISTING SYSTEM

There are various systems used over the internet for user clustering based on the search and browsing patterns of the users over the Internet. Some of the famous examples of such clustering techniques being used are Facebook Friend Suggestions, Twitter's "People you may know", and Recommender Systems.

### 3. PROBLEM STATEMENT

Web log mining is a new subfield of data mining research. It aims at discovery of trends and regularities in web user's access patterns. This project presents an algorithm for automated segmentation of web users based on their access patterns.Users browsing history contains a lot of valuable information which may be used to define a user. User's interests, habits, plans, etc. can be predicted with the help of the sites that a user visits. This system initially stores users browsing data and IP address in the database. The stored data of users are used for Interest detection and develop an Interest Cluster Model (ICM) [2] for each user. ICM helps to determine the Interest Matrix (IM) by using fuzzy clustering technique. [2] Further the geographical distances in terms of latitude and longitude i.e., the exact location of the users is calculated by GeoIP technique [7] in order to cluster them on the basis of their geographic vicinity and range conversion is performed to generate Location Matrix (LM). The Output of



the IM and LM is generated in the form of graph for each user. These two matrices are combined together to form a single Compatibility Matrix (CM). Graphical output is a visual representation of the compatibility between users ranging between 0 and 1. K- Mean clustering is applied on the CM for each user to categorize users in following groups viz, Less Compatible, Moderate Compatible, More Compatible.

THE CATEGORIZATION OF THESE USERS HELPS TO DETERMINE THE COMPATIBILITY BETWEEN THEM. OUTPUT OF THIS CLUSTERING TECHNIQUE IS GENERATED INTO REPORT SPECIFYING THE USERS CATEGORIZED IN THE ABOVE GIVEN GROUPS. THE REPORT WILL CONTAIN 1 TABLE OF ABOVE GROUPS CONTAINING THE USER ID OF DIFFERENT USERS. THE REPORT WILL BE SAVED IN A DATABASE.

### 4. PROPOSED SYSTEM

The Cluster Model designed can be represented in the given system block diagram. The System Block Diagram consists of the following blocks has been shown in fig 1.

The input of the block diagram is the IP address and the links visited from the user. The output at the end produced is interest graph, distance graph, compatibility graph and cluster report.

Figure 1: System Block Diagram

### 4.1 IP Address

IP address acts an Input to the cluster model. IP address is used to determine the user identity and find the Location using GeoIP technique. IP address is stored in the database. Since IP address are unique to each user it can act as a primary key for determining the user.

### 4.2 Links

Links also acts as input to the cluster model. Links is a data set which can be represented as follows:

Links (url, snippet, timestamp, count)

Where, snippet is the combination of title and summary and url is uniform resource locator. [3]

### 4.3 Interest Detection

Interest detection is technique used to determine the Interest from user links more accurately the snippet of the links. Snippets are stored for determining the interest topic of each link. With this purpose, Latent Dirichlet Allocation (LDA) model is applied, which is an unsupervised machine learning method to identify latent topics from large data sets. [6].



Figure 2: Graphical model of LDA

 $\boldsymbol{\alpha}$  is the parameter of the Dirichlet prior on the per-document topic distributions,

 $\beta$  is the parameter of the Dirichlet prior on the per-topic word distribution,

 $\theta_i$  is the topic distribution for document i,

 $\phi_k$  is the word distribution for topic k,

 $z_{ij}$  is the topic for the jth word in document i, and  $w_{ij}$  is the specific word.

JGibbLDA is a Java implementation of Latent Dirichlet Allocation (LDA) using Gibbs Sampling technique for parameter estimation and inference. The input and output for JGibbLDA are the same format as GibbLDA++[3].

### 4.4 Clustering Sessions

Latent topics determined using LDA, are stored in the database and the links from which it is determined are categorized into sessions. Sessions are created to avoid multiple users on same browser. Clustering sessions helps us to avoid such problems and create ICM[4].

### 4.5 UIR Calculation

UIR stands for User Interest Rating it is value which ranges between 0 and 10.0  $<\!\!\text{UIR}\!<\!\!10$ 

UIR is calculated based on the following formula,

No. of links visited (interest links) \* 10 / Total no of links visited

### 4.6 Develop ICM

ICM i.e. Interest Cluster Model is developed for each user which represents the user interest and their UIR for each user.

Interests in ICM are sorted based on the UIR which represents the top most interest in ascending order[1].

### 4.7 Interest Matrix Calculation

ICM developed for each user is used for matrix calculation. Similarity based fuzzy clustering algorithm is applied to determine the similarity of two users. This algorithm uses the UIR of interest for any two users to determine the interest index. It uses the following formulae

$$\sigma(\mu_1,\mu_2) = \frac{|\mu_1 \cap \mu_2|}{|\mu_1 \cup \mu_2|}$$

Where  $(\mu_1 \cap \mu_2)(p) = \min\{\mu_1(p), \mu_2(p)\}$ And  $(\mu_1 \cup \mu_2)(p) = \max\{\mu_1(p), \mu_2(p)\}$ 

 $\mu_1, \mu_2$  are the interest index. [2]

### 4.8 Distance by GeoIP

Users IP address is use to determine the distance between any two users. Determining the distance between two users is done by the GeoIP technique. This technique uses user IP address to determine the longitude and the Longitude of the user. This coordinates are used to determine the distance by the radial distance formula.[7]

### 4.9 Distance Matrix Calculation

Distance calculated by the GeoIP technique is stored in the Location matrix. Range conversion is done to limit the range of the distances calculated between 0 and 1. The formula for range conversion is

New Value ( $\alpha$ ) = 1 – ((Value - Min)/ (Max - Min))

Range conversion helps to convert long distance range to small range and then it is store in the Location Matrix.[9]

### 4.10 Compatibility Matrix Calculation

Compatibility matrix is calculated as an average of Interest Matrix and Location Matrix. Compatibility matrix will determine the compatibility between any two users.

### 4.11 Clustering Users

K- Mean clustering is applied on the Compatibility matrix for each User to distinguish users in following category viz, Less Compatible, Moderate Compatible, More Compatible. This will help us determine the compatible users. [5].K- Mean clustering is applied on the Compatibility matrix for each User to distinguish users in following category viz, Less Compatible, Moderate Compatible, More Compatible. This will help us determine the compatible users. [5].

### 4.12 Interest Graph

K- Mean clustering is applied on the Compatibility matrix for each User to distinguish users in following category viz, Less Compatible, Moderate Compatible, More Compatible. This will help us determine the compatible users. [5].Following is an example which will show you the calculations of the interest graph, distance graph, compatibility graph and cluster



Figure 3: Interest Graph for U1

### 4.13 Location Graph

Graph will be generated based on the Location Matrix which will determine the distance for any user.x-axis of the graph will represent the user set and the y-axis represent the range between 0 and 1, where 1 is the closest and 0 is the farthest[6].



Figure 4: Location Graph for U1

### 4.14 Compatibility Graph

Graph will be generated based on the Compatibility Matrix which will determine the distance for any user. x - axis of the graph will represent the user set and the y - axis the range between 0 and 1, where 1 is most compatible and 0 is no compatible[6].



Figure 5: Compatibility Graph for U1

The above figure shows you the compatibility graph for the user U1. The above given graph is plotted using the average values of the interest graph and the distance graph. Since the users having the same interest and within a local vicinity of user 1 will be more compatible, the users having same interest but are at a farther geographical location will be moderate compatible and the users having same interest around the globe will be having the less compatibility.

### 4.15 Cluster Report

Cluster report will be generated based on the K – mean clustering technique applied on the Compatibility Matrix. The report of a particular user will contain the set of user id divided in the following groups viz. Less Compatible, Moderate Compatible, More Compatible. This report will be stored in the database in the form of file. The report will contain 1 tables of above groups containing the User ID of different users. The report will be saved in the database. The following clustering report for user U1 is generated on the basis of compatibility graph as shown above.

The Table 1 given below will give us an overview of all the users that are compatible with the user U1 and the level of compatibility as well.

### **Table 1: Cluster Report**

More Compatible	Moderate Compatible	Less Compatible
U6	U4	U2
U7	U5	U3
U8	U10	
U9		

### 5. CONCLUSION

Clustering model technique thus improves the efficiency of a system through browsing history extraction which helps user to get a better compatibility according to its user interest as well as the location. Thus such an application can be used in various social networking or match making sites.

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# BRAIN COMPUTER INTERFACE

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### ABSTRACT

Detailed exploration of Brain Computer Interface (BCI) and its recent trends have been practiced in this paper. Demonstrations carried out by the R & D Centre describing how the task of identifying objects, images, videos, colors, compositions is done and how the heard sounds are identified and differentiated by the humans and how the nerves act as the bus of hardware for transmitting and receiving signals and how the Brain act as CPU for the Humans. With the advancements in technology, how the paralyzed and physically handicapped people are bestowed with technological advancements in BCI are also discussed. Further continuing with some of the ideas proposed by us, concerned with the brain play.

### **KEYWORDS**

Neural Computing, Brain Wave Communication, Artificial Intelligence

### 1. INTRODUCTION

An emerging technology that provides a direct communication and control to the brain by allowing it to convey messages and commands to the external world allowing the Brain to have control over devices that solely rely on the mental activity of the brain for performing operations, just the same way as any parts of human body does is here termed as Brain Computer Interface (BCI). Shailesh K. Gori Third Year Computer Engineering VIVA Institute of Technology, Virar Mumbai, India gori.shailesh4@gmail.com

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Fig 1.0:The Loop Fuctioning of BCI. [8]

# 2. BCI ASSOCIATED HISTORY AND ITS TYPES:

### 2.1 The Base:

The research in this field began with the German Neuroscientist, Hans Berger who discovered the electrical activity of human brain around 1924.

The available records say, the first ever made BCI was a Non-Invasive one which was developed by Hans Berger wherein, silver wires were inserted under the patient scalps for capturing electrical signals. Further, silver wires were replaced by silver foils but weak signals grasping capabilities of reading the electrical activities and other failures of earlier stages were replaced by using SIEMENS (Double-coil Galvanometer) having capabilities of reading upto one-ten thousandth of a volt. After further analysis, Berger started tracing the brain waves/signals/activities in the form of alpha waves ranging from 8Hz-12Hz [8].

### 2.2 Brain computer interface types:

With the advancements, the BCI implants came to be classified in the following manner:



### Fig.2.2.(a) Types Of BCI Implants.

The advantages and the disadvantages of the of Invasive, Partially Invasive and Non-Invasive are

BCI				
Invasive Implanted directlt into brain. Higher capability in detecting accurate signals. Very high possibilities of Scar Tissue formation. Very high cost for Implementation or implantation.	<ul> <li>Partially invasive</li> <li>Usually implanted into the gray matter between the skull and the brain.</li> <li>Comparatively less signal strength.</li> <li>Lower risks of scar tissue formation.</li> <li>Comparatively cheaper than Invasive implants.</li> <li>Eg.: ElectroCorticoGram (ECoG).</li> </ul>	Non-invasive • Sensors are attached into a cap or a hairband(No implantation needed) • The signals are detected in weakest forms than Invasive & No risk of scar tissue formation • The cheapest form . • Eg.: ElectroEncephaloGram(EEG.)		

Fig.2.2.(b) The difference chart of BCI types.

### 2.3 Electroencephalography (EEG):

It is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain.In clinical contexts, EEG refers to the recording of the brain's spontaneous electrical activity over a short period of time, usually 20-40 minutes, as recorded from multiple electrodes placed on the scalp. Diagnostic applications generally focus on the spectral content of EEG, i.e. the type of neural oscillations that can be observed in EEG signals. In Neurology, the main diagnostic application of EEG is in the case of epilepsy. A secondary clinical use of EEG is in the diagnosis of COMA, encephalopathies and Brain death. Also it is studies for the study of sleep and sleep disorders where recording are typically done for one full night or more.Despite of limited spatial resolution, EEG continues to be a valuable tool for

research and diagnosis, especially when millisecond range temporal resolution is required [1].



Fig.2.3 (a) EEG [13]

# 2.4 Electrocorticography (ECoG) or Intracranial EEG (iEEG):

It is the practice of using electrodes placed directly on the exposed surface of the brain to record electrical activity from cerebral cortex. ECoG maybe performed either in the operating room during surgery(intraoperative ECoG) or outside of surgery (extra operative ECoG). Beacuse a craniotomy(a surgical incision into the skull) is required to implant the electrode grid, ECoG is an invasive procedure.



### Fig.2.4 (a) iEEG [14]

Recent studies have explored the development of a noninvasive cortical imaging technique for presurgical planning that may provide similar information and resolution of the invasive ECoG. The epileptogenic zones (A cortical region of the brain that when stimulated produces too much of seizure or Aura) identified from preoperative EEG data were validated by observations from postoperative ECoG data. These preliminary results suggests that it is possible to direct surgical planning and locate epileptogenic zones non invasively using the described imaging and integrating methods [1].

### 2.4.1 Scar Tissue formation:

One of the disadvantage of ECoG or iEEG is that it leaves behind scar tissues. When the skin suffers a trauma, healing cells called fibroplasts migrate to the site of injury. The fibroplasts cover the damaged area and form collagen which is the building block of scar tissue. With time this collagen will contract and pull off the edges of wound tightly together forming flat and thin surface. Further, If the lining up of collagen goes uneven ,





it leads to the formation of scars which are large, raised, reddish and even painful in many cases. These scars are also reffered as keloid.

### 2.4.2 Grey matter:

Grey matter is made of neuronal cell bodies. Grey matter includes regions of the brain involved in muscle control, sensory perception such as seeing, hearing, memory, emotions and speech. While 20% of the oxygen taken in by the body goes to the brain, 95% of it is being consumed by the grey matter [8].

### **3.WORKING OF BCI:**

Comparing the above discussed technologies, the safest ,easiest and the least invasive method is of the ElectroEncephaloGram (EEG). The electrodes can read the brain signals. However, the skull blocks a lot of the electrical signals, also distorting the signals getting through. The electrodes measuring the minute differences in voltage between neurons is being filtered and amplified further. In current BCI systems, it is then interpreted by a system program, although some must be familiar with older analog encephalographs, which displayed the signals via pens that automatically wrote out the patterns on a continous sheet of paper in the case of a sensory input BCI, the function happens in reverse. A computer converts a signal, such as one from a videocam, into the voltage necessary to trigger neurons. The signals are sent to implanted device and if everything works correct, the neuros fire and the subject receive a visual image corresponding to what the camera sees another way to measure brain activity is with a MRI-Magnetic Resonance Imaging [2].

### **4. BCI DEVICES**

### 4.1Magnetic Resonance Imaging(MRI):

An MRI machine is a massive complicated device, it produces very high resolution images of the brain activity, but it cant be used as part of a permanent or semi-permanent BCI. Researchers use it to get benchmark for brain functions or to map where in brain electrodes should be placed to measure a specific function.



Fig4.1 Signals transmission and reactions within a BCI and the body parts [16].

For example, if researchers are attempting to implant electrodes that will allow someone to control a robotic arm with their thoughts, they might first put the subject into an MRI and ask him or her to think about giving them a clearer target for electrode placement [3].

### **4.2Cochlear Implant:**

A cochlear Implant (CI) is a surgically implanted electronic device that provides a sense of sound to a person who is deaf or severely incapable of hearing. However, the auditory nerves maybe functioning perfectly well. They just arent receiving any signals. A cochlear implant bypasses the nonfunctioning part of the ear, processes the sound waves into electrical signals and passes them via electrodes right to the auditory nerves. The result: A previously deaf person can now hear [6].

## **4.3Visor (Visual Instrument and Sensory Organ Replacement):**

In Star Trek: The Next Generation, The Enterprise's Chief Engineer Geordi La Forge was blind but was able to see with the aid of a VISOR. Now a team led by Dr.Amir Amedi at Hebrew University of Jerusalem has developed a similar device called the Sensory Substitution Device that 'HACKS' into the visual cortex of blind people and allows them to identify objects [3].

# 5. ATR AND HONDA DEVELOP NEW BCI

BCI for manipulating robots using brain signals. The BCI equipment so connected to the brain that its signals monitor the actions of the robot developed. It enables decoding natural brain activity for the controlling process. MRI based neural decoding is done to ensure accuracy in the process. There is a much advancement in this technique as no invasion incision of head and brain is required. The BCI model works by tracking haemodynamic responses in brain. The accuracy of this device with full testing is to be estimated about 85% [9].



Fig 5.1 ATR and HONDA invention [10].

### **6.EXPECTED APPLICATIONS:**

a. Help for paralysed(Already in use)



Fig.6.1 BCI for paralysed [11].

- b. Track focus during performing any activity
- c. Learn differently-Educational Purposes(Can be developed.): Being unaware of the BCI trends extended for educational purposes, we would like to put forward the learning strategies that can be adopted using BCI.
- d. Transform our way of working.
- e. Virtual Society(Can be developed)
- f. Can create Virtual Society representing ourselves.
- g. Keeping the persons thoughts, logic, ideas of tackling the situations alive even after his/her death. (Can be developed)
- h. Further, it is said that a persons brain can be kept alive even after his/her death. And now since we have developed the devices that can read and work as per the commands received from brain signals than does that mean that we can play chess with the world champion, even after his death?

### 7. CONCLUSION:

In this paper, a number of potential BCI technologies focused on communication and other applications have been described; however, these represent just a small sample of the broad future potential of these technologies. The current explosion of neuroscience research and neurotechnologies provides the opportunity to provide the computers with predictive capabilities for the emotional and cognitive states and processing of the people using them. Potentially revolutionizing not only interfaces, but the basic interactions people have with these systems as well. The exploration of this technology would open the door to vastly wider set of applications and eventually be a boon to mankind.

### 8. ACKNOWLEDGMENT

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# INTERACTIVE IMAGE SEGMENTATION

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## ABSTRACT

This paper proposes an algorithm for interactive image segmentation. Image segmentation is to partition the image grid into different regions such that the pixels in each region share the same visual characteristics. Although the past decades have yielded many approaches, automatically segmenting natural images is still a difficult task. The difficulties lie in two aspects. On the low level, it is difficult to model properly the visual elements including colors, textures, and other Gestalt characteristics in the image to be segmented. On the high level, it is difficult to group truthfully the visual patterns into the needed object regions. In the absence of prior knowledge about the image, none of these two aspects can be easily solved. It is proposed an inferring approach with Gaussian random field (GRF), local spline regression (LSR) for semi-supervised learning. Developed an iterative framework of learning with local and global consistency (LLGC) and graph cut (GC).

## **Keywords**

Graph Cut(GC), Single Linear Reconstruction Window (SLRW), Random Walk Method (RW), Multiple Linear Reconstruction Window(MLRW)

#### INTRODUCTION

Image segmentation is a process of dividing the image into many segment and work separately on each segment of image to give better visualization to user .The problem of interactive foreground/background segmentation in still images is of great practical importance in image editing. The state of the art in interactive segmentation is probably represented by the graph cut algorithm of Boykin and Jolly. Its underlying model uses both color and contrast information, together with a strong prior for region coherence. Estimation is performed by solving a graph cut problem for which very efficient algorithms have recently been developed. However the model depends on parameters which must be set by hand and the aim of this work is for those constants to be learned from image data. First, a generative, probabilistic formulation of the model is set out in terms of a "Gaussian Mixture Markov Random Field " (GMMRF). Secondly, a pseudo likelihood algorithm is derived which jointly learns the color mixture and coherence parameters for foreground and background respectively. Error rates for GMMRF segmentation are calculated throughout using a new image database, available on the web, with ground truth provided by a human segmented. The graph cut algorithm, using the learned parameters, generates good object-segmentations with little interaction. However, pseudo likelihood learning proves to be frail, which limits the complexity of usable models, and hence also the achievable error rate.

### EXISTING SYSTEM

In the existing top-down methods is that they significantly depend upon the accuracy of image segmentation, and the performance of these methods may be degraded by inaccurate Image segmentation.

#### DISADVANTAGE OF EXISTING SYSTEM

In this method provides inaccurate image segmentation. Object's area information is incorporated by the regional level attention rules for salient object detection.

#### PROPOSED SYSTEM

With the same user strokes, our algorithm can generate more accurate segmentations on most complexes. Both of them have their own explicit meanings, which are all independent of data and need not be tuned well from image to image. The most complex computation is to solve sparse symmetrical linear equations. In contrast, the main computation time will be taken to fulfill the linear reconstructions in the windows of 3.3 pixels.

### METHODS

## **Graph Cut**

This approach based on optimization by graph-cut has been developed which combines both texture and edge information.

The user interaction of this algorithm is friendly and the alpha-matte around an object and colors of foreground pixels estimating, The experimental results show that it is very effective when the background is not so compile Some background regions are incorrectly segmented into the foreground object. This will degrade the quality of segmentation.



Figure No 4.1(a)



Figure No 4.1(b)

## **Random Walks Method**

RW is fast and can provide satisfactory segmentations for most natural images. However, for complex natural image, it may generate unsatisfactory segmentations. Thus more user interactions are needed to improve the quality of segmentation. The random walker algorithm requires the solution of a sparse, symmetric positive-definite system of linear equations which may be solved quickly through a variety of methods.



Figure No 4.2(a)

Figure No 4.2(b)

## **MLRW Method**

Please use a 9-point Times Roman font, or other Roman font with serifs, as close as possible in appearance to Times Roman in which these guidelines have been set. The goal is to have a 9-point text, as you see here. Please use sans-serif or non-proportional fonts only for special purposes, such as distinguishing source code text. If Times Roman is not available, try the font named Computer Modern Roman. On a Macintosh, use the font named Times. Right margins should be justified, not ragged.

#### **Algorithm For MLRW**

Input: Image with pixels to be segmented; the set of

the user-specified foreground pixels and the set of the

user-specified background pixels two parameters r and l

Output: The segmentation of F

- 1: Construct X where x=[r,g,b],
- 2: Allocate a sparse matrix .
- 3: for each pixel, pi=1,2,3, ,n do n
- 4: Allocate a zero matrix .
- 5: for j=1,2,3,.....9 , do
- 6: Calculate ,Mij.
- 7: .Mij=Mi+Mj
- 8: end for
- 9: M=M+SMiSj, according to (13).
- 10: end for
- 11: Construct diagonal matrix , according to (16).
- 12: Construct vector, according to (17).
- 13: Solve ,f, according to (15).
- 14: for ,i=1,2,.....n do
- 15: Label as "pi ", if ; " ", otherwise.
- 16: end for

#### CONCLUSION

We presented a graph-based classification algorithm for interactive image segmentation. It is developed with multiple linear reconstructions in image windows. The key idea is to linearly reconstruct the color vector of each pixel with those of the remaining pixels also in the window. The estimated optimal reconstruction weights are transferred to linearly reconstruct the class label of each pixel. In this way, the label reconstruction errors are estimated and minimized to obtain the final segmentation. We analyzed the proposed algorithm.

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# Web Advertisement Based On Personalized Information.

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## ABSTRACT

In today's competitive world it is not affordable for any website to lose users due to the bombardment of the advertisements which are irrelevant and of absolutely no use to the customer. The user will only find the advertisements worthy of his attention if they promote the products for which the user has some personal interest or affinity. So it's the need of the hour to personalize the attention rather than to facilitate query matching. Traditionally, scheduling of ads for different users with objective to maximize matching of ads to queries employed standard information the revenue of the website.

## **Keywords**

Alter Ego, Browsing History, Evaluation, Personalized Web Search, Interleaving, Ranking, User Profile

### 1. INTRODUCTION

#### **1.1 NEED**

bombardment of the advertisements which are irrelevant and of task is notably more difficult than general query expansion since absolutely no use to the customer. The user will only find the ads are typically quite short and are often formulated as abrupt, advertisements worthy of his attention if they promote the non-grammatical phrases intended to capture reader's attention products for which the user has some personal interest or affinity. rather than to facilitate query matching. So it's the need of the hour to personalize the scheduling of ads for different users with objective to maximize the revenue of the search engine.

Personalizing web search results has long been recognized as an avenue to greatly improve the search experience. We present a personalization approach that builds a user interest

using a combination of content and previously visited websites are also difficult for Web search; however, modern search engines provides elective personalization. The current advertising policy use a huge amount of additional knowledge such as past query used by Google is stringent and rigid towards websites and statistics, link analysis, page popularity, anchor text, and clickbloggers. A single violation of a policy's rules causes a great through data, and thus can return decent results even for very short financial loss on the side of websites and bloggers. To solve this inputs. Thus, the highest-scoring search results are often quite problem we need to implement a less rigid and stringent policy good, and so we use them for query augmentation within a blind which can maximize the revenues of websites and advertisers.

### 2. Literature surveyed

The business of Web search, a \$10 billion industry, relies heavily on sponsored search, whereas a few carefully-selected paid advertisements are displayed alongside algorithmic search

results. A key technical challenge in sponsored search is to select ads that are relevant for the user's query. Identifying relevant ads is challenging because queries are usually very short, and because users, consciously or not, choose terms intended to lead to optimal Web search results and not to optimal ads. Furthermore, the ads themselves are short and usually formulated to capture the reader's retrieval techniques using the bag of words approach. Here we propose to go beyond the bag of words, and augment both queries and ads with additional knowledge rich features. The prevailing business model of Web search relies heavily on sponsored search, whereas a few carefully-selected paid advertisements are displayed alongside algorithmic search results. There is a fine but important line between placing ads reflecting the query intent, and placing unrelated ads: users may find the former beneficial, as an additional source of information or an additional Web navigation facility, while the latter are likely to annoy the searchers and hurt the user experience. In the realm of Web search (and more generally within the field of information retrieval), there have been a number of studies on query augmentation, but as far as we know, It is not affordable to any website to lose users due to the no studies focused on query expansion for ad search. The latter

Todays systems use blind relevance feedback which works by giving the original query (called the Web query in the sequel) to a Web search engine, and then use the returned top-scoring pages to gather additional knowledge about the query. Then they use this knowledge to create an augmented query (called the ad query in the sequel), which is evaluated against the ad corpus to retrieve Profile using users' complete browsing behavior. We show that relevant ads for the original Web query. Of course, short queries relevance feedback approach.

> As it was mentioned in the study conducted by Andrei Z. Broder, Peter Ciccolo, Marcus Fontoura and their colleagues a large part of the Web advertising market consists of textual ads, the ubiquitous short text messages usually marked as "sponsored

links". There are two main channels for distributing such ads. Recommendation partners should be advertised to the target Sponsored search (or paid search advertising) places ads on the customer. Although the utility of this approach has been result pages of a Web search engine, where ads are selected to be demonstrated in many applications, it has several limitations, such relevant to the search query for a brief history of the subject). All as its inability to advertise either newly introduced products that major Web search engines (Google, Microsoft, Yahoo!) support have yet to be rated by customers or products to a new customer sponsored ads and act simultaneously as a Web search engine and who has not provided any rating data (Mooney and Roy). Products an ad search engine. Content match (or contextual advertising) can often be categorized by an existing classification scheme, and places ads on third-party Web pages. Today, almost all of the for- customers with similar demographic characteristics often profit non-transactional Web sites rely at least to some extent on demonstrate similar preferences for certain product types. contextual advertising revenue.

published literature is quite sparse. A recent study conducted by C. recommend new products to new customers. Wang, P. Zhang, R. Choi, and M. D. Eredita. Understanding consumers attitude toward advertising. In 8th Americas Conference on Information System confirms the intuition that ads interactions with the search engine to describe the users have been need to be relevant to the user's interest to avoid degrading the proposed. This has the benefit that such usage data is easily user's experience and increase the probability of reaction. In the collected by search engines. Aiming for short-term content match scenario, Ribeiro-Neto examined a number of personalization, Sriram describe a search engine that personalized strategies for matching pages to ads based on extracted keywords. based on the current user session. Although this approach is shown They used the standard vector space model to represent ads and to improve retrieval quality, session data is often too sparse to pages, and proposed a number of strategies to improve the personalize ideally, and does not allow personalization before the matching process. While both pages and ads are mapped to the second query in each session. Similarly, M. Daoud, L. Taminesame space, there is a discrepancy (called "impedance mismatch") Lechani, M. Boughanem, and B. Chebaro propose using such between the vocabulary used in the ads and in the pages. For session-level personalization. A longer term personalization click example, the plain vector space model cannot easily account for model can also be used; exploding click through data collected synonyms, that is, it cannot easily match pages and ads that over a long time period. For example, Speretta and Gauch and Qiu describe related topics using different vocabularies. The authors and Cho model users by classifying previously visited web pages achieved improved matching precision by expanding the page into a topic hierarchy, using this model to re-rank future search vocabulary with terms from similar pages, which were weighted results. Similarly, Joachims proposes using user click-through data based on their overall similarity to the original page. In this as training data to learn a general search retrieval function, which project, we "bridge" between related words by defining new can then be used to produce personalized rankings for individual features based on higher-level concepts from the classification users or groups of users. taxonomy. In their follow-up work A. Lacerda, M. Cristo, M. A. Goncalves, W. Fan, N. Ziviani, and B. Ribeiro-Neto. Learning to advertise, the authors proposed a method to learn the impact of Teevan. They use a rich model of user interests, built from searchindividual features by using genetic programming to produce a related information, previously visited web pages, and other matching function. The function is represented as a tree composed information about the user including documents on their hard of arithmetic operators and functions as internal nodes, and drive, e-mails, and so forth. They then use this data to re-rank the different numerical features of the query and ad terms as leaves. top returned web search results, by giving more weight to terms The results show that genetic programming finds matching deemed more personally relevant. In doing this, they obtain a functions that significantly improve the matching.

are similar to the content profile of the product are then targeted. encapsulated within a web page. In this project, we focus just on To establish a more accurate content profile for the product, its web documents, using users' complete browsing history. We also of content features can be extracted by information extraction or showing this yields substantial improvements. Additionally, summarization techniques (Mooney and Roy 2000). However, the consider a variety of different weighting schemes to improve content-based approach clearly is inappropriate for products retrieval quality. whose profile is not electronically available. Furthermore, because a customer's content features are derived purely from the products 1995). Specifically, the collaborative approach looks for and we will also offer convenient and less rigid and harsh policy

Therefore, aggregation information about both customer Online advertising is an emerging area of research, so the demographics and products should enable targeted advertising to

A number of personalization approaches using previous user

The most promising profile based approach was proposed by significant improvement over default web ranking. In particular, Teevan make use a rich keyword based representation of users, The first type of recommender system, the content based utilizing a desktop index which indexes files on the user's hard approach (Loeb and Terry 1992), characterizes recommendable drive, e-mails, visited web pages and so on. However, this products according to a set of content features, and customers approach treats web documents as common documents and does according to an analogous feature set. Customers whose interests not take advantage of the characteristics and structure detailed description must be parsable (e.g., as text) so that the set exploit the specific characteristics and structure of web pages,

The previous research conducted by some researchers and in which he or she has shown interest, this approach probably engineers were focused on how to increase personalized data of cannot offer recommendations for novel products. Another type of user and how to show relevant advertises to users. But in our recommendation technique, the collaborative approach (sometimes project we also focus on increasing transparency between bloggers called the social based approach), remedies this problem by (users) and add-servers. By developing a different independent considering customers' interest profiles (Shardanand and Maes system which will be transparent to both advertisers and bloggers similarities among customers by observing the ratings they assign for bloggers and advertisers. Which will allow bloggers to avoid to products in a small training set. Nearest-neighbor customers are potential losses due to lack of transparency and rigid and harsh those who exhibit the strongest similarity to the target customer policies made by google adsense. Google adsense can disapprove and act as recommendation partners for the target customer. bloggers account for showing adds without specific or cogent Therefore, products that appears within the profiles of reason which results in frustration on the side of bloggers and users of adsense. Policy of google adsense is so strict and rigid that even one violation, which may have been accidental, results in disapproval of bloggers account for adsense forever. Many bloggers suffer through such difficulties. One of the our objective in this project will be to create system that will be transparent to bloggers and advertisers and will have a less rigid and strict policy. And using fraud detection techniques we will be able to give necessary and cogent reasons to users for disapproval of their account. Disapproval of users account will last for 2 weeks or for a specific time period. It won't be forever. It will be a temporary disapproval.

Though the todays algorithmss and systems are advanced but they still lack the ability to perceive the apppropriate knowledge about user to identify his personlaity traits, which can allow those systems to predict their interests in various advertisements. For that we have came up with an idea which utilizes the passage strucure generally used by most of the bloggers and websites, to gather more accurate information about users. Using this passage structure the weightage given to each word in the passage will depend on the position of the word in the passage. such as the associated with those terms, a list of visited URLs and the number general idea of the passage is usually conveyed in the 1st of visits to each, and a list of past search queries and pages clicked paragraph of the passage so the weightage given to the words in the 1 parafraph of the passage will be greater as compared to others. and the general idea of the paragraph is also conveyed in stored as (URL, HTML content) pairs. Next, this browsing history the 1st 1-2 lines so the weightage given to those words will also be is processed into six different summaries consisting of term lists. greater than other words in the passage.

The purpose of such systems and algorithms is not only to guess detail. and predict the users interests but also to predict and identify those ads that are releveant to the users current needs. There have been many scenarios where such systems shows the same ads to users even after they have bought that respecive item. to reduce such faults we should enhance our database systems so that they will be able to keep track of the users interests and their response to shown advertises. And then by mapping users response in 0 to 1 range for advertises we can select the more relevant advertises to users current needs.



### Figure. 3.1 **3.1 User Profile Generation**

A user is represented by a list of terms and weights for these search queries. This profile is generated as shown in following figure. First, a user's browsing history is collected and Finally, the term weights are generated using three different weighting algorithms. We now describe each of these steps in

## 3.2 Data capture

Every time a user leaves a non-secure (non-https) web page, the add-on transmits the user's unique identi\_er, the page URL, the visit duration, the current date and time, and the length of the source HTML to the server. The server then attempts to fetch the source HTML of this page.

### 3. METHODOLOGY:

The input to our system is a search (or "Web") query, and the output is a set of ads that are relevant to this query. Processing the input query involves two main phases. In the first phase, we conduct a Web search with the original query, and analyze the topscoring results obtained for it. We use these search results to augment the Web query and construct an ad query, which is then evaluated against an index of ads. Following figure presents a high-level view of the information flow.





#### **3.3 Data Extraction**

We considered the following summaries of the content viewed by users in building the user profile:

Full Text Unigrams

The body text of each web page, stripped of html tags.

### **3.4 Title Unigrams**

The words inside any <title> tag on the html pages. Metadata Description Unigrams The content inside any <meta name=\description"> tag. Metadata Keywords Unigrams The content inside any <meta name=\keywords"> tag.

## **3.5 Extracted Terms**

We will implement the Term Extraction algorithm. Running it on the full text of each visited web page. It attempts to summarize [2] Gagan Aggarwal, Ashish Goel, Rajeev Motwani. Truthful the web page's text into a set of important keywords. This Auctions for Pricing Search Keywords. ACM Conference on algorithm uses a combination of linguistic and statistical information to score each term. Term candidates are found using a number of linguistic patterns and are assigned a weight based on [3] Feng Qiu. Junghoo Cho. Automatic Identification of User the frequency of the term and its subterms. This is supplemented Interest For Personalized Search. WWW 2006, MAY 23-26. with term re-extraction using the Viterbi algorithm.

### **3.6 Noun Phrases**

Noun phrases were extracted by taking the text from each web page and splitting it into sentences using a sentence splitter from the OpenNLP Tools3. The OpenNLP tokenization script was then run on each sentence. The tokenized sentences were tagged using [5] the Clark & Curran Statistical Language Parser4 [3], which http://adwords.google.com/support/bin/answer.py?answer=10215 assigns a constituent tree to the sentence and part of speech tags to each word. Noun phrases were then extracted from this constituent [6] B. Edelman, M. Ostrovsky, and M. Schwarz. Internet tree.

## **3.7 Term Weighting**

After the list of terms has been obtained, we compute weights for each term in two ways.

#### 3.7.1 TF Weighting :

The most straightforward implementation we consider is Term Frequency (TF) weighting. We define a frequency vector that search via automated analysis of interests and contains the frequency counts of a given term for all of the input data sources. For example, f is the number of times a given term activities. In Proc. of SIGIR, pages 449{456, 2005. occurs in all of the titles in the user's browsing history. We calculate a term weight based on the dot product of these [9] Andrei Z. Broder, Peter Ciccolo, Marcus Fontoura... frequencies with a weight vector.

#### 3.7.2 TF-IDF Weighting:

The second option we consider is TF-IDF (or Term Frequency, Inverse Document Frequency) weighting. Here, words appearing in many documents are down-weighted by the inverse document frequency of the term.

#### 4. **Conclusion**:

We contribute a new framework for delivering personalized ads based on mining user behaviours such as the unigrams, categories, and classifications of each query, clicked documents or inquires. We also build a model for brand extraction, and loss memory to viewed and clicked ads. The simulation experiments show that our user interest model can infer user interest automatically, and further it can get better revenue for our search engine advertising system and it can attract users to click some interest ads. However the limitation for this framework is that it [14]http://malektips.com/google-chrome-browsing-history.html will not promising in performance when the user history behaviours is very rare.

So, we should not only account the collaborative works for all the users as CTR of ad, but also we will take into account of the

collaborative profiles of our friends in the same group or collaborative profiles of some similarity socials in the future.

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# Information Sharing Mechanism in Academic Network Community

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# ABSTRACT

Current day scenario speaks more of social networking websites rather than educational ones. This trend has led to decrease in relevant information sharing among the students throughout the globe. Various websites are developed in favors of making it educational and interactive but they lack the appropriate information sharing mechanism among the users. Our academic network community focuses on how the information is shared among all the users of that particular university with the help of a unique mechanism so that the users can easily share data within their group or among users. Our community even helps in providing information regarding various upcoming events occurring in different institutions of that university which helps in easy publicity of that event. And a live interactive communication comprising of audio, video and text so that users can communicate with each other in real-time.

## **Keywords**

Information sharing, academic, social education, easy sharing, academic network, institution information.

## **1. INTRODUCTION**

One of the major features that characterize social networks these days is the way information is shared. From documents to pictures to videos, everything can be shared via such networks, because in this way a user can communicate and share information irrespective in which manner he/she is communicating. But such networks lack in helping students to provide them knowledge relevant to their educational course. An educational web community should mainly focus on sharing knowledge relevant to the students and providing them with the updates of various events and competition which can help them participate and earn rewards, in a way this will also help them increasing their skills and knowledge on various other activities. Teachers of the registered institution can also be the part of such communities. They can help the students in providing information related to their current curriculum, which helps in faster communication with the students. Even various teachers of that institution can share data among each other or with teachers of other institution. Such communities will just not be constrained to the present day students or teachers but to the members who are now the alumni of the particular

institution. An alumnus can also be a former member, employee, contributor, or

inmate, as well as a former student. As such communities can be termed as E-Learning websites but such websites don't just help in providing knowledge, instead it helps to share and socialize with others also, though keeping in mind that even socializing with other people helps in generating and spreading more admissible knowledge. After all, the main purpose is to feed all the users with data they require to help them learn, share and socialize. To make this possible we are making an academic network community where we target on helping in communicating students, teachers and the alumni members of various institutions of a university and mainly providing them with an innovative information sharing mechanism to share data among each other in a way that data stored can be retained easily at any time and can be accessed from a single point of storage.

## 2. LITERATURE SURVEY

Through literature survey for this project, it has been discovered that many researches are based on information sharing mechanism. According to the classification principles of educational information in LOM, and the characteristics of grid community and resource distribution in grid, on the basis of a proposed model of grid community based education resource, the brief paper puts forward constructing the concept of Equivalent grid community group, building the mechanism of resources-sharing and information-spreading between communities, which help to achieve mutual communication and information- sharing between communities[1].As per the increasing advancement in information technology. It has extended the availability of information. Due to this reality, libraries are rethinking old practices related to acquisition, storage, organization, and dissemination of this growing quantity of information and knowledge. The organization of libraries into resource sharing consortia and networks are alternatives to address the former problems. With the information overload, the quantity of information produced and made available brings crescent difficulties to search for and to access it; the alternative to libraries is cooperation. The Academic Resource Sharing Consortia of Rio de Janeiro (CBIES/RJ) started its activities in 2000. This organization had the aim of developing cooperative activities between academic libraries of Rio de Janeiro [2]. Our project is based on cooperation among various users, in this way users can take out activities easily. Even government use computer and networking technologies to develop infrastructure to support information sharing within government organization as well as external stakeholder. A major obstacle to information sharing is the lack of a framework and an infrastructure that allows government organizations to share information selectively with different user group [3].Our project provides a user friendly framework which will not only help to contain the information in Orderly manner but it will help in less consumption of space.

## **3. EXISTING SYSTEM**

Systems or academic networks which are partially or completely based on our project are being discussed. Some of existing systems are as follows.

### 3.1 Blogger

From an educational standpoint, blogs allows educators and students to collaborate, share instructional resources, create content and connect to mainstream social media channels such as YouTube, podcasts, other blogs, tweets, social bookmarks, etc. all on a single centralized page.

## 3.2 Voki

Voki is a unique tool to engage students in creative expressions. Voki is a great way to have students share their knowledge of a topic in 60 seconds or less. Makes students organize their thoughts to focus on key details. Voki is not so much popular in general people but still its making it place to academics.

## 3.3 Wikispaces

Our mission is to help teachers help students. There are countless ways to teach and learn. Our job is to make fast, simple, delightful tools that respect and empower teachers so they can spend their time helping their students.

## 3.4 Thinkfinity

It is an amazing place to collaborate and share ideas with other educators through discussions and sharing of resources in groups. It is a virtual online Professional Learning Community.

## 3.5 Kubbu

Kubbu is another great site that performs this service. Essentially, educators go on the site to create, share, exchange ideas, and make them accessible to students. This is great for the educators, students and parents alike.

# **3.6 UCLA Alumni (University of California, Los Angeles Alumni)**

The UCLA Alumni Association gives you access to a vast network of professionals and offers you endless opportunities to connect, build relationships, participate and continue to learn from the incredible UCLA community.

## 3.8 ConnectU

ConnectU(originally HarvardConnection) was a social website launched on May 21, 2004.Users could add people as friends, send them messages, and update their personal profiles to notify friends about themselves. Users were placed in networks based upon the domain name associated with the email address they used for registration. The site has since launched and is an active online community.

## 4. SCOPE

The community can be used to share information with the registered members of the community only. It is accessible for all the students, teachers and alumni members of the university irrespective of the college, branch, batch or division they are associated with. But groups are bifurcated according to the category mentioned earlier. This helps in automatically connecting yourself to your current or passed out members of the association.

## **5. PROPOSED SYSTEM**

Block Diagram of Information Sharing Mechanism in Academic Network Community includes the modules which needs to there in order to run the system.

## 5.1 Login / Registration



#### Fig 5.8 Login/Registration

Our project provides the interactive way to register the user according to their type i.e. Student, Alumni and teacher and similarly the login facility will be provided and then the user can see their profile page and set their profile accordingly. The only reason why we separate the details of various profiles is to provide correct information to correct users.

## 5.2 Profile Setup



### Fig. 5.2 Profile Setup

Once User is registered to the project for first time, we will ask them to select the college and batch which is must for all. We will give them a Stream option to filter the college among the list and accordingly select the batch. This is must have step for all users.

# **5.3 Syndication Module**



### Syndication Module

This is one of the very important module, which is kind of heart of our system. As soon as there is any update happen in system, our script will look over it and accordingly syndicate it to users to whom the information belongs without any kind of user's input.

Fig.5.3

# **5.4 Information Sharing Module**



### Fig. 5.4 Information Sharing Module

For the system, the information can be file, text or any kind of details which a person wants to share it to the people, this module is responsible for handling the uploading stuff and also deal with the constraint related to upload and share the module.

# **5.5 Presentation Module**



### Fig. 5.5 Presentation Module

This module deals with presentation of information to the user. With the interactive GUI and responsive design, system will offer easy way to interact with eye friendly color schemes. Responsive design deals with handling various screen sizes of mobile devices and making the GUI compatible with each of them.

## 6. DESIGN DETAILS

To elaborate the working of our academic network community, and how the information is shared we have designed the flow chart.

# 6.1. Information Sharing



#### Fig. 6.1 Information Sharing

Information Sharing will get the file from client computer and recognize the type. If file size exceed the limit then error will be thrown else it will be uploaded by asking whether to share with a particular member or to make it public.

## 7. COMPARISON GRAPH

All the social and educational networks have few parameters in common which helps to compare various levels of their efficiency among the users.Following are the parameters which helps us to graph and compare different networks with our proposed system.

#### 7.1 Educational Index

This parameter helps to describe how closely the particular network provides the educational facility.

**Educational Index** 



Fig 7.1 Educational index comparison

#### 7.2 Interactivity

A given network requires a good level of GUI in order to attract more users and also at the same time keep it as simple as possible.

#### Interactivity



Fig 7.2 Interactivity comparison

### 7.3 Information sharing efficiency

Information is key thing inn any social and educational network. An ideal educational network should provide information sharing with ease.

#### Information Sharing Capability



# Fig 7.3 Information sharing capability **8. ACKNOWLEDGMENT**

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#### 9. CONCLUSION

Our academic network community will allow teachers, students and alumni to share files, videos and other relevant information with desired users in appropriate and very efficiently.

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# INTELLIGENT PERSONAL AGENT

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## ABSTRACT

A busy worker requires a personal assistant to help them in managing the overall workload. Since artificial agent can give a better and dynamic solution, we describe an Intelligent Personal agent (IPA) that will guide the busy worker in doing his daily work by suggesting which task is more important, and when to perform it. It divides the user's task in two categories Professional and Personal and accordingly assists him in achieving it. Most of the times we give less importance to professional activities and due to increase in the workload we even forget to complete the personal task. For e.g. Payment of home bills. Today's world is so busy that we need someone to do our work on behalf of us. The purpose of our agent is to help the user in his professional work simultaneously achieving the personal task also. Agent's reasoning and planning capability reveals its intelligent behavior. The learning capability of agent allows it to improve its performance by previous experiences. Thus the overall agent design guides the user in terms of managing, reasoning, planning, learning and improving its performance to user preference

## **General Terms**

Artificial Intelligence used to develop an personal agent with intelligent behavior.

### **Keywords**

Intelligent personal agent, assistive agent, autonomous software, artificial intelligence.

## **1. INTRODUCTION**

The technologies are improving in such a way that, human assistance is not enough. We human need a better assistance for managing thing in a busy environment. One such application is the Intelligent Personal Agent that is used for assisting a user in his professional as well as in his personal work. This agent can provide assistance to all kind of user but we consider here a busy user to illustrate the behavior of this agent. Our main motto is reducing the user's work in doing any particular task [3]. It reduces the increasing load of information, manages task by considering its deadlines to be considered.

The IPA can perform task in three ways performing the task directly on behalf of the user, performing a task along with the user by taking instructions from the user and finally perform task at back end by providing suggestion and reminders to user work [3]. Thus we are interested in developing an agent which handles the routine personal task of the user so that the user can concentrate more on his professional task.

A typical user always has a burden of his household activities such as paying the electricity, water bills, doing recharge frequently. This reduces the performance of the user in his professional activities. Our IPA supports user to handle simultaneous problem of handling the workload between personal and professional tasks. The key feature of the agent is its Intelligence that enables it to look at the problem more closely, think of the option available to solve it and finally take the action on its own. We are more concerned about the intelligent behavior of the agent to increase the overall performance of the agent in assisting the user. The framework of the user allows it to reason the task it can perform and when it can perform. It's also indicates its potential to perform any critical task, based on load which it is currently handling. IPA assists the user in task management with the help of available knowledge.

An important issue in this IPA is handling knowledge. What idea the agent has about the world and its corresponding application area decides its learning capabilities, suggestion and reasoning capabilities. Ontology is the commonly used way to represent the knowledge. The use of ontology for representing domain knowledge and for supporting reasoning is becoming wide-spread. Knowledge depends on the problem domain. It could be about the system and about the system environment [1]. It could be given initially to the agent or learned by the agent itself by its past experiences.

Other kinds of knowledge might relate to the application domain, the system's structure, problem-solving strategies, the system's ability to communicate with other systems, and so on [1]. IPA cannot assist the user every time because; its contribution should be beneficial to the user. If IPA takes more time in performing a task on behalf of the user than the user actually performing it, then its contribution is of no use. Thus, the IPA has to decide when it can prove useful to the user and correspondingly assist him. The performance or effectiveness of the IPA increases With respect to time or as the agent interacts with the user more and more.

The IPA is capable of learning user interests, his likes and dislikes and his overall preference e.g. consider that whenever user wants to discuss about the project progress the user always prefers for office meeting and ask the agent to send mail to the project members rather than a conference chat. Now the agent knowing the interested of the user, whenever the user want to set a project meeting the agent first suggest for sending mail to the project members and then for conference chat.

# 2. AIM & OBJECTIVES

Here we are describing the aim and objectives of our IPA system. In aim section we will be describing what we actually want to do and objectives is to concentrate different intelligent behaviors.

# 2.1 Aim

Our aim is to develop an intelligent agent which can perform task on behalf of the user and assist him in managing the task.

## **2.2 Objectives**

Basically the task of the IPA is divided into two categories

- 1. Professional tasks.
- 2. Personal tasks.

Professional tasks include all kinds of user's work environment task like scheduling, planning suggestions for meeting etc. and Personal tasks includes form filling ,registering, payment of bills, email checking etc. Our aim is to design an IPA which can has lot of autonomous behavior. In many case it can think and act on its own. We have divided our agent in different modules so that is it is easy to handle different tasks.IPA basically helps the user to completing the task on time by reminding the important task. This is regarding the professional task. It also helps in managing the user's day routine task. Many of the time the IPA and the user interact with each other to complete certain collaborative task.IPA is transparent enough indicating progress of the task and provides feedbacks, error messages [4] etc.

Our IPA will work in multitasking environment. The IPA will be accepting user input in the form of instructions then it will select the suggestions from the suggestion module. Hence our aim is to increase its adaptivity, learning, reasoning and its suggestion.

IPA does not provide assistances related to single application; rather it can provide assistance associated with multiple applications. It can interact with desktop applications like calendar, To-do list. It can interact with web applications like mails, shopping sites, online forms, and social sites and so on.

At any time the output of the agent is the final action or any kind of feedback. This is done by the Task Performer [3].task performer is assisted by a set of steps to be followed to complete the task. Management deals with ways to achieve the task with less effort e.g. IPA finds that for the current week the user is dealing with lots of professional task then it removes if any personal task is there and reschedules it to next week.

The effectiveness of the IPA increases only with its responsiveness. The challenge that has to be considered for Intelligence behavior is extracting new knowledge from existing knowledge. This indirectly depends on what idea IPA is having about the world.

# **3. EXISTING SYSTEM**

In this section we are going to discuss the popular assistive agent launched by apple iOS.

## 3.1 Siri

Siri is an intelligent agent that use natural language processing hence user interact with the agent in their natural language, it allows the user search, schedule meeting, place phone call and more. Siri basically accepts voice input process it and send an voice output to the user. But Siri has some drawback like sometimes it was not able to interpret the voice command, which resulted into unexpected output. Most of the search result defaults to restaurants and locations. Apart from this it does not have an interactive user interface. Siri cannot login into social websites using user id and password.it cannot update the status or send message in social websites.

## 4. PROPOSED SYSTEM

We are proposing the following fig for our IPA in which we have separated different task performed by the IPA by dividing them in different modules basic idea we have used here is divide and conquer as we are dividing it into multiple module task also divided in different parts according to their types so it become more simple for IPA to perform it by traversing to different module as it has to search more if the task are in same module. Different module of block diagram is explained below:



Fig 4.1 Block Diagram of IPA

## 4.1 Task Module

Task module is the module to which user interacts in this module we are performing separation of different types of tasks .This module is further divided into two parts they are as follows:

- 1. Professional tasks: These tasks are basically office related tasks some of them are like e-mail; auto-form fill ups etc. this block will consider all these types of tasks and neglect other tasks.
- 2. Personal tasks: They are basically person related tasks some are like account management; schedule management etc. this block will consider all these types of tasks and neglect other tasks.

# 4.2 Suggestion module

Suggestion model is actually the main module as it provide suggestion to user/system based on randomize algorithm in which we take user description from task module and find relevant information according to users description and suggest them to user. This module is further fragmented in two sub parts they are as follows:

- 1. User previous suggestion: In this block previously stored suggestion is used as it might happen that same task need to be performed multiple time.
- 2. Validate suggestion: In this block it check the suggestion with user requirement if it find that it is relevant then it will suggest to user else it will put forward user request to reasoning module

# 4.3 Reasoning Module:

This module is responsible for providing relevance knowledge to suggestion module this module store the relevance knowledge as well as containing all the information of user tasks. This module is also responsible for learning from user's previous activity thus this module is fragmented in two parts, they are as follows:

## 4.3.1 Relevance finder

This block contain the relevant information of the tasks that user may perform. This contain all knowledge-based content in this relevant suggestions are present which it forward to suggestion module for providing suggestion

# 4.3.2. Expertise learner

This block keep track of function performed by user or need to be performed. It stores the data every time user performs some new action.

# 4.4 Management Module:

Management module is performing different activities performed by user it also capable for performing management activities such as scheduling thus it named as management module. This module is divided in three parts they are as follows:

## 4.4.1 Task performer

This block is responsible for performing the tasks like mailing, auto-form filling etc. This block uses workflow for finding default steps for performing particular task.

## 4.4.2 Workflow tracker

This is responsible for tracking different workflows steps for performing particular task present in the system and then passing particular workflow steps to task performer block.

## 4.4.3 Schedule manager

This block handle all schedule tasks like meeting arrangements, personal schedule etc. This block access schedule and update it according to user's task.

# **5. FLOWCHART**

The Flowchart describes the sequence of actions that are performed and the flow of processes.



Fig 5.1: Flowchart for IPA

Basically there are three types of scenarios.

- 1. User enters a scheduling task:
  - When the user enters a scheduling task, the agent first identifies whether it is a professional or personal task. After identification the schedule manager will update it in the calendar. If any better schedule is there for that task then it gives suggestion to the user.
- 2. User enters a non-scheduling task:

When a non-scheduling task is entered, after identification the agent suggest a set of action that can be taken. User can select any suggestion. The agent checks the validity of the task whether it can perform or not, if yes then it follows the predefined steps to complete the task.

3. User enters an unknown task: When the user enters an unknown task the agent since has no information to suggest it, enters into the reasoning module to find new information from the existing information. It suggests some alternative action. If it could not find any suggestion then user can give any new steps to be followed to achieve that task which the agent while learn and add it into its workflow.

## 6. SECURITY IN IPA

Security is always a major issue in each and every domain of computers. As we have discuss earlier that our IPA will send emails on user command. It is going to fill online forms. All this activities are done by the agent on behalf of the user. Now consider the first case where the user commands the agent to send an email to his friend, for this task the agent requires the email id and password of the user. In the second case for online form filling also the agent requires the user personal information. The personal information of the user should not be leaked or the agent should be programmed in such a way that it should not expose the user details to unauthorized persons or sites. We are developing the agent more abstract. User has his code or password which has to be entered for doing any task. This is a primary security function; there are some agents that uses face recognition to authenticate the user. Access right has to be defined carefully to maintain the confidentiality of data. We have to first understand the security constraints of the agent's application domain so as to define the security constraints of the agent. Introduction of agent in the application domain should not degrade the current security of that domain. Agent deployment should not cause lack of confidentiality and integrity of data and resources. In our case the application domain is the simple user's desktop. Before the deployment of the agent user interacts directly with the operating system and then this operating system interacts with the system data and other desktop applications. But now the user is going to just interact with the agent and the agent is going to act on behalf of the user interacting with the other applications and data.



Fig: 6.1 Before deployment of agent.



Fig: 6.2 After deployment of agent.

From the above figure we can see that the user is interacting with the agent and the agent is performing on behalf of the user.

## 7. ACKNOWLEDGEMENT

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## 8. CONCLUSION

Thus we conclude that the need of the intelligent personal agent is increasing. The IPA helps the user to balance the personal and professional task, manage and plan task. It simply reduces the work done by the user and stress caused due to increasing workload. It allows user to concentrate on more important task. IPA stands for its intelligence and autonomous behavior. As stated earlier it has various features like mail sending, online form filling, planning and more. We have discussed the aims and objectives of the IPA, existing system and its limitations. The flowchart showing basic functioning of IPA. Security issues of IPA in its application domain. The security issues are still on search. IPA will play an very important role in the near future.

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# Use of Genetic SVM for ECG Arrhythmia Classification

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### ABSTRACT

The analysis of the ECG can benefit in diagnosing most of the heart diseases. The electrocardiogram (ECG) provides almost all information about electrical activity of the heart. One cardiac cycle in an ECG consist of the P-QRS-T waves or segments. The ECG signal analysis and classification system gives overall idea about the diseases. In recent years, many research and methods have been proposed and developed for analysing the ECG signal and extracting features such as amplitude and time intervals for classification of signals. This paper studies various techniques for ECG classification and also shows the experimental results of ECG arrhythmia classification using Genetic SVM.

**Keywords:** ECG, arrhythmia, heartbeat classifier, support vector machine, genetic algorithms, feature reduction.

#### 1. INTRODUCTION



diagnostic Categories. Conventionally, a typical heart beat is identified from the ECG and the component waves of the QRS, T, and possibly P waves are characterized using measurements such as magnitude, duration and area. Datasets used for training and test of automated classification of ECG signals include many different features. Some of them are based on laboratory experiments, while others involve clinical symptoms. However, one of the most popular and useful databases is the MIT-BIH. Researchers have used this database to test their various algorithms for arrhythmia detection and classification. Several methods have been proposed for the classification of ECG signals.

### 1.1. ECG SIGNAL

ECG [1] is a method to measure and record different electrical potentials of the heart. Willem Einthoven developed the ECG method in the early 1900s. The origin of the electrical activity measured by ECG is in the muscle fibres of different parts of the heart. The ECG may roughly be divided into the phases of depolarization and repolarisation of the muscle fibres making up the heart. The depolarization phases correspond to the P-wave (atrial depolarization) and QRS-wave (ventricles depolarization). The repolarisation phases correspond to the T-wave and Uwave (ventricular repolarisation). The elements in the ECG-complex are shown in Fig. 1. The human heart contains four chambers: left atrium, right atrium, left ventricle and right ventricle. Blood enters the heart through two large veins, the inferior and superior vena cava; emptying oxygen-poor blood from body into the right atrium. From the right atrium, the oxygen deficient blood enters the right ventricle.

## Fig 1: Elements of ECG Complex

The right ventricle then pushes the blood into the lungs. Inside the lungs a process called 'gas exchange' occurs and the blood replenishes oxygen supply. The oxygen rich blood then enters left atria. From the left atria, blood rushes into the left ventricle. Finally, it is the left ventricle that forces the oxygenated blood to the rest of the body. This mechanical activity of the human heart is powered by electrical stimulations inside the heart. The Depolarization (electrical activity) of a specific portion of the heart (either atria or ventricle) results in mechanical contraction of that specific part. Again, repolarisation results in the mechanical relaxation of the heart chambers. ECG acquisition devices basically pick up these electrical activities via sensors attached to the human skin and draws the electrical activities in millivolt ranges. During the regular activity of the heart, both the atria contract together, followed by ventricular contraction (both the ventricles contract together) [2].

# 2. LITERATURE REVIEW

Hafizah Husain and Lai Len Fatt proposed use of sparsely connected radial basis function neural network for ECG classification [17]. For this, three classes of ECG signals were selected, namely, the normal sinus rhythm, malignant ventricular ectopy and atrial fibrillation. From the web site of Physionet, the data base provides 23 atrial fibrillation type, 22 of malignant ventricular ectopy type and 18 of normal sinus rhythm type. For every ECG data, five sets of PQRST-wave were extracted using wavelet decomposition technique. This technique would detect the location of maximum R-wave, P-wave and QS-wave. A program called *Radii* was developed for classification of extracted data. Based on the results, it can be concluded that sparsely connected RBFNN can accurately classify ECG signals into normal sinus rhythm and malignant ventricular ectopy.

Philip de Chazal presented a method for the automatic processing of the electrocardiogram (ECG) for the classification of heartbeats [19]. The method allocates manually detected heartbeats to one of the five beat classes recommended by ANSI/AAMI EC57:1998 standard, i.e., normal beat, ventricular ectopic beat (VEB), supraventricular ectopic beat (SVEB) [3], fusion of a normal and a VEB, or unknown beat type. Data was obtained from the 44 nonpacemaker recordings of the MIT-BIH arrhythmia database. The data was split intotwo datasets with each dataset containing approximately 50 000 beats from 22 recordings. The first dataset was used to select classifier configuration fromcandidate а configurations.Twelve configurations processing feature sets derived from two ECG leads were compared. Feature sets were based on ECG morphology, heartbeat intervals, and RR-intervals. All configurations adopted a statistical classifier model utilizing supervised learning. The second dataset was used to provide an independent performance assessment of the selected configuration. This assessment resulted in a sensitivity of 75.9%, a positive predictivity of 38.5%, and a false positive rate of 4.7% for the SVEB class. For the VEB class, the sensitivity was 77.7%, the positive predictivity was 81.9%, and the false positive rate was 1.2%. These results are an improvement on previously reported results for automated heartbeat classification systems. Philip de Chazal presented a study that investigates the automatic classification of the Frank lead ECG into different disease categories [20]. A comparison of the performance of a number of different feature sets was presented. The feature sets considered include wavelet-based features, standard

cardiology features, and features taken directly from time-domain samples of the ECG. The classification performance of each feature set optimised using automatic feature was selection and choosing the best classifier model from linear, quadratic and logistic discriminants. The ECG database used contains 500 cases classed into seven categories with 100% confidence. Using multiple runs of ten-fold cross-validation, the overall seven-way accuracy of different feature sets and classifier model combinations ranged between 60% and 75%. The best performing classifier used linear discriminants [4] processing selected time-domain features. This is also found to be the simplest and fastest classifier to implement.

Mansouria Sekkal and Mohammed Amine Chikh presented a study that shows that the use of multi-layered feed forward neural networks has been hampered by the lack of a training algorithm which reliably finds a nearly globally optimal set of weights [18]. Genetic algorithms are a class of optimization procedures which are good at exploring a large and complex space in an intelligent way to find values close to the global optimum. The paper dealt with designing a neural network classifier of PVC beats whose weights are genetically evolved using a genetic algorithm [5]. Two classifiers were developed. First, the Classical neural classifier (CNC) was trained by the back-propagation (BP) method. Second neuro-genetic classifier (NGC) was trained by genetic algorithm technique. Performance and accuracy of the two techniques are presented and compared. Our results illustrate the improvements gained by using a genetic algorithm rather than BP. We use the medical database (MIT-BIH) [6] to validate our results.

K .O. Gupta and Dr. P. N. Chatur proposed a method for ECG Signal Analysis & Classification using Data Mining and Artificial Neural Network[7]. In this method The signal is pre-processed for removing of noises and other DC components. After preprocessing, actual method of feature extraction and classification is done. This extracted feature is given as input to the already trained supervised neural network for classifying ECG signal waves. This ECG signal is also classified using some data mining techniques using intelligent data miner software. Finally, the results of both ANN and data mining algorithms are compared.

#### 3. PROPOSED SYSTEM COMPONENTS

#### 3.1. Feature Extraction and Selection

In this section we will explain the characteristics of the extracted feature from the ECG signals and the procedured esigned for the extraction. Figure 2, presents the block diagram of the proposed arrhythmia classification.





#### 3.2. Feature Reduction

Many studies, in the field of data analysis and feature selection, suggest that not all the features are useful for classification [8, 9, and 10]. On the contrary, some features may act as noises and, hence, reduce the classification accuracy. In this research, two

different feature reduction approaches are adopted. The studied showed that a meta-heuristic-based approach has better performance for classification of ECG arrhythmia than statistical method [9].

#### 3.2.1. Principal component analysis

Principal Component Analysis (PCA) is a statistical method for reducing the dimensions of the data [11]. It selects a set of variables that are uncorrelated with eachother and, at the same time, each one is linear combination of the original variables. Principal components are derived from the original data such that the first principal component accounts for the maximum proportion of the variance of the original data set, and subsequent orthogonal components account for the maximum proportion of the remaining variance [9]. The process steps of PCA are as follows:

Step 1) Compute the mean vector of data.

Step 2) Compute the covariance matrix of data.

Step 3) Compute the eigen value and eigen vector matrix of covariance matrix.

Step 4) Form the components using the eigen vectors of the covariance matrix as weighting coefficients.

It remains to be shown that the PCA classifier performs well for all datasets, rather, it may not perform well for some datasets [8]. Some researches [12, 13 and 14] show that the PCA isn't powerful at analyzing nonlinear structure data. It seems, the existence of noisy data, abnormal features ranges such that the range of some features is [0 1] while for others is [0 1000], and low variance of some important features are reasons for the weak performance of PCA. You can see the experimental result by PCA in table 1.

Table 1:The Arrhythmia classification result using *PCA\_SVM* with Linear (1.) and Polynomial (2.) kernel.

	P, LR	P, LL	P,N	LR,LL	LR, N	LL, N	OVERALL
1.	98.2	98.7	53.7	99.4	54.6	66.7	80.00
2.	99.2	99.4	54.6	97.5	54.6	66.7	79.26
4.	39.2	33.4	54.0	91.5	54.0	00.7	79.20

**Step 4:** select P(t) from P(t+1) [perform selection]

**Step 5:** recombine *P*(*t*) [perform mutation and crossover]

**Step 6:** Evaluate current population (compute fitness of all chromosomes).

**Step 7:** t = t+1 **Step 8:** go to Step 3.

## 3.2.2. Genetic Algorithm

Genetic Algorithm is one prospective option for feature reduction. Other meta-heuristic optimization techniques such as simulated annealing tabu search, and evolutionary strategies are also candidates for this purpose. GA has been demonstrated to converge to a semi-optimal solution for many diverse and difficult problems as a powerful and stochastic tool based on principles of natural evolution [15].In many application it is used for feature reduction and

Feature weighting [16].

The details of our implementation of GA are described as follows:

### **Algorithm 1 : Genetic Algorithm**

Input: Training Data

**Output:** Useful Features

**Step 0:** Initialize parameters (e.g. population size, crossover rate, mutation rate and the maximum number of population generation.)

**Step 1:** Create initial population randomly (P(0)).

**Step 2**: Evaluate current population (compute fitness of all chromosomes.)

**Step 3:** while (termination condition not satisfied) do [step 4-8]

The first step in any GA algorithm is to define the encoding to allow describing a potential solution as a numerical vector, and then try to generate a population randomly. We briefly describe some concepts and operations in GA [10].

**Selection operator:** The selection process directly selects individuals from the current population based on the fitness values of every chromosome.

**Recombination:** The role of the crossover operation is to create new individuals from old ones. Crossover often is a probabilistic process that exchanges information between some (usually two) parent individuals in order to generating some new child individuals.

**Mutation Operator:** Mutation is applied to one individual and produces a modified mutant child.

**Fitness Function**: The role of a fitness function is to measure the quality of a solution.

4. PROPOSED GENETIC SVM CLASSIFICATION METHOD



Fig 3: The Proposed Genetic –SVM approach

#### 4.1. SVM Classification with genetic algorithm

The procedure describing the proposed SVM classification system is as follows:

**Step 1** - Randomly generates an initial population of size 50.

Step 2 - For each chromosomes of the population, train n(n-1)/2 SVM Classifiers.

**Step 3** - Using OAO (multi-class SVM), compute the fitness of each chromosome (subset of features).

**Step 4** - Directly Select some individuals from the current population based on the fitness values and regenerate new individuals from old ones.

**Step 5** - If the maximum number of iteration is not yet reached, return to step 2.

**Step 6** - Select the chromosome with the best fitness value as the desired subset of features.

Step 7 - Classify the ECG Signals with the trained SVM.

#### 5. CONCLUSION

The ECG signal has been studied by various researchers for classification of arrhythmias. The work done in this field is reviewed in literature review. In addition to that proposed method aims to analyse and classify the ECG signal using Genetic SVM. After implementation the results will be used to calculate the accuracy of genetic SVM classification method on MIT-BIH database.

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# Key Generation using Genetic Algorithm for Encryption

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# ABSTRACT

With all of the vital personal and business data being shared on networks every day, security has become one of the most essential aspects of networking. No one recipe to fully safeguard networks against intruders exists. Network security technology improves and evolves over time as the methods for both attack and defense grow more sophisticated. Various encryption and decryption algorithms exist for safeguarding the information which is transferred over the network. Genetic algorithms (GAs) are a class of optimization algorithms. Many problems can be solved using genetic algorithms through modeling a simplified version of genetic processes. By using GA secret key generation can be performed for adding an additional security layer to the existing encryption algorithms by making data more secure and difficult to decipher.

### Keywords

Genetic Algorithm, Mutation, Crossover, Fitness Function, Encryption, Decryption, Secret key, Cryptography, DES.

### INTRODUCTION

Internet computer security is a problem of major significance, particularly considering the pervasive impact of the Internet on nearly all segments of the computing industry. Systems used in homes, education, business, and government are all susceptible to invasion. There are many aspects to security and many applications, ranging from secure commerce and payments to private communications and protecting passwords. One essential aspect for secure communications is that of cryptography but using genetic algorithm for key generation. Cryptography is the science of writing in secret code and is an ancient art which involves nothing but encryption and decryption using a key which we will be generating using genetic algorithm. There are two types of cryptography

## 1.1.1 Symmetric Cryptography

Here same key is used for encryption and decryption .For e.g. AES, IDEA, DES, etc.

## 1.1.2 Asymmetric Cryptography

Two different keys are used in Asymmetric cryptography where key for encryption is known as the public key, and the other for decryption, known as the private key. For e.g. RSA, Diffie - Hellman.

# **1.2 NEEDS**

GENETIC ALGORITHMS (GAS) ARE ADAPTIVE HEURISTIC SEARCH ALGORITHMS BASED ON MECHANICS OF NATURAL SELECTION AND NATURAL GENETICS. THEY BELONG TO THE CLASS OF EVOLUTIONARY ALGORITHMS (EAS), WHICH ARE USED TO FIND SOLUTIONS TO OPTIMIZATION PROBLEMS USING MECHANISMS BASED ON BIOLOGICAL EVOLUTION SUCH AS MUTATION, CROSSOVER, SELECTION AND INHERITANCE. NOT ONLY DOES GAS PROVIDE ALTERNATIVE METHODS TO SOLVING PROBLEM, IT CONSISTENTLY OUTPERFORMS OTHER TRADITIONAL METHODS IN MOST OF THE PROBLEMS LINK. . GENETIC ALGORITHMS ARE A WAY OF SOLVING PROBLEMS WHICH USE THE COMBINATION OF SELECTION, CROSSOVER AND MUTATION TO EVOLVE A SOLUTION TO A PROBLEM. IN THIS PROJECT, THE KEYS GENERATED WILL ALWAYS BE PURELY RANDOM AND NON-REPEATING AND HENCE INCREASING THE STRENGTH OF KEYS AND SECURITY. THE MAIN IDEA BEHIND GAS IS TO REPLICATE THE RANDOMNESS OF THE NATURE WHERE POPULATION OF INDIVIDUALS ADAPTS TO ITS SURROUNDINGS THROUGH NATURAL SELECTION PROCESS AND BEHAVIOUR OF NATURAL SYSTEM. THIS MEANS THAT SURVIVAL AND **REPRODUCTION OF AN INDIVIDUAL (I.E CHROMOSOME) IS** PROMOTED BY THE ELIMINATION OF UNWANTED TRAITS.

## **2 .RELATED WORK**

In the literature review, it was observed that the characteristics feature that determine the strength of the key are not quantifiable but matrices might be used for evaluating and comparing cryptographic algorithm. The characteristics that are considered are Type: Symmetric or Asymmetric; Functions: Integrity and authentication of message; Key size and rounds; and the complexity of the algorithm. The parameters used to judge the effect of these attacks are based on the key length and complexity of the algorithm from which key is generated.[1] Key can be made complex by increasing the complexity involved in generation process. It will become very difficult for a cryptanalyst to attack the key. Random number generator is used to generate key and genetic algorithm is used to make the key more complex. Which key should be selected will entirely depends on the fitness value of the different strings generated by random number.

This work proposes application of GA in the field of cryptography which is an essential component of information security. The work makes an attempt to explore the key generating process for Cryptography to be unique and non-repeating by exploiting GA thus making data more secure. To get an idea of the previous attempts made in this field, research papers have been studied and analyzed. In one of the work, GAs is used for searching the key space of encryption scheme. In another work, cryptanalysis of vigenere cipher is done using GA.Another work proposes key generation using GA and deals with only vernam cipher.[3] Computer Scientist in the field of information security and privacy will be curious to investigate the role of GA in cryptography. The concept of GAs has been highlighted in detail in one of the thesis, GAs in Cryptography by Bethany Denman<sup>[4]</sup>. In another work, key based bit level Cryptography is done using GA[5] consisting of two levels. In this Bitwise XOR operation is performed which is followed by Genetic Crossover and Mutation.

# 3 .CLASSIFICATION TECHNIQUES

The generation of initial population of chromosomes is in hexadecimal number using

random function. This initial population is 128 bit long. Here 'n' number of population is generated. All this individuals are sent to a fitness function. This fitness function is a maxima function which means that the individual which is having maximum fitness value is selected for the further process. After this process we select two best individuals. On the selected individuals one point crossover is performed and the point of crossover is decided on the basis of a random number. After performing crossover we get the offspring of the selected individuals. Now again fitness function is applied on the children and if their fitness value is better than the parent, then parents are replaced by the children otherwise not. Now the output of previous step will work as input of mutation operation. After mutation we will get the final key which will be used for encryption process. The key

generation process from the Genetic Population has the following steps:

## **3.1 Initial Population Generation**

It is quantitative approach where the chromosomes from populations are chosen to reproduce based on fitness value of chromosomes.128 bit long initial populations of chromosomes are generated using a random number generator in decimal number.

## **3.2** Conversion

The decimal number is converted in to hexadecimal/binary number.

## **3.3.** Fitness Calculation

The fitness value of each individual is calculated. The fitness value is calculated on the basis of symbol which is repeated maximum.

The fitness function can be expressed as:

 $\mathbf{F} = \mathbf{n} + (\mathbf{\epsilon} / \mathbf{m})$ 

- n = Total number of symbols used in key formation.
- m = Percentage of maximum appeared symbol.

 $\in$  = Ideal Percentage of each symbol.

# 3.4 Crossover

Crossover is a genetic operator that helps in joining two chromosomes to form a new chromosome. The newly generated chromosome is called child which takes one part of chromosome from each parent. On the randomly selected two chromosomes one point cross over is performed on the basis of a random value. After crossover operation we get two new offspring's generated from their parent chromosome.

# 3.5 Mutation

Mutation is a genetic operator which changes one or more bit values in a chromosome. It is performed on a child after crossover which guarantees the entire state-space will be searched. Now mutation is performed on a randomly selected chromosome and its new fitness value is calculated

## **3.6 Fitness Check**

Again Fitness value of whole population of that particular run is checked and maximum one is taken in to account. The whole process is performed hundreds of time. Population or the chromosome having maximum fitness value will be considered the fittest and will be used as a key.



is a widely-used method of data encryption using a private (secret) key that was judged so difficult to break by the U.S. government that it was restricted for exportation to other countries. There are 72,000,000,000,000 (72 quadrillion) or more possible encryption keys that can be used. For each given message, the key is chosen at random from among this enormous number of keys. Like other private key cryptographic methods, both the sender and the receiver must know and use the same private key.DES applies a 56-bit key to each 64-bit block of data. The process can run in several modes and involves 16 rounds or operations. Although this is considered "strong" encryption, many companies use "triple DES", which applies three keys in succession. This is not to say that a DES-encrypted message cannot be "broken." Early in 1997, Rivest-Shamir-Adleman, owners of another encryption approach, offered a \$10,000 reward for breaking a DES message. A cooperative effort on the Internet of over 14,000 computer users trying out various keys finally deciphered the message, discovering the key after running through only 18 quadrillion of the 72 quadrillion possible keys! Few messages sent today with DES encryption are likely to be subject to this kind of code-breaking effort.DES originated at IBM in 1977 and was adopted by the U.S. Department of Defense. It is specified in the ANSI X3.92 and X3.106 standards and in the Federal FIPS 46 and 81 standards. Concerned that the encryption algorithm could be used by unfriendly governments, the U.S. government has prevented export of the encryption software. However, free versions of the software are widely available on bulletin board services and Web sites. Since there is some concern that the encryption algorithm will remain relatively

unbreakable, NIST has indicated DES will not be recertified as a standard and submissions for its replacement are being accepted.



Fig.2. DES Algorithm

## 4. CONCLUSION

The primary goals of our project are to produce better and fast performance results and to determine the validity of typical GA-based methods in the field of cryptography. Thus from statistical analysis of results, final keys obtained from GA were observed to be purely random and hence increasing the strength of keys and security.

#### **5.** ACKNOWLEDGEMENT

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# Driver Drowsiness Detection System using Classifier and Fuzzy Logic

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## ABSTRACT

Real Time Drowsiness Detection System has been developed, using a non-intrusive machine vision based concepts. The system uses a camera that points directly towards the driver's face and monitors the driver's eyes in order to detect fatigue. In such a case when fatigue is detected, a warning signal is issued to alert the driver. This report describes how to detect face and eyes using haarcascade classifier, and also describes how to determine whether the eyes are open or closed by using fuzzy logic.

## **Keywords**

Drowsiness Detection, Face Detection, Haar-Cascade Classifier, Fuzzy Logic.

### 1. INTRODUCTION

Driving with drowsiness is one of the main causes of traffic accidents. Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Due to the hazard that drowsiness presents on the road, methods need to be developed for counteracting its affects [2]. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to fatigue related crashes [1].

There are a number of safety devices used in vehicles to protect the driver at present, for examples, seat belts, airbags, brake systems and hard sheet metal, etc. However, these devices always act after the accident happened. There are less of equipments can warn drivers before the accidents happened. Nevertheless, some signs usually exist before many accidents occurring. Driver fatigue recognition system hopes to warn driver when they are fatigued, and avoid traffic accidents caused by fatigue [3].

There are many technologies for drowsiness detection and can be divided into three main categories: biological indicators, vehicle behaviour, and face analysis. The first type measures biological indicators such as brain waves, heart rate and pulse rate. These techniques have the best detection accuracy but they require physical contact with the driver. They are intrusive. Thus, they are not practical [2]. Yogita Paghdar B.E.INFT(Student) Atharva College Of Engineering Mumbai yogita.paghdar1@gmail.com

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The second type measures vehicle behaviour such as speed, lateral position and turning angle. These techniques may be implemented non-intrusively, but they have several limitations such as the vehicle type, driver experience and driving conditions. Furthermore, it requires special equipment and can be expensive[2].

The third type is face analysis. Since the human face is dynamic and has a high degree of variability, face detection is considered to be a difficult problem in computer vision research. As one of the salient features of the human face, human eyes play an important role in face recognition and facial expression analysis. In fact, the eyes can be considered salient and relatively stable feature on the face in comparison with other facial features. Therefore, when we detect facial features, it is advantageous to detect eyes before the detection of other facial features. The position of other facial features can be estimated using the eye position[2].

The focus of our paper is on the last category of alertness monitoring technologies. These technologies monitor in real time. We are using OpenCV in image processing for detecting face and eye position using haar cascade classifier. And developing alertness system using fuzzy logic in order to alert the driver in case of drowsiness.

## 2. RELATED WORK

Research [3] discusses about the detection of the human face and the eye using a camera. It detects the face based on the skin color scope. Then finds and marks out the eyes and the lips from the selected face area. Then combines the image processing of eyes features with fuzzy logic to determine the driver's fatigue level, and make the graphical man-machine interface with MiniGUI for users to operate.

The proposed method in[4] describes drowsiness detection system based on eye blink duration using the Mean-shift algorithm. It detects eye blinks via a standard webcam in real –time YUY2\_640 x480resolution.

The envisioned vehicle-based driver drowsiness detection system [5] continuously and unobtrusively monitors driver performance (and "micro-performance" such as minute steering movements) and driver psycho physiological status (in particular eye closure). The system is programmed to provide an immediate warning signal when drowsiness is detected with high certainty.

This paper[6] uses the LOIS algorithm in order to track the lanes through a sequence of images, and provide a warning if a lane crossing is imminent. Specifically, the vehicle's offset with respect to the right and left lane markings (as determined by LOIS) are examined as a function of time. A Kalman filter is used to predict the future values of these offset parameters, based on past observations. If the vehicle's position as determined LOIS is within one meter of either the left or the right lane marking, and if the vehicle's path as predicted by the Kalman filter will lead to it being within 0.8 meters of either lane markings in less than one second, then a lane crossing warning is generated.

This literature[7] proposes the wavelet transform method is a method for analyzing non-stationary signals. The aim of this study is to classify alert and drowsy driving events using the wavelet transform of HRV signals over short time periods and to compare the classification performance of this method with the conventional method that uses fast Fourier transform (FFT)-based features.

Detecting Driver Drowsiness Based on Sensor [8] uses an angle sensor mounted on the steering column, the driver's steering behaviour is measured. When drowsy, the number of micro-corrections on the steering wheel reduces compared to normal driving. To eliminate the effect of lane changes, the researchers considered only small steering wheel movements (between 0.5° and 5°), which are needed to adjust the lateral position within the lane. Hence, based on small SWMs, it is possible to determine the drowsiness state of the driver and thus provide an alert if needed.

#### 3. CLASSIFICATION TECHNIQUES

### 3.1 Haar Cascade classifier

The core basis for Haar classifier object detection is the Haar-like features. These features, rather than using the intensity values of a pixel, use the change in contrast values between adjacent rectangular groups of pixels. The contrast variances between the pixel groups are used to determine relative light and dark areas. Two or three adjacent groups with a relative contrast variance form a Haar-like feature. Haar features can easily be scaled by increasing or decreasing the size of the pixel group being examined. This allows features to be used to detect objects of various sizes.[9]

### 3.2 Fuzzy logic

The concept of fuzzy set is a class with unsharp boundaries. It provides a basis for a qualitative approach to the analysis of complex systems in which linguistic rather than numerical variables are employed to describe system behaviour and performance. In this way, a much better understanding of how to deal with uncertainty may be achieved, and better models of human reasoning may be constructed.

The concept of fuzzy logic has gained wide acceptance in recent years and have found numerous applications in expert systems and artificial intelligence applications. Fatigue is a type of fuzzy bodily state .It cannot be quantified objectively. Thus, we use computers to apply the fuzzy logic and determine the level of fatiguness. The variable used by the drowsiness detection system encompasses the blinking time and the mean of the eye. The risk factor is calculated based on rule-table decision. The standard deviation and mean are taken as the input variables. The physical state of the eye is the output variable.[11]

#### 11. PROPOSED SYSTEM

After inputting the real time video of the driver, it is converted into a gray scale image and then based on this grey scale image face and eye of the driver is detected using Haar cascade classifier. After detection comparison will be made with specified threshold using fuzzy logic to determine whether the driver is drowsy or not. If driver seems to be drowsy then it will alert the driver.



Figure 1 Flowchart for Drowsiness Detection

## 11.1. Initialize

In the proposed system we are using a web cam in order to capture a real time video of a driver while driving. This real time video is scanned so as to detect the face of the driver.

### 4.2. Tracking

Following figure indicates the flow in which face, and eye is detected using haar cascade classifier



#### Figure 2 Flow diagram of the face detection.

The function of this module is to determine where in an image a face is located. The face detection module works by scanning an image at different scales and looking for some simple patterns that denote the presence of a appears in the centre and presented at a uniform size. Face detection determines where in an image a face is located. The face detection works by scanning up an image at different scales and looking for some simple patterns that identify the presence of a face[10].

The more window looks like a face, more classifiers to be computed and the longer it takes to classify that window. Thus, if the window is not a face the classifiers will quickly reject it after considering small fraction of feature in it. Similarly eye area will be detected.

#### 4.3. Analyzing using fuzzy logic

Once the eye feature selected precisely, so we set appropriate threshold based on the results of experiments. When we compute the white spot of ROI image which is higher than a certain value, it is frame of opening eyes; on the contrary, when it is lower than the certain value, it means closing eyes. On the basis of results, when we set the threshold value, the system can distinguish the eye which is opening or closing effectively.



#### Figure 3 Flow diagram of fatigue recognition

#### 5. ACKNOWLEDGMENTS

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# GPS Based bus arrival time prediction system

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# ABSTRACT

There are a lot of researches to this arrival time prediction but only a few have made satisfactory conclusion. This paper presents an efficient way of predicting the bus arrival time at different bus stops along the fixed route. The proposed system takes into account the historical data along with temporal and spatial variations of the traffic conditions and combines it with the real-time data that is received from the global positioning system. A transit network is been made onto which the geographic information of the bus location is tagged in order to calculate the distance. The algorithm is used to find accurate arrival time and demonstrate the error occurring.

# **General Terms**

Transit, Traffic, passenger, vehicles

## **Keywords**

historical data, operational, route, bus

### 12. INTRODUCTION

As the numbers of vehicles are increasing day by day, which leads to a serious problem of traffic congestion, people are taking public transportation as an alternative. Consequences of congestion lead to low accessibility, loss of travel time and pollution. So far, there is a lot of solution to the traffic congestion, one of them is to improve and expand the use of public transportation system. In urban cities, it is expected that public transportation will become more important for many people. Subsequently, public transportation services should satisfy the customer needs like arrival time and the travel time are the valuable information for both the customer and transport system. Nowadays, by the use of wireless communication, global positioning system and other devices, passengers are able to get information about the arrival time of the transit vehicle. Travel time is the most important information for a traveler and cannot be measured directly. Measuring an accurate travel time is a challenging research problem which is still not achieved as the complexity of variations exists. Some metropolitan areas are providing real time information of the transit vehicle, but still there are difficulties to give accurate real-time information due to the complex nature of urban traffic.

It is even worse in developing countries as considering the traffic is not discipline, collected data is insufficient and the technology is outdated. Thus, for providing real time information, we need to develop an algorithm that can give accurate results. Hence the real time-travel time depends on the behavior of the traffic flow, which in turn depends on other characteristics such as road works, weather, accidents etc. A simple approach is to find average travel time that is derived from the historical data. This approach has a drawback as it does not capture the constant update of the traffic very well.

The measurement of an accurate bus arrival time is significant for both the traveler and transit services. Travel management is the major concerns in a passenger life, as scheduling the routine plays and the important need. Public Transportation system is not that efficient to provide user the comfort of planning their travel such as the bus services in urban and rural areas. This paper presents an efficient way of calculating the bus arrival time at a particular bus stop by making use of historical data and real-time values along with the other factors.

### 13. EXISTING SYSTEM

THE IBUS IS AN INNOVATIVE TRANSPORT SYSTEM IN LONDON WHICH WORKS OVER THE GPS AND GPRS. THERE ARE 8000 BUSES ACROSS LONDON. IBUS IS ONE OF THE GLOBALLY RECOGNIZED AND MODERNIZED BUS TRACKING SOLUTIONS IN THE WORLD. IT MANAGES BUS TRANSPORT FACILITIES IN AN VERY EFFICIENT MANNER PROVIDING ACCURATE DETAILS ON A DAILY BASIS FOR PUBLIC TRANSPORT. TRAVEL COMFORT LEVELS ARE HIGHLY MANAGED AS PEOPLE TRAVELING FROM VARIOUS COUNTRIES COULD BE GUIDED WELL THROUGH THE VOICE ANNOUNCEMENT SYSTEM WHICH GIVES INFORMATION ABOUT THE NEXT STOP AND VARIOUS OTHER ROUTE DIRECTIONS. THIS SERVICE HELPS THE BUS DRIVER TO PERFORM IN A MUCH RELIABLE AND EFFICIENT MANNER AND PROVIDES SAFETY AND CONFIDENCE TO THE PASSENGERS ON BROAD TRAVELING TO VARIOUS PARTS OF THE CITY. ANOTHER EFFICIENT WAY TO PROVIDE INFORMATION TO PASSENGER IS THROUGH THE ELECTRONIC INFORMATION SYSTEM LIKE THE MOBILE PHONES OR INTERNET. THE PROPOSED BENEFIT OF THE BUS SERVICE MAY BE MANY BUT THE MOBILITY OF TRAINING THE BLIND TO TRAVEL WITH CONFIDENCE ON BOARD IS THE AUDIBLE ANNOUNCEMENT SYSTEMS, THE LEVEL OF TRUST BASED THE TECHNOLOGY ENCOURAGES THE HANDICAPPED TO LIVE LIFE IN A BETTER IMPROVED AND TECH-SAVVY MANNER. THE DRIVER OF THE BUS HAS FACILITIES OF COMMUNICATING WITH THE PASSENGER FOR STOPPING OVER VARIOUS STATIONS. IT ALSO PROVIDES AN ANNOUNCEMENT SYSTEM AT THE BUS STATION WHICH HELPS IN MONITORING THE TIME ARRIVAL OF THE BUS. OTHER VARIOUS ANNOUNCEMENT RECORDINGS ARE MADE BY THE DRIVER.

#### 14. PROPOSED SYSTEM

The The proposed Algorithm is divided into two parts for predicting the bus arrival time. In the first part the passenger tries to request for the information about the bus. For example the passenger states requests for the bus number, source, destination of the bus, from this information we can interpret the bus service route and the direction of the bus. The transit vehicles running on that route are determined by the respective global positioning system (GPS) id. This GPS id has information stored in the database that is unique id, bus number, bus running direction that is either upstream or downstream. The bus running direction attribute is monitored and refreshed every time when the direction changes. After the information that is given by the passenger is matched and a list of buses that come under that route are found. However the position of each and every bus is determined on the geographical map system, only the required positioned buses are noted which must satisfy the request made by the passenger and the remaining should be eliminated. For example It might be the case that there are three buses on the route but only two buses are monitored on the route that are feasible and out of which the nearest bus is located and current speed is measured.



Fig 1: Proposed System Architecture

Time Zone	Monday	Tuesday	Wednesday	Thursday	Friday
(hrs)	Km/h	Km/h	Km/h	Km/h	Km/h
8am-10am	35	30	55	51	44
10am-11am	20	21	25	22	23
11am-15pm	18	20	21	24	25
15pm-19pm	21	22	28	20	30
19pm-23pm	48	39	40	45	55

#### Fig .2 Historical data table for average speed

**The** In the figure 2, records of the average speed have been shown over a period of 5days.

The average speed calculated from the data serves right when the traffic is stable and there is no congestion but lacks when there is variation in the traffic flow. As to overcome this variation and unstable nature of traffic we make use of real time data which is obtained by tracking the bus GPS and gaining the current speed of the bus. The proposed algorithm takes the mean of the current speed of the bus and the average bus speed from the historical data.

Speed = 
$$\frac{cs+av}{2}$$

The second phase of the algorithm is to calculate the distance between the bus and the nearest bus stop. After acquiring the GPS bus location that is longitudes and latitudes which is mapped on to the geographical information system then by using the map matching techniques the distance between the bus stations can be measured. The prediction of the bus arrival time can be estimated after calculating the speed of the bus and accurate measurement of the distance between the bus and the bus stations.

#### 15. CONCLUSION

Bus arrival time prediction helps a lot of passengers to save their departure times from homes, workplaces and make any travel plan fast and easy. This prediction system also helps to attract more passengers and increase the demand of buses. The information received by this method can improve the transit agencies management and gain a responsive behavior like real-time scheduling. This system is able to handle and track a large number of buses, identifying there service routes, and the forecasting model predicts the arrival time with great efficiency.

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# DATA LEAKAGE DETECTION SYSTEM USING DATA ALLOCATION STRATEGIES

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### ABSTRACT

In real life sometime a valuable data or sensitive data is given to a set of supposedly trusted agents (thirdparties).if the data which is given to the some third parties found publically then we can say that the datamight be leaked &also finding this guilty data is challenging task. To find such guilty data, traditionallypeople was used the watermarking technique. If this watermarked data was found on any site then they are claimed for its ownership .This Issus is solved by using data allocation strategies which are used to improve he performance of finding the guilty data. In this paper we are introducing some data allocation strategiesthat are useful to us for finding the leaked data. for finding this we can used the concept of fake object whichlooks like a real object but is actually fake. By using this method we can find the guilty parties as well asleaked data. in this paper we are also introduced Explicit &Implicit(sample) algorithms which are used for data allocations

*Keywords*: data leakage, fake object, data allocation ,guilt agent.

## 1. INTRODUCTION

In the course of doing business, sometimes sensitive data must be handed over to supposedly trusted third parties. For example, a hospital may give patient records to researchers who will devise new treatments. Similarly, a company may have partnerships with other companies that require sharing customer data. Another enterprise may outsource its data processing, so data must be

given to various other companies. We call the owner of the data the distributor and the supposedly trusted third

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parties the agents. Our goal is to detect when the distributor's sensitive data has been leaked by agents, and if possible to identify the agent that leaked the data. We consider applications where the original sensitive data cannot be perturbed. Perturbation is a very useful technique where the data is modified and made less sensitive' before being handed to agents. For example, one can add random noise to certain attributes, or one can replace exact values by ranges. However, in some cases it is important not to alter the original distributor data. For example, if an outsourcer is doing our payroll, he must have the exact salary and customer bank account numbers. If medical researchers will be treating patients (as opposed to simply computing statistics), they may need accurate data for the patients. Traditionally, leakage detection is handled by watermarking, e.g., a unique code is embedded in each distributed copy. If that copy is later discovered in the hands of an unauthorized party, the leaker can be identified.

Watermarks can be very useful in some cases, but again, involve some modification of the original data. Furthermore, watermarks can sometimes be destroyed if the data recipient is malicious. In this paper we study unobtrusive techniques for detecting leakage of a set of objects or records. Specifically we study the following scenario: After giving a set of objects to agents, the distributor discovers some of those same objects in an unauthorized place. (For example, the data may be found on a web site, or may be obtained through a legal discovery process.)At this point the distributor can assess the likelihood that the leaked data came from one or more agents, as opposed to having been independently gathered by other means. Using an analogy with cookies stolen from a cookie jar, if we catch Freddie with a single cookie, he can argue that a friend gave him the cookie. But if we catch Freddie with 5 cookies, it will be much harder for him to argue that his hands were not in the cookie jar. If the distributor sees enough evidence' that an agent leaked data, he may stop doing business with him, or may initiate legal proceedings. In this paper we develop a
model for assessing the guilt of agents.

We also present algorithms for distributing objects to agents, in a way that improves our chances of identifying a leaker. Finally, we also consider the option of adding fake' objects to the distributed set. Such objects do not correspond to real entities but appear realistic to the agents. In a sense, the fake objects acts as a type of watermark for the entire set, without modifying any individual members. If it turns out an agent was given one or more fake objects that were leaked, then the distributor can be more confident that agent was guilty.

## 2. EXISTINGSYSTEM

Traditionally, leakage detection is handled by watermarking, e.g., a unique code is embedded in each distributed copy. If that copy is later discovered in the hands of an unauthorized party, the leaker can be identified. Watermarks can be very useful in some cases, but again, involve some modification of the original data. Furthermore, watermarks can sometimes be destroyed if the data recipient is malicious. The Existing System can detect the hackers but the total no of cookies (evidence) will be less and the organization may not be able to proceed legally for further proceedings due to lack of good amount of cookies and the chances to escape of hackers are high.

2.1 Drawbacks:

#### 2.1.1 Obscures Image

Worthwhile watermarks need to obscure the image just enough to make it unusable. Key areas of the illustration or photograph may end up hidden.

Unless your photograph or illustration features strong color and composition, your image's appeal may suffer after the addition of a watermark as key areas are hidden beneath the watermark.

## 2.1.2 Easy to Remove

Over-sized watermarks cover larger areas of an image and obscure the image's clarity. Small watermarks, on the other hand, can easily be removed with the assistance of image-editing software.

#### 2.1.3 Limited Protection

Professional watermarking services provide invisible but limited digital protection. Advanced watermarking technology that embeds ownership information into photographs or illustrations enable the use of search services to help you find incidents of unlawful use of your images. Unfortunately, professional watermarking search services may not be able to find images when they sit behind firewalls, in Flash-enabled galleries, and database-driven or password-protected websites.

#### 2.1.4 Time Consuming

Adding watermarks to your work can be time consuming. If you are already selling large volumes of images, consider if watermarking is worth the time it takes to add them to all of your images.

Unless you integrate watermarking into your workflow, manually adding watermarks to hundreds of images may rob you of valuable time. Automating the watermarking process with a dedicated application may be worth spending money on, especially if you plan to produce, watermark and display lots of images.

#### **3. PROPOSED SYSTEM**

Our goal is to detect when the distributor's sensitive data has been leaked by agents, and if possible to identify the agent that leaked the data. Perturbation is a very useful technique where the data is modified and made less sensitive' before being handed to agents. We develop unobtrusivetechniques for detecting leakage of a set of objects or records. In this section we develop a model for assessing the guilt' of agents. We also present algorithms for distributing objects to agents, in a way that improves our chances of identifying a leaker. Finally, we also consider the option of adding fake' objects to the distributed set. Such objects do not correspond to real entities but appear realistic to the agents. In a sense, the fake objects acts as a type of watermark for the entire set, without modifying any individual members. If it turns out an agent was given one or more fake objects that were leaked, then the distributor can be more confident that agent was guilty. Today the advancement in technology made the watermarking system a simple technique of data authorization. There are various software's which can remove the watermark from the data and makes the data as original.

Data Allocation



#### **4.RELATED WORK**

The guilt detection approach we present is related to thedata provenance problem [3]: tracing the lineage ofS objects implies essentially the detection of the guiltyagents. Tutorial [4] provides a good overview on the research conducted in this field. Suggested solutions aredomain specific, such as lineage tracing for data warehouses[5], and assume some prior knowledge on the way adata view is created out of data sources. Our problem formulation with objects and sets is more general and simplifies lineage tracing, since we do not consider any data transformation from Ri sets to S.As far as the data allocation strategies are concerned, ourwork is mostly relevant to watermarking that is used as a means of establishing original ownership of distributed objects.

Watermarks were initially used in images ,video[8], and audio data [6] whose digital representation includesconsiderable redundancy. Recently, [1], [7], and other works have also studied marks insertion to relationaldata. Our approach and watermarking are similar in thesense of providing agents with some kind of receiver identifying information.. If theobject to be watermarked cannot be modified, then awatermark cannot be inserted. In such cases, methods thatattach watermarks to the distributed data are not applicable.

Finally, there are also lots of other works on mechanismsthat allow only authorized users to access sensitive data through access control policies ,[2]. Such approachesprevent in some sense data leakage by sharinginformation only with trusted parties. However, these policies are restrictive and may make it impossible to satisfy agents' requests.

#### **5.ANALYSIS**

#### 5.1 Major Modules of the Project

#### 5.1.1 Data Allocation Module:

The main focus of our project is the data allocation problem as how can the distributor "intelligently" give data to agents in order to improve the chances of detecting a guilty agent.

#### 5.1.2 Fake Object Module:

Fake objects are objects generated by the distributor in order to increase the chances of detecting agents that leak data. The distributor may be able to add fake objects to the distributed data in order to improve his effectiveness in detecting guilty agents. Our use of fake objects is inspired by the use of "trace" records in mailing lists.

#### 5.1.3 Optimization Module:

The Optimization Module is the distributor's data allocation to agents has one constraint and one objective. The distributor's constraint is to satisfy agents' requests, by providing them with the number of objects they request or with all available objects that satisfy their conditions. His objective is to be able to detect an agent who leaks any portion of his data.

#### 5.1.4 Data Distributor Module:

A data distributor has given sensitive data to a set of supposedly trusted agents (third parties). Some of the data is leaked and found in an unauthorized place (e.g., on the web or somebody's laptop). The distributor must assess the likelihood that the leaked data came from one or more agents, as opposed to having been independently gathered by other means.



Fig. 2..Data leakage detection system Architecture.

## 6.METHODOLOGY

#### 6.1 Problem Setup and Notation:

A distributor owns a set  $T=\{t_{1,...,t_m}\}$  of valuable data objects. The distributor wants to share some of the objects with a set of agents  $U_1, U_2, ..., U_n$ , but does not wish the objects be leaked to other third parties. The objects in T could be of any type and size, e.g., they could be tuples in a relation, or relations in a database. An agent Ui receives a subset of objects, determined either by a sample request or an explicit request:

- 1. Sample request
- 2. Explicit request
- 6.2 Guilt Model Analysis:

our model parameters interact and to check if the interactions match our intuition, in this section we study two simple scenarios as Impact of Probability p and Impact of Overlap between RiandS. In each scenario we have a target that has obtained all the distributor's objects, i.e., T = S.

## 6.3 There are two types of strategies algorithms:

#### Explicit data Request:

In case of explicit data request with fake notallowed, the distributor is not allowed to add fake objects to the distributed data. So Data allocation is fully defined by the agents data request. In case of explicit data request with fake allowed, the distributor cannot remove or alter the requests R from the agent. However distributor can add the fake object. In algorithm for data allocation for explicit request, the input to this is a set of requestR1, R2,....,Rn from n agents and different conditions for requests. The e-optimal algorithm finds the agents that are eligible to receiving fake objects. Then create one fake object in iteration and allocate it to the agent selected. The e-optimal algorithm minimizes every term of the objective summation by adding maximum number bi of fake objects to every set Ri yielding optimal solution.

# 6.4 Evaluation of Sample Data Request Algorithm

With sample data requests agents are not interested in particular objects. Hence, object sharing is not explicitly defined by their requests. The distributor is "forced" to allocate certain objects to multiple agents only if the number of requested objects exceeds the number of objects in set T. The more data objects the agents request in total, the more recipients on average an object has; and the more objects are shared among different agents, the more difficult it is to detect a guilty agent.

#### 7.RESULT

We implemented the presented allocation algorithms in java and we conducted experiments with simulated data leakage problems to evaluate their performance.













# 8. CONCLUSION

In a perfect world there would be no need to hand over sensitive data to agents that may unknowingly or maliciously leak it. And even if we had to handover sensitive data, in a perfect world we could watermark each object so that we could trace its origins with absolute certainty.

However, in many cases we must indeed work with agents that may not be 100% trusted, and we may not be certain if a leaked object came from an agent or from some other source, since certain data cannot admit watermarks. In spite of these difficulties, we have shown it is possible to assess the likelihood that an agent is responsible for a leak, based on the overlap of his data with the leaked data and the data of other agents, and based on the probability that objects can be guessed' by other means.

Our model is relatively simple, but we believe it captures the essential trade-offs. The algorithms we have presented implement a variety of data distribution strategies that claim prove the distributors chances of identifying a leaker. We have shown that distributing objects judiciously can make a significant difference in identifying guilty agents, especially in cases where there is large overlap in the data that agents must receive. It includes the investigation of agent guilt models that capture leakage scenarios that are not studied in this paper.

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# **REMOTE DESKTOP USING ANDROID DEVICE**

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# ABSTRACT

In this Paper, we will enlist the process to access the Desktop of Remote Computer systems with the use of an Android based cellular phone. This process will be carried out using Virtual Network Computing (VNC) based architecture.

User will be able to access and manipulate the Desktop of Remote Computers through a VNC viewer that will be provided on the user's cell-phone. Condition that must be followed is that VNC based application should be installed on the server as well as client side and it must be connected to a Wi-Fi network.

The user can access and manipulate the Desktop within the Wi-Fi range irrespective of various platforms like windows, mac or linux. The image of the Desktop is compressed before it is transmitted to the cellular phone.

There are several functions provided so as to ease the viewing on cell-phones. The user can do several operations as the need of user.

# **KEYWORDS**

Remote Desktop Protocol, Virtual network computing, Pocket Droid, Android, Wi-Fi (WLAN).

# INTRODUCTION

Mobile phones now- a- days are not just devices that are used for making calls. With the advancement of the technologies the ways mobile phones are used have changed. Mobile phones now -a -days can be used for various purposes. For example cameras, gaming devices, calculators, remote controls or sensors. As new technologies are being discovered day by day, tough competition is going between mobile companies to produce better phones. Those who cannot stand up to the expectations of users disappear slowly. The factor that makes mobile phones popular is the applications that allow users to do various surprising tasks.

These applications have been among the important reasons for the growth of the mobile market. In the battle of operating systems for mobiles, Android has emerged as a competitor or dominator to all existing mobile companies including Nokia and Apple. So choosing Android application development as a profession in today's competitive world seems to be secure.

The goal of this final year project was to develop a remote desktop application allowing a user to have full control over the computer's mouse and the keyboard in an Android platform. The Android phone in the project was the client application acting as remote control for controlling the server desktop application. The Bluetooth technology was used for the communication between the server and the client. The applications allow a user to control a computer without getting physically involved. The scope of the project can be extended by replacing the Bluetooth with the Internet/WIFI as a communication mediator.

#### ANDROID PLATFORM

In Today's era the Smartphone based on android platform plays great role in the technical field, which also provides various applications. The main aim of the application is to remotely access and control different applications on a static IP PC by connecting to it over a Wi-Fi link from a Android based mobile phone. Mobile Remote Control turns your mobile into a remote control that can control various applications on Desktop PC.

Both the PC and mobile phone have to support Wi-Fi which is being used to send and receive the data. The user installs a server Application on the PC and a client on the mobile phone. Both applications going to be developed in Java Using Eclipse or JDK. Eclipse is an integrated development environment (IDE) used for android development. It is also called as android development tools (ADT). To develop server and client application VNC architecture is very efficient.

# Why Android as a Platform?

The Android Platform is a software stack for mobile devices including an operating system, middleware and key applications. Developers can create applications for the platform using the Android SDK. Applications are written using the Java programming language and run on Dalvik, a custom virtual machine designed for embedded use, which runs on top of a Linux kernel. There are many advantages to developing applications for Google's Android Mobile Operating System.

The most prominent of these is Android's open-source nature. Both Google and Verizon are confident that giving this kind of freedom to developers will lead to a burst of innovative applications, and so far, the numbers are looking good. Android app developers use the classic open source Linux OS. When an operating system or any application is open source, it simply means all of its source code is transparent and available to any developer who wants to modify it or see how it works. Anyone who installs Linux on a machine can change any of the files that control the way the operating system works. Someone might go in and redesign the look and feel of the operating system, or they might modify these files in order to use system resources for a new application.

# **General Architecture Overview**



Fig.1: Architecture of Android.[2]

PROBLEMS WITH THE EXISTING SYSTEM

# **Existing System**

Ample options are there in now a day s operating systems it to execute applications at the remote end. The basic services used by these operating systems today promote executions of the applications at the remote end with just restricted access.

# Problem of Existing system

- Administrator is not having full control.
- There is no provision to reboot or shutdown.

- Supports only one remote command on the remote machine at the same time.
- Never gets the feeling that we are using the remote machine.

# Advantages and Disadvantages of the Existing System

Utilities like Telnet and remote control programs like Symantec's PC anywhere let you execute programs on remote systems, but they can be a pain to set up and require that you install client software on the remote systems that you wish to access.

By using this users can save time by accessing data from remote systems. But using this all the users are not able to access the desktop of the remote machine.

The user will never get the feeling that they are working in the remote machine. There is no provision to shut down or reboot remote system.

There is no way to use the processor of the remote machine directly.

Android phones are very popular but still have some drawbacks. The battery drains out rapidly on using the Internet or while using an application that uses the resources of a mobile. So whenever a developer develops an application he or she has to be careful about the battery power drainage. Also in long use of such applications the battery gets slightly heated.

# Scope of the Project

This trend has prompted us to propose the use of a cellular phone as a device for remotely controlling computers.

It Provide us the full access to the desktop so anyone can had the power at their hand. Thus the extended scope of this system will prove to be helpful in providing mobility and accessing the remote desktop over the internet. In our future work, we will work on the memory management and on the file sharing management.

Memory management deals with managing and sharing memory among the systems that are connected to the android device. In file sharing, we are going to work on sharing the files stored in the android device to the system that we got connected.

## VNC (VIRTUAL NETWORK COMPUTING):

A VNC system consists of a client, a server, and a communication protocol

The VNC server is the program on the machine that shares its screen. The server passively allows the client to take control of it.

The VNC client (or viewer) is the program that watches, controls, and interacts with the server. The client controls the server.

The VNC protocol (RFB) is very simple, based on one graphic primitive from server to client ("Put a rectangle of pixel data at the specified X,Y position") and event messages from client to server.



The server sends small rectangles of the frame buffer to the client. In its simplest form, the VNC protocol can use a lot of bandwidth, so various methods have been devised to reduce the communication overhead. For example, there are various encodings

# **RDP** (Remote Desktop Protocol):

Remote Desktop Protocol is a <u>proprietary protocol</u> developed by <u>Microsoft</u>, which provides a user with a <u>graphical interface</u> to connect to another computer over a network connection. The user employs RDP client software for this purpose, while the other computer must run RDP server software.

Clients exist for most versions of <u>Microsoft Windows</u> (including <u>Windows Mobile</u>), <u>Linux</u>, <u>Unix</u>, <u>Mac OS X</u>, <u>iOS</u>, <u>Android</u>, and other modern <u>operating systems</u>. RDP servers are built into Windows operating systems; an RDP server for Linux also exists. By default, the server listens on <u>TCP port</u> 3389.

Microsoft currently refers to their official RDP server software as <u>Remote Desktop Services</u>, formerly "Terminal Services". Their official client software is currently referred to as <u>Remote Desktop Connection</u>, formerly "Terminal Services Client".

## **RFB** (Remote Frame buffer):

It is a simple <u>protocol</u> for <u>remote access</u> to <u>graphical user</u> <u>interfaces</u>. Because it works at the <u>frame buffer</u> level it is applicable to all <u>windowing systems</u> and applications, including <u>X11</u>, <u>Windows</u> and <u>Macintosh</u>. RFB is the protocol used in <u>Virtual Network Computing</u> (VNC) and its derivatives.

### HOW IT WORKS? (PROPOSED SYSTEM) :



#### Fig. 3: Data Flow Diagram.

User need to login to the client software. Then it sets a static IP that has been set on the server software. If the IP address and the authentication has been completed than the connection is established. Screen sharing takes place. When the user gives an input as keyboard function or a click event on client side the appropriate output will be seen on the server screen.



#### Fig. 4: Actual flow.

INPUT	OUTPUT	
User inputs username /nickname, password, ip address and port.	User is logged into the system	
User can move the cursor	Accordingly the cursor position is changed on the desktop.	
User can click	Accordingly the program is executed.	
User can zoom.	Depending on the area of zooming, the enlarged view of a region can be seen.	
User Can Edit Documents.	As per the code user can use keyboard.	

#### CONCLUSION

In the proposed system we allow access to user which is registered on the network, so there is less constraint on security. Server we designed is java based and can be installed on any operating system which runs java. The only thing needed is android operating system Smartphone.

Remote desktop feature lets you view and interact with your computers desktop from your mobile phone. Advantage of Wi-Fi for remote control instead of Bluetooth includes faster response time and greater range.

Typically you will be able to remotely control your pc from a distance of up to 45 meters indoors.

Thus the extended scope of this system will prove to be helpful in providing mobility and accessing the remote desktop over the internet.

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# INTELLIGENT SURVEILLANCE SECURITY ALERT

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# ABSTRACT

One the most important aspect of surveillance system is to collect the information or behaviors of the target. Such systems can thus be used in many applications. Security and vigilance is one of the fastest growing applications for fixed wireless equipment. Government agencies, municipalities, and private enterprises are all in the process of enhancing security through the use of increased real-time vigilance. In this paper we propose a low cost real-time Video surveillance system. We have created a PC-based Video surveillance system also called as vigilance system that tracks objects. Whenever a motion is detected it captures the images, stores in a database and sends SMS alert as well as email notification to the registered users. In order to access those images the user can log into the site if he is in the private network of the organization. If he is outside that organization then he can access those images via his/her email. A user can also search from a database in order to get the previous images. The result shows that our system is eligible of providing a high level of security in various kinds of environment.

## 1.INTRODUCTION

People want to interact with computer in an natural way, Automated video surveillance is an important research area in the commercial sector as well Technology has reached a stage where mounting cameras to capture video imagery is cheap, but finding available human resources to sit and watch that imagery is expensive. Surveillance cameras are already prevalent in commercial establishments, with camera output being recorded to tapes that are either rewritten periodically or stored in video archives. After a crime occurs - a store is robbed or a car is stolen - investigators can go back after the fact to see what happened, but of course by then it is too late. What is needed is continuous 24-hour monitoring and analysis of video surveillance data to alert security officers to a burglary in progress, or to a suspicious individual loitering in the parking lot, while options are still open for avoiding the crime

#### 2.EXISTING SYSTEM

A camera system that uses an NVR (network video recorder) allows you to broadcast your footage over the internet/private

network and check up on your house / office / shopping malls, etc., at anytime, even when you're on vacation Surveillance cameras can be an attractive target for a thief, and a stolen camera can cause interruptions in recording and leave your home open to further theft or vandalism. camera system cannot monitor every area of your office or home at all times. Hence it cannot be considered as a foolproof method for crime prevention. Privacy Concerns: Invasion of privacy is the major issue when it comes to any security system device like the camera system. It lowers the employee morale and hampers productivity at times. Constant monitoring of every activity might put the workers ill at ease. Initial Costs: The initial costs incurred per camera are high. The installation may also increase the initial expenditure. It depends upon the complexity of the camera system as well. but as we are using our system computer webcam it will be cheap ,this system will be cheap as compare to CCTV n other bulky costly system. CCTV (Closed-circuit television) camera: Thefirst CCTV system was installed by Siemens AG at Test Stand VII in Peenemünde, Germany in 1942, for observing the launch of V-2 rockets. Capture videos . Use parking lots, monitoring area etc. Surveillance systems were most effective in parking lots, where their use resulted in a 51% decrease in crime; Public transportation areas saw a 23% decrease in crimes; Systems in public settings were the least effective, with just a 7% decrease in crimes overall.cannot give instant alert, no message alert, no mail alert, no calling alert after closing hour or in restricted Area of bank , home, office etc.Using some beam in machine for alert which is very noisy, bulky and costly.

#### **3.CONCEPT**



## Fig. 1:Basic Concept of System

The system that performs some of video and Image processing tasks and sends the processed data to a registered Mobile .We have created a PC-based intelligent surveillance system that tracks objects.

In Video Surveillance Application. Image will capture. When any object or person will come after Office closing hour or in restricted Area.After a crime occurs - a store is robbed or a car is stolen - investigators can go back after the fact to see what happened, but of course by then it is too late.

The system captures image if any motion is detected in the area where the camera is mounted. the current image is compared with the previous image if any change is detected the systems send an SMS alert as well as a email notification along with an attached image to the registered user. The system can also record video and provides searching facility to search a desired video.

no loud alert so that theft cant grasp by us . our system will give quit and hidden alert such that theft can be easily caught.In program we have used image processing and intelligent agent

## **4.FEATURES**

The first and most important one is deter crime. The second is to help catch criminals when a crime has been committed. Then system will send alert via message and emails. Recording any crimes that are committed and giving alert to respective encharge. Allowing people to monitor the cameras and see what is happening at any time of the day Pinpointing exact times when crimes have been committed Providing an identification method, by which people can be screened before entering a building Does not need any special costly and bulky hardware requirement. We just required laptop or pc with camera. No need of slow wireless transactions. Can be synced anywhere, anytime with the help of any one device. Simple to implement. Easier to understand. Operations are to the point and very basic. The objective of this project is to design an intelligent video surveillance system. That is, the system consists of a PC- based system. I propose the system that performs some of video and Image processing tasks and sends the processed data to a registered Mobile .We have created a PC-based intelligent surveillance system that tracks objects The main aim of the technology is to enable systems to not just capture video footage for post-event investigation, but to actually detect suspicious activity as it happens. In that sense, video analytics serve to provide a form of preventative surveillance. And thus provide a secure environment. The objective of this project is to design a real time surveillance system. That is, the system consists of a PC- based system. The camera is set on in the specified area. After working hours camera captures the image if it detects any motion in

that area. The captured image will be stored into the database. The system also has website with the help of which user can view the captured images. An SMS alert as well as email notification will be sent to the registered users. The user can access the images through the website if he is the private network of the organization else he/she can access through his email and take necessary actions. The system can also record video of the whole day.

# **5.DESIGN DETAILS 5.1 PLATFORM:**

Windows 9x/NT/2000/ME/XP

## 5.1.1 Software Components:

- Operating System Windows XP
- Front End Microsoft Visual Studio .net(Asp.net & C#.net)
- Back End Microsoft SOL Server 2005

#### 5.1.2 Hardware Components:

- PROCESSOR P IV AND LATEST
- HARD DISKS 40 GB
- MEMORY 256MB DDR RAM •
- CAMERA .



Fig.2: Flowchart for proposed system

# OCU FUNCTIONAL MODEL

#### 6. APPLICATION

SCOPES THAT WE CAN EVEN INCREASE THE NUMBER OF CAMERAS FOR HIGHER LEVEL OF SECURITY. DISPLAYS AND CAPTURES VIDEO FROM MULTIPLE CAMERAS SIMULTANEOUSLY MULTIPLE CAMERAS CAN BE CONNECTED AND CAN ALL BE USED AT THE SAME TIME.ZOOMING SUPPORT FOR MANY NETWORK CAMERAS ALLOWS YOU TO ZOOM INTO THE CAMERA TO SEE MINUTE DETAILS .CALLING MECHANISM CAN BE ADDED IN THIS SYSTEM TO ALERT BY CALLING.IMAGE CAPTURING EVEN IN DARK AREA.RECOGNIZING ADMIN AND HIS RELATIVE WHO'S IMAGES ARE FEED INITIALLY IN DATABASE.MESSAGE OR CALLING ALERT TO MULTIPLE PHONE. EVENTS BETWEEN IMAGE CAPTURING CAN BE DECREASE FOR MORE EFFICIENCY. AS EVENT IS INVERSELY PROPOSANAL TO EFFICEINCY OR THE FREQUENCY OF ALERT .

#### 7. CONCLUSION

In this proposed system we present a low cost, highly secure, remotely accessible and an easy to configure solution for automated security in various environments. The SMS and the email notification facility provided helps to take immediate actions which reduces the further hazards. The main difference between existing and our system is that our system not only captures and stores the images but also provides searching facility that may be useful in near future.

There is always a room for improvement no matter how good the software might be and the same thing goes for our software too. Since we have used asp.net there is a lot of scope for future enhancement. If need arises the software can be connected to the internet easily without any labor and thus the website can be hosted on internet. The second feature which could be added in this system is that even video files can be sent to the registered user. We can even increase the number of cameras for higher level of security. Multiple cameras can be connected and can all be used simultaneously. Zooming support for many network cameras can allow you to zoom into the camera to see minute details. The increasing need for sophisticated surveillance systems and the move to a digital infrastructure has transformed surveillance into a large scale data analysis and management challenge.

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# **Authentication Protocol Using Cued Click Algorithm**

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In this project, we propose a click based graphical password application called Cued Click Points (CCP). It can

# ABSTRACT

Cued Click point is a click-based graphical image password technique. Users Click on one point per image for a sequence of images.

The user has the freedom to select as many images as per his convenience, based on his personal preference. The user will select a point in each image.

The images will appear in random order. If the user clicks on the right point on the image, he will be redirected to the next image; else the application will trigger an error.

Cued Click point algorithm basically raises the security of the system. It is time efficient and the performance is better then pass point. User can easily remember a point on an image rather than remembering alpha-numeric password.

Cued click point also provides greater security than Pass Points because the number of images increases the drudgery for attackers. It significantly reduces hotspots while still maintaining its usability.

#### 9. INTRODUCTION

Various graphical password algorithms have been proposed as alternatives to alpha-numeric passwords. Experience and research have shown that alpha-numeric passwords are vulnerable with both usability and various attacks that make them insecure.

Psychological studies have revealed that human brains tend to remember images more easily then alphanumeric or text. Passwords should be easy to remember, and the user authentication protocol should be executable quickly and easily by humans.

Passwords should be secure, i.e., they should look random and should be hard to guess; they should be changed frequently, and should be different on different accounts of the same user. They should not be written down or it should be made secure by using various cryptographic algorithms or steganography. be viewed as a combination of cued clicks on random images generated by the system at that instant.

Users password consists of one click-point per image for a sequence of images selected by users itself. The next image displayed is based on the previous click-point, so users receive immediate implicit feedback as to whether they are on the correct path while login

## 10. LITERATURE SURVEY

What we came to know through literature survey was, that now a days there is a rise in security breaches and dictionary attacks in computational environment .Cued click point algorithm tries to overcome the odds which were present in alpha-numerical passwords the works on the principal of gridlines.

# 2.1. Problems with alpha-numeric passwords

Humans have poor long-term memory and hence the problem arises of remembering the password. Once user registers itself on a system he must have a password that he must be able to recall while logging in. But, users tend to forget their passwords. Researches explains why people forget their password.

End number of things in memory may compete with a password and prevents its accurate recall. If a password is not used regularly it will be even more prone to be forgotten. More complication arises when users have many passwords for computers, accounts, networks, and web sites. Numerous passwords increases obfuscation and is likely to lead to forgetting of passwords.

User solution for this problem is by decreasing their memory load at the expense of security. First, they write down their passwords and Secondly, when they have multiple passwords, they use one password for all systems or trivial variations of a single password. In terms of security, a password should consist of a string of 8 or more random characters, including upper and lower case alphabetic characters, digits, and special characters.

A random password does not have meaningful content and must be memorized by rote, but rote learning is a weak way of remembering (Rundus, 1971). As a result, users are known to ignore the recommendations on password choice. Two recent surveys have shown that users choose short, simple passwords that are easily guessable, for example, "password," personal names of family members, names of pets, and dictionary words users the most important issue is having a password that can be remembered reliably and input quickly. They are unlikely to give priority to security over their immediate need to get on with their real work.

# 2.2. Why graphical passwords?

The properties of security systems that set them apart include:

- There is a group of users, which are illegitimate users, who are trying to attack the system. Such attackers will destroy any information leaked by, or can extracted, the interface.
- They will also clout any way that the system can be exploited or any means to spoof the interface to trick authentic users. This makes providing helpful feedback difficult, as it may also help attackers.
- Users have poor mental models of security and often misunderstand or underestimate the consequences of insecure actions. They may not even realize that their actions are insecure in the first place.
- Computer security suffers from the "barn door" property if information or a system is exposed even for a brief time, there is no guarantee that it has not been compromised in an irrecoverable way.

# 3. Design of Cued Click point.

In Pass Point passwords consist of a sequence of five click points on a given image. Users may select any pixels in the image as click-points for their password. To log in, they repeat the sequence of clicks in the correct order. Each click must be within a system-defined tolerance region of the original clickpoint. The usability and security of this scheme was evaluated by the original authors was found that although relatively usable, security concerns remain.

The primary security problem is hotspots: different users tend to select similar click-points as part of their passwords. Attackers who gain knowledge of these hotspots through harvesting sample passwords or through automated image processing techniques can build attack dictionaries and more successfully guess Pass Points password.

A dictionary attack consists of using a list of potential passwords (ideally in decreasing order of likelihood) and trying each on the system in turn to see if it leads to a correct login for a given account. Attacks can target a single account, or can try guessing passwords on a large number of accounts in hopes of breaking into any of them. To reduce the security impact of hotspots and further improve usability, we proposed an alternative click-based graphical password scheme called Cued Click-Points.



Fig1.Users navigate through a sequence of images

# 4. Proposed Solution

The proposed system consists of

The users i.e.; either they will register themselves or will login. They make use of login forms to interact with the system. Users are associated with different login name and graphical password and according to the selection that they did during registration they can access the system and do their work done.



# Fig 2.User registration & login modules

# **5.** Application

- 1. Hard Disk Locking.
- 2. System login & logout process.
- 3. Folder Locking.
- 4. Web logging application
- 5. Application locking

# 6. Features

- 1. Graphical password schemes provide a way of making more human-friendly passwords.
- 2. Here the security of the system is very high.
- 3. Here we use a series of selectable images on successive screen pages.
- 4. Dictionary attacks are infeasible.
- 5. It satisfies both conflicting requirements i.e. it is easy to remember & it is hard to guess.
- 6. By the solution of the shoulder surfing problem, it becomes more secure & easier password scheme.
- 7. By implementing encryption algorithms and hash algorithms for storing and retrieving pictures and points, one can achieve more security
- 8. Picture password is still immature, more research is required in this field.

# 7. Conclusion

The proposed Cued Click Points scheme shows promise as a usable and memorable authentication mechanism.

By taking advantage of users' ability to recognize images and the memory trigger associated with seeing a new image, CCP has advantages over Pass Points in terms of usability. Being cued as each images shown and having to remember only one click-point per image appears easier than having to remember an ordered series of clicks on one image.

CCP offers a more secure alternative to Pass Points. CCP increases the workload for attackers by forcing them to first acquire image sets for each user, and then

conduct hotspot analysis on each of these images.

In future development we can also add challenge response interaction. In challenge response interactions, server will present a challenge to the client and the client need to give response according to the condition given. If the response is correct then access is granted. Also we can limit the number a user can enter the wrong password.

## 8. Acknowledgement

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# The Qualities of a good Teacher: the Krishna way

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# ABSTRACT

In a society just having the knowledge and you using it for yourself is just not acceptable. If you have the knowledge you should share it with the students and society at large. India has a rich tradition of teacherstudent knowledge transfer relationships. Most of the times, when we talk about the best teacher-student relationships the picture of Arjuna of the Mahabharata with a bow in hand being taught the art of archery by his teacher Dronacharya comes in the mind.

It has to been seen that the best role model for a student is the teacher. The teachings of a good teacher leaves a lasting impact on the student. So, the teacher should set out to give a good example to the students.

This paper will focus on finding out qualities that a teacher should possess by keeping Krishna, the teacher to the world, of the Mahabharata as an example.

## **Keywords**

Qualities of a good Teacher, Teacher, Krishna, Mahabharata.

# 1. INTRODUCTION

A great society is identified by the great scientists, philosophers and leaders that it produces. India as a society has produced great scientists like Aryabhatta and Dr. A. P. J Abdul Kalam, thinkers and philosophers like Shankrasharya and Madhvacharya and leaders like Chatrapati Shivaji and Sardar Patel. So, what is it that enables the society to produce such great people? The answer to this question is education.

As Aristotle says 'All who meditated on the art of governing mankind have been convinced that the fate of empires depends on the education of the young' [1]. And, to provide a good and right education you need good educators, teachers. India as a country and a society has had a very rich tradition of great teachers' right from Manu, from whom humans got their name to Veda Vyas, the original writer or compiler of most of the works that are present in our tradition to Krishna and so on, the list is endless. And, the teachings that they have given or provided have been priceless, invaluable.

Only a good and a great teacher will produce greater students. Students, who become an asset to the country and society as a whole. So, what are the qualities that make a person a good and a great teacher? This paper presents some qualities that are essential for a teacher to have that would make them great teachers taking the life and teachings of Krishna as an example. Krishna is called the teacher to the world; his teachings are universal, priceless and are timeless.

# 2. QUALITIES OF A GOOD TEACHER

A teacher plays a very important role in the development of a child. In this section we will look at the some of the important qualities that a teacher should possess to become a good human and a very good teacher. So that it will enable one to give out a good human being to the country and the society.

# 2.1 A good teacher himself should be well educated

To be a good teacher you should have the right kind of education. Krishna spent around 13 years acquiring education at a teacher [2]. Without the right kind of education one cannot expect and rather should not try to teach. As an engineer a person cannot expect to teach medical subjects to the students. In other words you yourself should have the right credentials and knowledge of the subject before thinking of the teaching profession. Also, education is not a one-time event it is a continuous process. One should have the habit of learning throughout his life especially if one is a teacher. From time to time task should be taken up that enhances your knowledge. This is what Krishna showed throughout his life he had always kept himself surrounded by scholars. In fact scholars of any country visiting his country had direct access to him.

# 2.2 A good teacher loves to teach

The first and foremost thing in education is that the teacher should love to teach. The teacher should be passionate about teaching. It should not be that it has been forced on him and he is carrying out the task as job without his heart at it. When one is teaching just for the sake of it neither does students understand anything nor is any use in wasting any time of the students or himself. Krishna shows this time and time again in his life at every given opportunity he is willing to share his knowledge be it with friends Bheema or Arjuna or enemy like Jarasandha [2].

# 2.3 A good teacher has good control over his senses

In Gita [2] time and time again Krishna stresses out the fact that before we start to concur over the enemies outside, we have to win over the enemies inside. In other words Krishna says that we have to win over our senses, and this should be our first course of action before even trying to achieve or win in any other thing in life. This is true in everyday life of a professional and especially true for a teacher. You cannot be good at any profession if you take your fights outside of your home, you won't be effective if you think of only money or comfort. And, as a teacher you will daily encounter students who might become easy prey to your anger, greed or frustration. These kind of situations is highly undesirable. These things are a big hindrance in one becoming a good teacher, or we can say that these act as big roadblocks in any professional career. So, it is important to have your senses under control.

# 2.4 A good teacher practices before he teaches

Krishna in his whole life only preached those things that he himself practiced [2]. When he said Arjuna to fight against the injustices he himself had fought injustices throughout his life. When he says punish the wrong be it your own relatives he himself had punished his own relatives including his maternal uncle his own son when they were wrong. So, as a teacher you should practice before you teach. You cannot expect a student to accomplish a task which you yourself cannot accomplish it. You should understand first as what kind of difficulties the student might face expecting him accomplish the task.

# 2.5 A good teacher demonstrates a caring attitude

Even though you are well educated and keep updating your knowledge from time to time and you love to teach it may happen that due to daily routine it may happen that you ignore the concerns of the students. As a teacher you should have a caring attitude towards the students. On should make sure that students do not become victims of his personal problems. Even students will have their own problems make sure you do not turn a blind eye to their concerns. Also, as a teacher you should not jump to conclusions in any event that may be, be it at the time of resolving conflicts. This is was Krishna taught us when he for almost of 60-70 shloka kept mum and allowed Arjuna to lament his insecurities [2]. That is Krishna allowed Arjuna bring into words whatever was in his mind. And, when Arjuna had completed his monologue Krishna spoke taking under consideration all the doubts and insecurities that Arjuna had. Kishna show us that first of all we should be good listeners and we should understand and show empathy towards the problems of the students.

# 2.6 A good teacher is an excellent communicator

At the end of the day a teacher communicates either with students or colleagues or the parents of the students. To be a good teacher you need to be a good and effective communicator. Your communication should be such that whoever you are communicating that person or group should feel compelled to undertake a particular work. Or, the student should be inspired to take up the work or task you intend him to undertake. This is what Krishna shows whenever he communicates [2]. Some might ask if Krishna was such an excellent communicator then why did he fail in the peace mission that he was entrusted with? The answer to the question is it was never a peace mission. Because, there was no chance to peace and this was amply clear to all. The armies on both the sides were ready to move into the battlefield with in a days' notice. Also, while leaving for the mission Krishna tells everybody to be ready for war and further Krishna tell everyone as to why the war was important and it has to be fought.

# 2.7 A good teacher thinks out of the box

There is no one set method of teaching. One method may be effective to one student that same might not be to other students. Also one set of method may be easier for the teacher to explain but there is no guarantee that the students will follow what you are trying to teach. As it is said there is no one set cookie cutter way to teach. As a teacher you have to be creative and be adaptive while trying to teacher a particular subject. You cannot go into a class thinking this is how I'm going to mug up and deliver. Weighing the mood and the capabilities of the students you should be adaptive. So, one should not fall into the trap of following one set of things over and over again. One should reinvent himself time and again so as to not become obsolete in terms of teaching method. Also, you cannot expect to solve all problems with one set of methods. The long and short of it is one should be creative and adaptive in the face of problems or teaching methods. This is what Krishna teaches us through his actions. Whenever the chips were down and odds were stacked against Krishna he found a way out all the time. Be it the defeating of Jarasandha through the hands of Bheem or be the killing of Dronacharya or be it killing of Bhishmachaya. The out of the box thinking that resulted in these thing eventually helped him and the Pandavas in winning the war [2].

# **2.8 A good teacher sets high expectation** from the students

Traditionally, the placebo effect has been thought of as triggering self-healing using fake drugs. So, for instance, if I take a sugar pill believing that it's a pain reliever, that belief causes my brain to release endorphins, which brings pain relief. But now, the placebo effect is being looked at as more than the ability of fake medicine to fool people into feeling better. Research into placebos is broadening out to examine everything that affects a patient's expectations for treatment — how the doctor talks and acts, the side effect information they read online, the news reports of killer diseases — and how, when, and to what extent those expectations can help or hinder healing.

And placebo effects in medicine are just one example of how our expectations can bend reality. For instance, brain scans reveal that expectations about a wine's quality (based on price or a critic's review) actually change the level of activity in the brain's reward centres when a person takes a sip. Highly-trained weight lifters can out-do their personal bests when they believe they've taken a performance booster. People who wear taller, better looking avatars in virtual reality behave in ways that taller and better looking people tend to act. For example, they approach better-looking potential dates and they are more aggressive in negotiations, both in the virtual world and after the headgear is removed. In lab and field experiments, people who stand in powerful poses (think Superman) for a minute or two, have similar hormonal changes to people who are given actual power and authority over another person, and they exhibit the same sorts of behavioural changes.

This is what Krishna teaches us through his life [2]. That is as a teacher if you don't expect the stars from your students how can they even reach the moon! One should have the confidence in his teaching and his students for keeping high expectation from his students. One should expect high standards from his students. And, this is possible if the teacher himself sets high standards for his teaching.

# 2.9 A good teacher is humble

A teacher should not try to impress their students with their knowledge. Rather, a good teacher will speak in terms that students can understand. After all, the goal is to pass knowledge on to the student, not show off what you as a teacher know. It's a granted that teachers have to be knowledgeable; that's what qualifies them to teach in the first place. So, there no point in showing off your knowledge in front of the students.

Krishna was worshiped as a god by many people, even in those days. The people who followed his teachings believed and worshiped him as god. He could have said anything and the people might still have followed his teachings, however wrong it might have been. But he never let the fame and adulations through to his head. Whenever and whatever he taught he always supported it with logical reasoning's.

# 2.10 A good teacher leaves a lasting impression with good example

A teacher plays a very important role in the life of the student. Knowingly or unknowingly the students observe every move of the teacher and learn from them. Like in his autobiography 'Mein Kampf' [3], Hitler says that the biggest impression he had on his life was of his history teacher. And this history teacher was a big heater of the Jewish public and told his students that the Jewish were the single most important reason for the under development of the Aryan population of the German-Austrian belt. This hate was carried forward by Hitler and was turned into a historic and horrific mission of exterminating the Jewish population globally. On the other hand if we notice the example of Dr. A. P. J. Abdul Kalam, 11<sup>th</sup> President of the Republic of India; he says in his Autobiography 'Wings of Fire' [4] that the greatest inspiration he ever had in his life was of his teacher in Indian Space Research Organisation (ISRO) Dr. Vikram Sarabhai. It was this inspiration from Dr. Vikram Sarabhai that gave India the Prithivi and Agni series of missiles under the Integrated Guided Missile Development Program. From this we have to understand that sometimes a teacher knowingly or unknowingly does leave a lasting impression or impact on the students mind, be it good or bad. But, the impression and the impact should be in the better interest of the student, country and society at large. Krishna through his teaching in Gita [2] has put forward a good example as to how a teacher should leave behind a good example for

the students to follow which will be in the betterment of the individual, country and society at large.

# 3. CONCLUSION

If we want to see our country grow in all dimensions then we would have to produce good young humans. Or, we can also say that it the prerogative of the learned and the educated of the country to give good young citizens to the country and society as a whole. And, to do this we first need to produce good teachers and trainers to develop these kids.

The Mahabharata is one of the most comprehensive works ever. The Mahabharata through the character of the great Krishna outlines to us the qualities a good teacher should possess. Krishna was responsible in creating a new era and in the same way if we follow the guidelines he has put forth, we as teachers can create a better and brighter future for our country and society as a whole by producing or training excellent citizen to this country and the society.

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# Study of single walled and multiwalled carbon nanotube structure and application

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# ABSTRACT

In present paper "Study of single walled and Multi-walled carbon Nano tube structures and Application" is a description of the structure of carbon Nano tube and its properties. This paper is focused to the analyze the various geometry of carbon Nano tube and properties of its. .Carbon nanotubes show extraordinary mechanical and electrical properties with their nature of the folds of wall. These properties are most important for application of further development in modern scientific world.

## Keywords

Single walled, multiwall and carbon nanotube

## **1. INTRODUCTION**

Carbon is a most important element in our nature which has two crystalline structures: diamond and graphite. Carbon nanotubes are also allotropes of carbon. The thin sheet of graphite forms cylindrical shape for formation of carbon nanotube. These nanotubes show novel properties that make them potentially useful in many applications in nanotechnology, electronics, optics and other fields of materials science, as well as potential uses in architectural fields. They exhibit extraordinary strength and unique electrical properties, and are efficient Conductors of heat. This present study is an effort to enhance the understanding of the structure of carbon nanotube and its application in various field of science and technology.

#### 2. STUDIES OF CARBON NANOTUBES

Basically a thin sheet of graphite is known as graphene .A carbon nanotubes are formed by circular folding a graphene sheet with variousOrientation and diameter. Carbon nanotubes are classified on the basis of their size. The diameter of a nanotube is in Nanometers and their length several millimeters. Its depend on the number of walls the Carbon nanotubes are categorized as single walled nanotubes and multi walled nanotubes. Carbon nanotube consists of ten and hundreds of concentric layers of carbons with adjacent layer separation of 0.34 nm i.e. The carbon network of the layers is related to the honeycomb .The chemical bonding of nanotube are consist of sp<sup>2</sup> bonds. This bonding is in carbon molecules provide large strength. The nanotubes have high Young's modulus and tensile strength, which makes them suitable for composite materials with improved mechanical properties. The nanotubes are metallic or semi -conducting which depends on their structural parameters. The studies of carbon nanotubes are focusing on the Mechanical, and electrical properties of different kinds of carbon nanotube. There are three different geometries of carbon nanotubes. These geometry of armchair, zigzag, and chiral [e.g. zigzag (n, 0); armchair (n, n); and chiral (n, m)] are classified by how the

carbon sheet is wrapped into a tube. These carbon nanotubes are shown in figure no-1, 2&3. A polymorphic form of carbon exists in discrete molecular form. Its consists of a hollow spherical cluster of 60 carbon atoms a single molecule is denoted by C60.Each molecule is composed of groups of carbon atoms that are bonded to one another to form both hexagon 6 carbon atoms and pentagon 5 carbon atoms geometrical configuration . One such molecule shown is found to consist of 20 hexagons and 12 pentagons which are arrayed such that no two pentagons share a common side. The material composed of C60 (Fig- 4) atoms is known as Buckminsterfullerene.



Fig1 Armchair carbonnanotube



Fig2 Zig Zag carbon nanotube



Fig3Chiral carbon nanotube





## **3.** STUDY OF PROPERTIES OF CARBON NANO TUBE AND ITS APPLICATION

Carbon Nano tubes are the strongest and stiffest materials, these carbon nanotubes having largest tensile strength and elastic modulus. This strength results from the covalent sp<sup>2</sup> bonds formed between individual carbon atoms and weak vandar wall force of attraction between adjacent walls of carbon Nano tube. The Young's modulus value of single walled nanotubes is 1.8 Tpa. Theoretically the Young's modulus of single walled carbon nanotube depends on size and chirality ranging from 1.22 Tpa to 1.26Tpa.Thermal conductivity is the function of their chirality, the degree of twist as well as their diameter. Some types of armchair structure carbon nanotube conduct better than the carbon nanotube structures. The resistivity of single wall carbon Nano tube is of the order of  $10^{-4}$  ohm cm at 27'c. Single walled Nano tube current densities  $10^{-15}$  A/cm2.The temperature stability of carbon nanotubes is established to be up to 2800 degrees Celsius in vacuum and about 750 degrees Celsius in air. Carbon Nano tube acts as superconductor below 20°K .The carbon nano tube has large surface area and high absorbency. This property of carbon nano tube make the carbon nano tube an important element for filtration in air ,gas and water. Now Charcoal is replaced by carbon nanotube in ultra-high purity application. Carbon nanotubes also known as Bucky tubes having important electrical conductivity, heat conductivity and mechanical, optical properties. Carbon Nano tube are the best electron field-emitter. Carbon Nano tubes are polymers of pure carbon and by using the chemistry of carbon can be reacted and manipulated. Several important properties of carbon nanotube make them important for various applications. Waterproof tear-resistant cloth fibers. In concret carbon nanotube increase the tensile strength, and halt crack propagation Stronger and lighter tennis rackets, bike parts, golf balls, golf clubs, golf shaft and baseball. Bucky paper which is a thin sheet made from nanotubes that are 250 times stronger than steel and ten times lighter and used as a heat sink for chipboards, a backlight for liquid crystal display screens and as a faraday cage to protect electrical devices and aero planes. Carbon Nano tube are also used in developing

transparent, electrically conductive films to replace indium tin oxide. Carbon Nano tube films are more mechanically robust then indium tin oxide films, this property make them ideal for touch screens and flexible displays. Nanotube films use in displays for cell phones, computers and automatic money transfer machines. Carbon Nano tubes are used in place of tungsten filaments in incandescent lamps. Nanotubes can replace Indium tin oxide in solar cells to act as a transparent conductive film in solar cells to allow light to pass to the active layers and generate photocurrent. Nanotubes have been shown to be superconducting at low temperatures. Nanotubes, when bound to plates of capacitors increase the surface area and thus increase energy storage ability. Nano tubes are used in designing extremely fine electron guns. This fine electron gun which could be used as cathode ray tubes in thin highbrightness low-energy low-weight displays. This type of display would consist of a group of many tiny cathode ray tubes, each providing the electrons to hit the phosphor of one pixel, instead of having one giant cathode ray tube. These displays are known as field emission displays. Nanotube membranes are used for filtering carbon dioxide from power plant emissions. Nanotubes filled with biological molecules, has the applications in biotechnology. Carbon nanotube can used for hydrogen storage. They have the potential to store between 4.2 and 65% hydrogen by weight. Nanotube membranes have been developed for use in filtration. This technique of using carbon nanotube as filtration will reduce desalination costs by 75%. The tubes are so thin that small impurities in water can be filtered. Carbon nano tube is use for design fastest oscillators having frequency more than 50 Giga hertz. Liquid in carbon nanotube flows up to five orders of magnitude faster than predicted by classical fluid dynamics .Carbon nano tube are Smoother than Teflon and can be used as waterproofs.

# 4. CONCLUSION:

The study of this paper is analyzing various geometry of carbon nanotubes. Carbon Nano tubes are widely used in all branches of science and engineering. This paper is also explaining mechanical and electrical properties of carbon Nano tube. Application of Carbon nano-tubes is inventive and innovative in various segment of science and engineering (electrical chemical science and biomedical sciences).of carbon nanotube in various fields.

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# Scaffolding: Language -Engineering for Socio-Personal Development

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# Abstract

The theory of language and socio-cultural approach support each other's perspectives in making language learning a deep 'social event'. This paper highlights theoretical construct by Lev Vyogotsky in relation to the nature of learning and registers of language by Michel Holliday. Pauline Gibbons developed theory based on the same foundation that is "scaffolding language and scaffolding learning". Language Scaffolding is a support which provides temporary framework that supports learners during the construction of content knowledge. "Scaffolding—in its more usual sense—is a temporary structure that is often put up in the process of learning" .Scaffolding helps learner through the curriculum Cycle. Curriculum cycle has following stages:

Stage 1: Building field, Stage 2: Modelling the text. Stage 3: Joint construction, Stage 4: Independent writing.

How to decode myth of writing, genre approach, and explicit teaching to create innovative space for every learner in classroom is the important facet of this paper.

# 1. Scaffolding: Theoretical Grounds

Language learning and language teaching are complex areas of study as language operates on two different dimensions. On one level, it is language *per se* and on another, it serves as scaffolding to learning itself. Michael Halliday articulates this rather well in his work on the Systemic Function of Linguistics: "...language is involved in almost everything we do, and whenever we use language there is a context, or to be more precise, two kinds of context. Firstly, there is a context of culture: speakers within a culture share particular assumptions and expectations, so that they are able to take for granted the ways in which things are done" [1]

Lev Vyogotsky, the Russian psychologist, who had a significant influence on western education, has a perspective that further clarifies the significance of language in the process of human development and learning. He described learning as being embedded within social events and occurring as a child interacts with people, objects, and events in the environment. This suggests that human development is a social event, and completely depends on social interactions.

Some of the ideas and strategies that support development and fall under the umbrella of socio-cultural approach and language learning are:

- Collaborative approach
- Scaffolding
- Making meaning Explicit
- Learning new registers
- Integrating language and content
- Social view of teaching and learning: Freire's Banking Model

2. What is Scaffolding: A historic perspective

The term scaffolding was first used by Woods, Bruner, and Ross (1976). Scaffolding is a support, such as the temporary framework that supports workers during the construction of a building. "Scaffolding—in its more usual sense—is a temporary structure that is often put up in process of constructing a building." [1] Scaffolding is a teaching method which Burner (1978) describes as: The step taken to reduce the degree of freedom in carrying out some tasks so that the child can concentrate on difficult skills she is in the process of acquiring. Scaffolding is temporary but essential, nature of the mentor's assistance" in supporting the learner to carry out tasks successfully (Maybin, Mercer, and Stierer (1992). Rogoff defines it thus: "As it relates to intelligent behaviour, scaffolding refers to the supportive situations adult create to help children extend

current skills and knowledge to a higher level of competence [3]

Gibbons further mentions in the book, "Scaffolding language scaffolding learning," that scaffolding is not just a word for HELP—it is a special kind of help. It assist learner to move towards new skills, concepts, or levels of understanding. Scaffolding is the temporary assistance by which a teacher helps a learner to know how to do something, so that the learner will later be able to complete a similar task alone.

Scaffolding is future oriented. Vygotsky says that what a child can do with support today, she or he can do alone tomorrow and these kinds of adult (teacher) support helps children to learn and at the same time it speeds up their development in the zone of proximal development.

"Learners need to be engaged with authentic and cognitive challenging learning tasks; it is the nature of the support support that is responsive to the particular demands made on children learning through medium of a second language—that is critical for success." [1]Thus, scaffolding helps learners to sense, understand, participate, and collaborate the process of learning. With the help of teachers, learners jointly construct/develop their own meanings and performance.

# 3. Scaffolding and classroom/teaching practice

Language learning develops and grows through five key skills, namely reading, writing, speaking, listening, and thinking. Sensing and understanding are also very important factors in learning or we could also say that in language learning, our five senses and their right kind of coordination plays a very important role. In a sense, contexts of culture and situations account for about 80% of role in the actual process of learning, while grammar rules and words account for the remaining 20%.

Scaffolding for each pillar of language learning is important. Let's choose one desired linguistic skill and see how scaffolding works...

# 4. Writing skills and scaffolding

The teacher needs to remember the following things, so that s/he can use more consciousness/awareness in the teaching process. In "Scaffolding language, scaffolding learning," the chapter, "Learning to write in second language," is an important chapter and it is very helpful to improve instructional strategies and further our understanding about how scaffolding can be used in language classrooms, especially for teaching writing skills. There are some important features of this chapter which tells how the use scaffolding in following sections is very important. The final section is about curriculum cycle which practically helps teachers to design teaching/instructions Text/ writing



## 5. Decoding process

Great writers:

- They think about what to write and create an outline before they begin writing

-They understand that writing is a recurring process- which is composed of revising and editing in all the stages of the writing process

- They anticipate readers' problem- They understand how to organize ideas and the writing of the text as a whole

-They focus on the primary mechanism of writing

-They balance between content (thoughts) and language

#### A genre approach to teaching writing

-Different genre: Essay, Poem, Novel, Story etc.

-Different language/time for different form

-Use commercial and academic language

-Genre: specific purpose, structure, linguistic features etc.

- Different time and space understanding form

#### Explicit teaching about writing

-process approach ~ put learner at the center of the learning process

-meaning is more important than form

-interactive and interesting setting

-how language is used in specific purpose

-Explicit teaching is related to reallife use, so that student understand about language- to develop own writing context.

#### The Curriculum Cycle:

Stage 1: Building field:

Background info, primary content, activities related to writing

Stage 2: Modeling the text:

Get together with purpose, structure, linguistics, and formfunction Stage 3: Joint construction:

Student & teacher writing together

Stage 4: Independent writing:

Student writing

## 6. Limitations/challenges and remedies

While using the actual process of scaffolding, we mostly encounter with following limitation and challenges:

- a) Large number of students: it is very difficult to interact with each student but group scaffolding is the way out.
- b) Multicultural classroom: Teacher needs more awareness about various cultures and different interactive modes.
- c) Time factor: Scaffolding is a time consuming process; learners demands a lot of time and attention which is impossible in contemporary big classrooms.
- Teacher cantered: Scaffolding is slightly teacher centered teaching and learners' needs should not be ignored but taken care off in this process.
- e) Teacher's readiness is very important. Scaffolding is not just depending on teacher's content knowledge but how teacher understands the psychology of the learner, problem solving skills, and student's academic data/observation.

## 7.1 Technical aspect

Language learning is not a simple linear process. It involves the ongoing development of skills for a range of purposes. Scaffolding sees this development as largely the result of the

#### 1. Building Field

- Building knowledge of the topic
- Activity to involvement of learner
- Collaboration: Sharing and listening, notetaking, reading.
- Authentic communication
- Learn to use subject-specific language
- Different aspects of the topic
- Research
- Library skills or specific info development
- Technological aspect to topic
- Bridging between reality to classroom
- Practice and introduce grammar structures to content development

#### 4. Independent Writing

- Students will write their own text
- Individually or in pair
- Doing first draft
- Self editing
- Discussing draft with friends
- Producing and sharing or displaying

Fig 6.1 : Curriculum Cycle

# 7. Conclusion:

#### 1. Modelling the Text

- Build up students understanding to purpose, overall structure and language features
- Model text: commercially produced, teacherwritten
- Introduce some Meta-language or content to talk and think about it
- Deep meditation on the content
- Text reconstruction
- Use a dictogloss

## 3. Joint Construction

- Write and think with learner
- Discuss overall structure
- Suggest more vocabulary
- Alternate ways to wording
- Work on mistakes, spellings, punctuations etc.
- Model the process of writing
- Illustrate process of composing so that they will independently write later

social context and interaction in which learning occurs. Scaffolding is a thinking-hat which basically engages teacher and students both to reconstruct the knowledge.Not just language learning but any subject area can be taught and learnt by the scaffolding theory. This theory is itself a vista to understand hidden dimension of totality. To understand the total one must understand its hidden aspects; we can see it through the big idea (total) and its smallest aspects or in their co- relations. Complexity of big idea can be converted (decoded) into many small ideas. Later after decoding of this big idea, teacher and learner collaboratively encode the same idea again with their experience and association with the knowledge.

#### 7.2 Philosophical aspect

Scaffolding is a very powerful teaching technique. It helps teachers to understand what teaching is all about. A complete and humble practice." understanding about student and scaffolding, proper planning of scaffolding, variations in scaffolding style, mastery over content knowledge and well-designed teaching goals help teachers in this process. All these ideas are possible through theoretical understanding and rigorous practice.

However, we need to understand that "True teaching is not just about techniques." It is a true urge, passion, love and a social need that shapes/creates a true form (teaching) and it's an authentic

A strong passion and the understandings of our life's quests, directs us to the right paths on our life journey. True teaching is derived through these mystique inspirations and continues thinking and then naturally teachers touch new horizons of student-learning and student-teacher relationships. Scaffolding, as a technique, never exists alone; it co-exists with learners' true needs and a humble behavior of a teacher-who *really* wants to teach and leads their students to the mysticism of language learning and knowledge. Scaffolding really helps teachers explore learner's world and it really transforms the *teaching event* into an intensely spiritual experience.

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# CHARACTERIZATION OF CYLINDRICAL OPTICAL NANO ANTENNA BY MESH ANALYSIS

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# ABSTRACT

Present research paper "CHARACTERIZATION OF CYLINDRICAL OPTICAL NANO ANTENNA BY MESH ANALYSIS" is the study of optical nano antenna which works in the Tera Hz frequency (445THZ) range. This research paper is focused to analyze the distribution of fields in surrounding of nano antenna. At the same time present paper also focused on enhanced field in confined space between nano cylinder and dielectric medium with the help of mesh electric field, mesh magnetic field, current field density and smith chart of electromagnetic wave.

# Key words

Optical nano antenna, mesh field and enhanced field.

# 1. INTRODUCTION

Communication system is a most important segment of the modern society. Antennas are important element of communication system. The present practical working antennas dimensions are in centimeters, meters and inches. It's working in frequency range from kilohertz to gigahertz. The optical nano antennas or detectors dimensions are in nano scale and its frequency range is terahertz .Therefore the optical nano antennas or detectors are most efficient and suitable comparative to the practical working antennas. This study of optical nano antenna is an important contribution of further development of latest science and technology.

# 2 DESIGN OF GOLD CYLINDRICAL NANO ANTENNA

The optical Nano - antenna is design by a gold cylinder of nano - scale of diameter (215nm) is place at the co-ordinate (0,0,1)which is mention in fig-.1This gold nano scale cylinder enclosed by a rectangular space of dimension  $(1\times1\times2)m^3$  with isotropic medium of air ,its face centre placed at the co – ordinate (0,0,0). The separation is 1nm between gold nano - scale cylinder and rectangular isotropic air medium by a rectangular vacuumed space which is depicted in the fig -1 &2.

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Fig.1



## Fig 2

The plane Y-Z of rectangular space is perfect electric field design as like as in fig -3



The X-Z plane of rectangular space is perfect magnetic field like as fig- 4



Fig.4

The radiation plane is define X-Y in rectangular space as given fig – .5  $\,$ 



Fig 5

The limp port is arranged for excitation along Y- axis which is given in fig -.6



Fig 6

# 3. MESH ANALYSES

Mesh analysis's of optical nano antenna is an visualization of electric field magnetic field and surface current density of electromagnetic wave surrounding of nano antenna or confined space which is emitted by nano antenna.

# **3.1** Studies of mesh plots of conical optical nano antenna

# 3.1.1 Mesh plot of Electric Field

The mesh of electric field of conical optical nano antenna is plotted in fig- no 7. The geometry of the mesh of electric field are base joint trihedral. These values of electric field network lies the value of electric field  $1.3554 \times e^{+004}$  to 0. The enhanced electric field is maximum shown with red colour, mediocre is yellow and minimum with green & blue colour.



Fig 7 Mesh plot of Electric Field Intensity of Optical Cylindrical Nano Antenna

# 3.1.2 Mesh plot of Magnetic Field

The mesh plot of magnetic field of spherical optical nano antenna is plotted in fig-8. The enhanced magnetic field on outer boundary surface of nano antenna are depicted in term of color in fig 8. The geometry of magnetic field network of mesh are base connected tetra header. The value of magnetic field lines from  $2.2108e^{+002}$  to  $1.1430e^{+000}$ .



#### Fig 8 Mesh plot of Magnetic Field Intensity of Optical Cylindrical Nano Antenna

# 3.1.3 Mesh plot of Surface Current Density

The surface current density of conical optical nano antenna is plotted in fig -9. The geometry of enhanced surface current density networks are base connected tetrahedral. The value of surface current density lie1.7833e  $^{+001}$  to3.7724e  $^{-001}$ .The red



Fig 9 Mesh plot of Electric Current Density of Optical Cylindrical Nano Antenna

# 4. Study of Smith Chart of Cylindrical Optical Nano Antenna

The smith chart of cylindrical optical nano antenna is shown in fig no-10 .The result gives value of Rx=- 2.089-j 2.023 , GB = -0.206+j 0.239 and VSWR= 4.313. This result gives reflected power percentage being 28.9% making the total loss of transmitted signal being -3.10 db, which concludes total normalized transmitted power being approx 97%.



Fig10: Smith Chart Of Cylindrical Optical Nano Antenna

# 5. CONCLUSION

This research of cylindrical nano antenna is examined the performance of the designed cylindrical optical nano antenna with the aspect of mesh field and smith chart. The polarization pattern shows uniform distribution in azimuth plane overelevation plane that provide more capability of rotation of antenna in various direction. The result power or energy of radiation pattern are uniformly distributed at every angle with vswr= 4.313 demonstrating reflected power percentage being 29.9% making the total loss of transmitted signal being -5.88 db, which concludes total normalized transmitted power being approx 94.12% (from the concept of non-nano antenna). Plasmonic resonance is appearing in the form of the colour of mesh that show enhancement of fields.

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# SOME SUBORDINATION RESULTS OF CERTAIN SUBCLASSES OF ANALYTIC FUNCTIONS

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## ABSTRACT

The aim of this paper is to study the functions belonging to each of the subclasses  $P^*(\alpha)$  and  $Q^*(\alpha)$  of normalized analytic functions in open unit disk U =  $\{z: z \in C \text{ and } |z| < 1\}$ , to derive several subordination results involving the Hadamard product of the associated functions .A number of interesting consequences of some of these subordination results are also considers.

#### Keywords

Analytic functions, Univalent functions, convex functions, Subordination principle, Hadamard product, subordinating factor sequence.

# 1. INTRODUCTION, DEFINATIONS AND PRELIMINARIES

Let A denote the class of functions f(z) of the form

 $f(z) = z + \sum_{n=2}^{\infty} a_n z^n$ , (1.1) which are normalized and analytic in the open unit disk U={ $z: z \in C \text{ and } |z| < 1$ }

Let  $P(\alpha)$  be the subclass of A consisting of the functions f(z) which satisfies the inequality:

$$\operatorname{Re}\left\{\frac{zf'(z)}{f(z)}\right\} < \alpha \quad (z \in U)$$
(1.2)

And let  $Q(\alpha)$  be the subclass of A consisting of the functions f(z) which satisfies the inequality:

$$\operatorname{Re}\left\{1 + \frac{zf''(z)}{f'(z)}\right\} < \alpha \quad (z \in U)$$
(1.3)

For some  $\alpha(\alpha > 1)$ . Then we see that

$$f(z) \in P(\alpha)$$
 if and only if  $z f'(z) \in Q(\alpha)$  (1.4)

The classes  $P(\alpha)$  and  $Q(\alpha)$  were introduced and studied by Owa et al.([1] and[2]) In fact, for  $1 < \alpha \le 4/3$  these classes were investigated earlier by Uralegaddi et al.([3] and [4])

# Coefficient inequalities associated with the function classes $P(\alpha)$ and $Q(\alpha)$ :

#### Theorem A(Nishiwaki and Owa[4])

If  $f \in A$  given by (1.1), satisfies the coefficient inequality

$$\sum_{n=2}^{\infty} \left[ \left( n-k \right) + \left| n+k-2\alpha \right| \left| a_n \right| \le 2(\alpha-1) \quad (1.5)$$
  
(\$\alpha > 1; 0 \le k \le 1\$) then f \in P(\$\alpha\$)

#### Theorem A (Nishiwaki and Owa [4])

If  $f \in A$  given by (1.1), satisfies the coefficient inequality

$$\sum_{n=2}^{\infty} n[(n-k) + \left| n + k - 2\alpha \right|] \left| a_n \right| \le 2(\alpha - 1) \quad (1.6)$$

 $(\alpha \succ 1; 0 \le k \le 1)$  then  $f \in Q(\alpha)$  from theorem A and

theorem B, now introduce the subclasses

$$\mathbf{P}^{*}(\alpha) \subset P(\alpha) \text{ and } \mathbf{Q}^{*}(\alpha) \subset Q(\alpha)$$
 (1.7)

which consist of functions  $f \in A$  whose Taylor-Maclaurin

coefficients  $a_n$  satisfies the inequalities (1.5) and (1.6) respectively In proposed investigation of functions in the classes  $P^*(\alpha)$  and  $Q^*(\alpha)$ , I shall also make use of the following definitions and results.

#### **Definition 1**(Hadamard product)

If a function f is given by (1.1) and g is defined by

 $g(z) = z + \sum_{n=2}^{\infty} b_n z^n$  is in A ,then the Hadamard product of f(z) and g(z) is given by

$$(f*g)(z) = z + \sum_{n=2}^{\infty} a_n b_n z^n = (g*f)(z)$$

#### Definition 2 (subordinate principle)

For two functions f and g analytic in U, we say that the function f(z) is subordinate to g(z) in U and write

 $f \prec g \text{ or } f(z) \prec g(z) \quad (z \in U)$ 

if there exists a Schwarz function  $\omega(z)$ , analytic in U With

$$\omega(0) = 0 \quad and \quad |\omega(z)| < 1 \quad (z \in U)$$

Such that  $f(z) = g((\omega)) \quad (z \in U)$ 

In particular, if the function g is univalent in U, the above subordination is equivalent to

$$f(0) = g(0)$$
 and  $f(U) \subset g(U)$ 

**Definition 3**(Subordination factor sequence)

A sequence  $\{b_n\}_{n=1}^{\infty}$  of complex numbers is said to be subordinating factor sequence if, whenever f(z) of the form (1.1) is analytic ,univalent and convex in U, we have the subordination is ginen by

$$\sum_{n=1}^{\infty} a_n b_n z^n \prec f(z) \ (z \in \mathbf{U}; a_1 = 1)$$
(1.8)

**Theorem C** The sequence  $\{b_n\}_{n=1}^{\infty}$  is a subordinating factor sequence if and only if

$$\mathbf{R}\left(1+2\sum_{n=1}^{\infty}b_{n}z^{n}\right) \ge 0 \tag{1.9}$$

# **2. SUBORDINATION RESULTS FOR** THE CLASSES $P^*(\alpha)AND P(\alpha)$

**Theorem 1.**Let the function f(z) defined by (1.1) be in the class  $P^*(\alpha)$ . Also let S denote the familiar class of functions  $f \in A$  which are also univalent and convex in U. Then

$$\frac{(2-k) + |2+k-2\alpha|}{2[(2\alpha-k) + |2+k-2\alpha|]} (f * g)(z) \prec g(z)$$
(2.1)

$$(z \in U; 0 \le K \le 1; \alpha > 1; g \in S)$$

And

$$R(f(z)) \succ - \frac{(2\alpha - k) + |2 + k - 2\alpha|}{(2 - k) + |2 + k - 2\alpha|}$$
 (z \epsilon U) (2.2)

The following constant factor in the subordination result (2.1)

$$\frac{(2-k) + |2+k-2\alpha|}{2[(2\alpha-k) + |2+k-2\alpha|]}$$
 cannot be replaced by larger one.

**Proof:** Let  $f(z) \in P^*(\alpha)$  and suppose that

$$g(z) = z + \sum_{n=2}^{\infty} c_n z^n \in S$$

Then we readily have

$$\frac{(2-k)+|2+k-2\alpha|}{2[(2\alpha-k)+|2+k-2\alpha|]}(f*g)(z)$$
(2.3)  
=
$$\frac{(2-k)+|2+k-2\alpha|}{2[(2\alpha-k)+|2+k-2\alpha|}(z+\sum_{n=2}^{\infty}c_{n}a_{n}z^{n})$$

Thus, by definition 3, the subordination result (2.1) will hold true if

$$\left\{\frac{(2-k)+|2+k-2\alpha|}{2[(2\alpha-k)+|2+k-2\alpha|]}a_{n}\right\}_{n=1}^{\infty}$$
(2.4)

is a subordinating factor sequence (with  $a_1=1$ )In view of theorem C, this is equivalent to the following inequality;

$$\mathbb{R}\left(1+\sum_{n=1}^{\infty}\frac{(2-k)+\left|2+k-2\alpha\right|}{(2\alpha-k)+\left|2+k-2\alpha\right|}a_{n}z^{n}\right)\succ0$$
(2.5)

Now, since  $(n - k) + |n + k - 2\alpha|$  is increasing of n, we have

$$R\left(1 + \sum_{n=1}^{\infty} \frac{(2-k) + |2+k-2\alpha|}{(2\alpha-k) + |2+k-2\alpha|} a_n z^n\right)$$
  
=  $R\left(1 + \frac{(2-k) + |2+k-2\alpha|}{(2\alpha-k) + |2+k-2\alpha|} Z + \frac{1}{(2\alpha-k) + |2+k-2\alpha|} \sum_{n=2}^{\infty} (2-k) + |2+k-2\alpha| a_n z^n\right)$ 

$$\geq 1 - \frac{(2-k) + |2+k-2\alpha|}{(2\alpha-k) + |2+k-2\alpha|} r$$
  
$$- \frac{1}{(2\alpha-k) + |2+k-2\alpha|} \sum_{n=2}^{\infty} (2-k) + |2+k-2\alpha| |a_n| r^n$$
  
$$\geq 1 - \frac{(2-k) + |2+k-2\alpha|}{(2\alpha-k) + |2+k-2\alpha|} r - \frac{2(\alpha-1)}{(2\alpha-k) + |2+k-2\alpha|} r$$
  
$$\geq 0 \ (|z| = r \prec 1)$$
(2.6)

Where I have also made use of the assertion (1.5) of theorem A.This evidently proves the inequality (2.5), and hence also the subordination result (2.1)asserted by theorem1.The inequality (2.2) follows from (2.1)upon setting

$$g(z) = \frac{z}{1-z} = z + \sum_{n=2}^{\infty} z^n \in S$$
(2.7)

Next we consider the function

$$q(z) = z - \frac{2(\alpha - 1)}{(2 - K) + |2 + K - 2\alpha|} Z^2$$
(2.8)

 $(0 \le k \le 1; \alpha > 1)$  which is a member of the class  $P^*(\alpha)$  then by using (2.1), we have

$$\frac{(2-k) + |2+k-2\alpha|}{2[(2\alpha-k) + |2+k-2\alpha|]}q(z) \prec \frac{z}{1-z}$$
(2.9)

It is easily verified for the function q(z) defined by (2.7) that

$$\min\left\{R\left(\frac{(2-k)+\left|2+k-2\alpha\right|}{2[(2\alpha-k)+\left|2+k-2\alpha\right|]}q(z)\right)\right\} = -\frac{1}{2} \quad (2.10)$$

Which complete the proof of the theorem 1.

**Corollary 1.**Let the function f(z) defined by (1.1)be in the class of  $P(\alpha)$ . Then the assertions (2.1)and (2.2) of the theorem 1 hold true. Furthermore, the following constant factor

$$\frac{(2-k) + \left|2+k-2\alpha\right|}{2[(2\alpha-k) + \left|2+k-2\alpha\right|]}$$

Cannot be replaced by larger one. BY taking k=1 and  $1 \le \alpha \le \frac{3}{2}$  in corollary 1, I obtained.

**Corollary 2.** Let the function f(z) defined by (1.1) be in the class of  $P(\alpha)$ . Then

$$\left(1 - \frac{1}{2}\alpha\right) \left(f * g\right)(z) \prec g(z)$$

$$\left(z \in U; 1 \prec \alpha \leq \frac{3}{2}; g \in S\right)$$

$$(2.11)$$

And

$$R(f(z)) \succ -\frac{1}{2-\alpha} \quad (z \in \mathbf{U}) \tag{2.12}$$

The constant factor  $1 - \frac{1}{2} \propto$  in the subordination result (2.11) cannot be replaced by a larger one.

# **3. SUBORDINATION RESULTS FOR** THE CLASSES $Q^*(\alpha)AND Q(\alpha)$ .

Our proof of Theorem 2 below is much akin to that of Theorem1. Here we make use of Theorem B in place of Theorem A.

**Theorem 2.**Let the function f(z) defined by (1.1) be in the class  $Q^*(\alpha)$ .then

$$\frac{(2-k)+|2+k-2\alpha|}{2[(\alpha+1-k)+|2+k-2\alpha|]}(f*g)(z) \prec g(z)$$
(3.1)

$$(z \in U; 0 \le K \le 1; \alpha > 1; g \in S)$$

And

$$R(f(z)) \succ -\frac{(\alpha + 1 - k) + |2 + k - 2\alpha|}{(2 - k) + |2 + k - 2\alpha|} \quad (z \in U)$$
(3.2)

The following constant factor in the subordination result (3.1)

$$\frac{(2-k) + |2+k-2\alpha|}{2[(\alpha+1-k) + |2+k-2\alpha|]}$$

Cannot be replaced by a larger one.

**Corollary 3.**Let the function f(z) defined by (1.1) be in the class  $Q(\alpha)$ . Then the assertions (3.1) and (3.2) of the theorem 2. hold true .Furthermore the following constant factor

$$\frac{(2-k)+\left|2+k-2\alpha\right|}{2[(\alpha+1-k)+\left|2+k-2\alpha\right|]}$$

Cannot be replaced by a larger one.

By letting K=1 and  $1 < \alpha \le \frac{3}{2}$  in corollary 3, we obtain the following further consequence of theorem 2.

**Corollary 4.**Let the function f(z) defined by (1.1) be in the class  $Q(\alpha)$ .Then

$$\frac{2-\alpha}{2(3-\alpha)}(f^* g)(z) \prec g(z)$$

$$(z \in U; 1 < \alpha \le \frac{3}{2}; g \in S)$$
And  $R(f(z)) > -\frac{3-\alpha}{2-\alpha} \quad (z \in U)$ 

$$(3.4)$$

The following constant factor in the subordination result (3.3)

 $\frac{2-\alpha}{2(3-\alpha)}$  Cannot be replaced by larger one.

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# SITUATING WOMEN IN PLAYS OF VIJAY

# TENDULKAR

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# ABSTRACT

Contemporary Indian drama, digressing from established and European models, is exploratory and creative regarding thematic and specialized qualities. It is not an off spring of any particular custom and it has established the framework of a notable convention in the historical backdrop of world drama piece by reinvestigating history, legend, myth, religion and society love with connection to contemporary socio-political issues. Girish Karnad, in the limit of essayist, executive and on-screen character considerably helped, improved the custom of Indian English theatre. Vijay Tendulkar had written plays keeping in mind the Indian traditional women and now we can realise that he was true even in some cases of women in so called Modern Indian community. Most recent illustrative overview can be the case of Mrs. Sunanda Pushkar. In this paper I have presented attitude of Vijay Tendulkar towards women life sketch.

#### 6. INTRODUCTION

Born in 1828, Vijay Tendulkar started his vocation as a journalist. Heading the Vanguard of the cutting edge Marathi Theatre, Vijay Tendulkar symbolises the new cognizance and endeavors of Indian dramatists of the century to portray the miseries, suffocations and yells of man, concentrating on the middle class society. In all his plays, he harps upon the subject of confinement of the singular and his showdown with the unfriendly surroundings. Impacted by Artaud, Tendulkar, relates the issue of anguish to the subject of savagery in the majority of his plays. He doesn't think about the event of human savagery as something evil or sickening in to the extent that it is in note in human nature.

In the plays Silence! The Court Is In Session (1968), the theme of oppression dominates. Sakharam Binder (1972) is a study in human violence amounted to powerful dramatic statement. Kamala (1982) is written on the lines of naturalistic institution. Kamala is a survey of connubial position in addition to study in the theme of exploitation. Vijay Tendulkar was associated with New Theatrical Movement in Maharashtra. He acquaints with an illusory actuality in which the reality of life acquires a sharp focused character having rare dramatic power. Vijay Tendulkar happens to be a standout amongst the most productive Indian play wrights who has advanced the Indian drama and theatre by imagining the differed issues of local life in Maharashtra. He effectively wanders in disclosing the social turpitude and the holocaust in which the fain diversions of the fairer sex are practically strangled. The way he excited theatre through his provocative investigations of ethics, force and roughness, merits an overwhelming applause! He truly endeavored to study, investigate and accept "violence" as the common marvel and accordingly the main driver of all issues of life from his theaters. (Bharan, N.S.: 1999)

Tendulkar effectively gives the readers an agreeable knowledge into the lives of his unique characters and inspires sympathy for every one of them, as they appear to be casualties of their own trappings. He additionally gives an abundantly required social uncover of brutality, intrinsic in man, since time immemorial. Assuming that India passed through the rigours of parcel, it additionally exhaust persistently the tumulus political change that compass crosswise over decades. All these appear to have been profoundly settled in the mind of the normal human creatures. In the event, that "Violence" is the pivotal word in the regular setting, Tendulkar's plays are loaded with roughness. It isn't as though normal man is not mindful of roughness around , however Tendulkar's plays shake them out of their trance of ongoing acknowledgement of it and make them have the stunning acknowledgment that the picture is far bleak than they could have figured it. (Naik, M.K.:1982)

Women play a focal part in Tendulkar's plays. His female characters are predominantly from the more level and middle classes: housewives, educators, special ladies, girls, film additional items, slaves, and servants. These women carry mixed bag of social station as well as a wide go of feelings into the plays: " from the incredibly naïve to the cunning, from the moldable to the willful, from the moderate to the disobedient, from the selfless to the grasping."

## 7. ANALYSIS OF PLAYS

The most naturalistic play, Vijay Tendulkar's Sakharam Binder (1972) spins around its focal character Sakharam,

a book folio and Brahmin by caste, presents contrast to the general beginning of a piece of his neighborhood. He moreover abuses women, tortured them and treats them as straightforward as an object of longing, both physical and mental. He doesn't confide in the establishment of marriage. So he remains unmarried. He offered asylum to unprotected and left women in the social request, not with a view to improve their status however to undertaking them by fulfilling his sexual wanting. Wine and woman are his head attractions. He has his standards of the preoccupation with remarkable moral code which he envisions that his short favor woman will keep. He advocates all his enactments through cases of cutting edge, unusual considering, and concocts empty contentions implied indeed to oppress women. (Debnita Chakrabarti : 2008) Paradoxically, a portion of the women which Sakharam had oppressed get tied up with his contentions and all the while additionally gravely need flexibility from their oppression.

An alternate grasping adventure of brutality is Silence! The Court is in Session (Shantata : Court Chaalu Aahe !) which carries into center the mental torture that is constrained onto an adolescent and autonomous woman, Leela Benare , who set out to resist the patriarchal power and establishment accordingly carrying upon herself the societal savagery that devastates her at the close. The play manages the most dubious issue of now is the ideal time female child murder. The story is rough and inciting since not just it manages the misuse confronted by the female hero Benare by her supposed beloveds additionally manages the social consciousness of the indecencies of female child murder.

Silence! The Court is in Session introduces the course of a counterfeit trial where Benare, as the blamed, is striven for a nonexistent wrongdoing of child murder. Despite the fact that the trial is led in a diversion like and nongenuine manner, it uncovered the past life of Benare and validates the inclination of prevalence of men over women in Indian society. The play Silence! The court is in Session manages the mental state of taught woman in a generally male commanded Indian Society. The purported social laborers like Kashikar and his troupe show social concern for social change. They are known for their twofold guidelines state of mind. Tendulkar has communicated his state of mind towards such individuals in the society. He struck unexpectedly and satirically all around the play.

In Silence! Court is in Session, he guides his feedback against the fraudulent male mentality in Indian society where a woman is much smothered and any little endeavor by a woman for her flexibility is profoundly decayed.

An alternate play Kamala was enlivened by a genuine occurrence - the Indian Express uncover by Ashwin

Sarin, who really purchased a young lady from a rural flesh market and displayed at a question and answer session. The focal character of the play is a selfish News Reporter, Jai Singh Jadhav, who treats the woman he has acquired from the rural flesh market as a protest that can obtain him advancement in his employment and invalidation in his expert life. Jai Singh purchases, Kamala, an Adivasi woman, at the tissue business of Luhardaya past Ranchi for two hundred and fifty rupees. Jai Singh's excitement is regulated towards sheer sentimentality. He makes sentimentality at the express of Kamla. Jai Singh Jadhav tosses Kamala as a shelter for woman and washes off his hands for his wellbeing, after she stops further bolstering be a good fortune to him. Jai Singh Jadhav abuses Kamala as well as his wife, Sarita. It is through Sarita, Tendulkar uncovered the Chanvinism natural in the cutting edge male who accepts himself to be liberal minded. Jai Singh- through his medication of Kamala, makes Sarita understand that she is likewise a slave- a negligible stunning fortified labourer to him. (P.D. Dubbe: 1993-1994)

# 8. EXPLOITATION OF WOMEN IN INDIA

In the Indian progressed country is brisk climbing as a worldwide power however for half of its people, the women the country over, fight to live with deference moves ahead. Women, paying little heed to their class, standing and informational status, are not secured. In the present day social request women have been the setbacks of misuses since long time in dissimilar fields all around their life both physically, socially, judiciously and financially. There are some explanations behind sexual and what's more moral sick utilization which are consistently highlighted by the media in Indian breakthrough social request, and an impressive measure of those moreover remains unexplored.

Despite the truth, such ruthlessness against women, sexual bullying, and abuse to women is not of later starting, it accompany is discovered ever. Women are facing issues in every loop of life if work, access to social protection or property rights. India is fast making however women are in India being divided. The declining sex extent in India sufficiently delineates the separation showed towards women at the period of origination. They are losses of wrongdoing guided especially at them, ambush, snatching and grabbing, settlement related law violations, strike, sexual incitement, eve-teasing. It is comprehended that the long run incomparable nature of male over female in all gratefulness in the patriarchal social request in India is significantly responsible for catching the fortifying of women. Women are, probably trafficked for sex, incitement at working situations and tortured in family and social request. In India, segregation towards women is from very much a while and has affected women over their lives. Regardless of the way that the constitution

has permitted comparable rights to women yet sex inconsistencies remains.

In today's world we are satisfied to recognize the value that has been distinguished between age, sexual introduction, sex and race. Women are managed as equivalents with men. Today, women are liberated from their acknowledged parts as housewives. In the making countries, many females are obliged into prostitution for the sole explanation behind benefitting men. My work will have an in significance study into the psychophysical a piece of women's technique towards women happening into sexual ill-use and backings by male ruled social request in Indian association.

## 9. CONCLUSION

Tendulkar is an inventive writer with a fine sensibility. He uncovered estrangement of up to date individual to contemporary governmental issues. He additionally uncovered men's predominance over women, his representation of clear and incognito roughness in human-creatures or more all his profound and tolerating cognizance of women's defenselessness in Indian social chain of importance. Tendulkar's focal concern is the relationship between singular and society. In play after play he has made viable presentation of the idle roughness and desire in middle class life, the ensuing destruction and the vital depression of man.

The greater part of his plays have regulate, coordinated association with actuality with an uncommon mixture of viciousness that is so much ubiquitous yet concealed in genuine lives of true individuals. A large portion of his plays bargain with the singular set against the setting of society and investigates the pressures between the two. His imagination has a kaleidoscopic quality heap potential and an incalculable number of shades. This multifaceted, towering virtuoso has investigated virtuoso the probabilities of the tragic class his essential territory of creation. His works will likewise have a gigantic effect on the delicate crisp personalities of the world wide enthusiastic readers.

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# Implementation Of Kaizen In Technical Education System

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ABSTRACT

Technical institute play a vital role for developing human resource. Who can build infrastructures, equipment, instruments, projects, ideas, concept, for the society and nation. Kaizen focuses on continuous improvement with zero investment. This paper highlights the effective process for improving educational causes and the value proposition for students. This philosophy can be implemented by principal, faculties, non-teaching staff and students at work place.

**Keywords:** Kaizen, Continuous Improvement, Technical Institute

# **1. INTRODUCTION**

Education is vital for the overall development of a person. It is the one of the most important contributors to the success in an individual's life. The impact of education will be both in the personal and professional life. By applying the knowledge in daily life one can reach new heights in life. If a society is filled with highly educated individuals, there will be room for adjustment of better living conditions. As a matter of fact, education is a continuous process where the information is processed and the resultant knowledge will be applied for the betterment of individual and society. Kaizen greatly aids the very purpose of education. By absorbing the Kaizen concepts right from the childhood, students will strive to achieve the best as they convert into adults.

#### 1.1 Kaizen

The word Kaizen refers to continuous improvement. It stems from two Japanese words "Kai" meaning "change" and "Zen" meaning "good". While competitive market requires individuals at all levels in the organization to think of methods to continuously improve the products and services, educational institutes should look for ways to improve the quality of education. Companies who are able to improve the value proposition often become the supplier Farhat Shaikh Mechanical Department, Mumbai University, VIVA Technology, Mumbai

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of choice among the customers. Continuous improvement in gaining importance among Technical Institute as a result of recent calls to improve the education in Technical Institute.

Kaizen means that improving the processing in any aspect of the business. This concept is a part of Total Quality management (TQM). It is used and applied in variety of businesses. That can be healthcare, tourism, educational institute, and banking and financial services etc. In this article an attempt has been made to focus on how kaizen strategy can be adopted in improving the Technical Institute. Kaizen is a system of continuous improvement in quality, technology, processes, company culture, productivity, safety and leadership. We look at Kaizen by answering three questions: What is Kaizen? What are the benefits of Kaizen? What do you need to do to get started using Kaizen principles?

#### **1.2 Kaizen in Education System**

It will be integral to the success of the student. Once a student and a school use to the Kaizen concept, there will be room for greater progress and overall prosperity. By applying Kaizen to the Institute curriculum, it is possible to figure out the outdated chapters and contents. It is possible to replace or add the textbooks as per the current generation's line of thinking. By undergoing this transformation process, the system will be refined. There will be elimination of wastage in all aspects. Students will get the best possible material than ever before.

Students will be able to implement new things by keeping the Kaizen concept in their mind. There will not be any clash or conflict in the thinking process. Teachers will get the opportunity to reconsider their teaching methodologies. There is the possibility to implement new ways of teaching whereby students will be able to grasp the teachings easily and they will be able to remember the concepts for ever. It is possible to review the way examinations are conducted. It is possible to frame exams in such a way that student's logical thinking and understanding power are traced in a better way. You will not treat students as mere memorizing machines. There will be room for generation of new ideas. The ideas that are useful in the best interests of the overall organization will be implemented without any hesitation. There will be continuous monitoring of the milestones that were achieved so far and remedial measures will be taken to streamline the process to achieve greater success through Kaizen in education.

# 2. BACKGROUND

Kaizen was created in Japan following World War II. The word Kaizen means "continuous improvement. Kaizen is a system that involves every employee - in this case from Principal to Peon (P2P). Everyone is encouraged to come up with small improvement suggestions on a regular basis. This is not one month or once a year activity. It is continuous. Japanese companies, such as Toyota and Canon, a total of 60 to 70 suggestions per employee per year are written down, shared and implemented. In most cases these are not ideas for major changes. Kaizen is based on making little changes on a regular basis: always improving productivity, safety and effectiveness while reducing waste. Suggestions are not limited to a specific area such as production or marketing. Kaizen is based on making changes anywhere that improvements can be made. The Kaizen philosophy is to "do it better, make it better, and improve because if we don't, we can't compete with those who do." Kaizen in Japan is a system of improvement that includes both home and business life. Kaizen even includes social activities. It is a concept that is applied in every aspect of a person's life. In business Kaizen encompasses many of the components of Japanese businesses that have been seen as a part of their success. Quality circles, automation, suggestion systems, just-intime delivery, Kanban and 5S are all included within the Kaizen system of running a business. Kaizen involves setting standards and then continually improving those standards. To support the higher standards Kaizen also involves providing the training, materials and supervision that is needed for employees to achieve the higher standards and maintain their ability to meet those standards on an on-going basis.

# 3.IMPROVEMENT IN TECHNICAL INSTITUTE

In order to understand the place of a Technical institute in the local knowledge and training industry, it is also necessary to look at three other sources of competition.

First, there are other Technical institute competing in the area for students, parental loyalty. Each has typical competitive features strong emphasis on qualifications of staff, easy access, strong co-operative programmes with local business, A Technical Institute wishing to understand its place needs to look at its own competitive advantages relative to those of other Technical Institutes.

Second, there is a need to look at the potential impact of new technology on the competitive position of the Institute. The presence of these technologies in the Institute can be a factor in determining competitive advantage.

Third, the Technical Institute needs to consider what threats or opportunities are posed by new entrants to the market for students and the provision of educational services.

While applying kaizen in Technical Institutes, it is essential that the organization be looked upon in two ways: (a) as an organization of people it is people and their creativity that make a difference to organizational effectiveness, most especially those who act in leadership roles within organizations. and (b) : as an organization involved in a great many of routine tasks, each of which can be improved. The first point productivity comes from people not things is important to realize in an age of materialism. A great many changes are being driven by technology and by decisions about curriculum materials. Yet each of these materially driven changes depends upon people to make them effective. Some excellent curriculum schemes, such as the careers material developed by the Technical Institutes fails because they lack ownership among those asked to use them. While minimum resources are required for effective teaching and learning, material resources do not explain any significant differences in Student performance. More significant is the climate and culture of the Technical Institute as expressed in the nature and quality of interpersonal relationships.

In each Technical Institute there are moments of truth critical moments at which the culture and values of the Technical Institute are expressed through the action of a professor or the Head Of Department or the Principal the Technical Institute. For students these moments of truth will include timetable changes, the return of assignments, transport arrangements and so on. For teachers, their moments of truth come from looking at supervision, from the marking loads at a particular time, from the interactions with students.

These moments the quality of the Technical Institute as experiences immediately available to the participant: it is a moment at which the truth about the nature of Technical Institute as an experience is real for the participant. The task of effective management is to manage these moments of truth. By seeking constant improvements in each of them it is possible to achieve significant gains in the quality of Technical Institute and effectiveness academic systems Indeed, it is by attending to just these moments that the most significant gains can be made. To make these two points clear, let us examine a typical moment of truth for a professor and a Student. At the end of each term a report card is written outlining the achievements of the Student. At one time, a report card contained simply a list of subjects, a grading, and a class position in relation to that subject. In more recent times, reporting has changed and more detailed and descriptive systems have emerged, mainly because of the development of profile reporting. In some Technical Institute, this reporting is now done using a combination of text and audio tapes with each professor contributing to a tape held by each student, with the idea that this makes the feed-back more personal and provides the professor with an opportunity of communicating the finish of their feedback more accurately. In addition, this makes the feedback available to concerned stake holder more thorough and has changed the use of time at follow-up parent-professor considerably. By looking at this moment of truth the linear reporting at the end of each term in a critical way, small improvements can be made constantly which should better express not just the achievement of the Student (or his or her failures) but also the meaning of these achievements for those with whom the student is working. Changing the routine actions in the Technical Institute and involving the creativity of people in doing so is more likely to produce significant changes for more people over time.

#### **4. KAIZEN IMPLEMENTATION**

The following pointers offer guidance for anyone thinking about implementing Kaizen in Technical Institutes.

- I. Decide upon a section of the Technical Institute, upon which Kaizen will be implemented.
- II. Decide upon a team leader for the team ensure this person has all the correct training.
- III. Bring the team together, and explain the theory behind Kaizen, let the team discuss problems in the workplace.
- IV. Get the team to discuss as many issues as they would wish to tackle, remember it does not have to be a single issue against which they should focus, several small issues are always Worthwhile looking at.
- V. Let the team decide which issues is going to be tackled.
- VI. Let the team decide how the issues will be measured how has the current issue been decided?
- VII. Information about the issue is gathered.
- VIII. Let the team, decide upon how to bring about the change to the workplace, is it going to be visually communicated? Verbally communicated?

Finally let the team decide upon how they will monitor the changes they bring, to see how successful they have been. The members of Kaizen need to agree on the

following methods to help usachieve goal of Technical Institutes.Everyone has a role, contributes, and speaks. Presentation will be visuals and interactive.

- 1. Be creative.
- 2. Be humorous.
- 3. Remain engaged.
- 4. Be logical, clear, and concise.

## 4.1 Environment for Kaizen

The purpose of team Kaizen is to prepare a 50 to 60 minutes presentation on theorists of Organizational Dynamic. To effectively accomplish this, Kaizen team will incorporate collective knowledge and understanding of group dynamics and adult learning principles, while contributing our individual strengths to our team. Team Kaizen decides to use the operating agreement drafted during our first meeting.

- 1.Optimistic 2.Fairness 3Courtesy 4.Fun 5.Flexible 6.Contribution 7.Empathy 8.Listening 9.RiskTaking 10.Prepared 11.FeedbackGive/Receive 12.Trust
- 13.Kaizen Attitude

Kaizen team will encourage each other to explore the areas they don't usually, like creating and managing conflict, taking risks and challenging ourselves, developing trust in each other and the group process, and improving Communication, listening and observation skills.

# 4.2 Maintenance, Innovation, and KAIZEN in Technical Institute

Three functions should happen simultaneously within any Technical Institute: Maintenance, Innovation, and KAIZEN. By maintenance, it refers to maintaining the current status, the procedures are set and the standards are implemented. By Innovation, it refer to breakthrough activities initiated by top management, buying new machines, new equipment, developing new markets, directing R&D, change of strategy etc. In the middle there is KAIZEN, small steps but continuing improvement. KAIZEN should be implemented by the lower/middle management, with the encouragement and direction of the top. The top management responsibility is to cultivate a

6<sup>th</sup> & 7<sup>th</sup> March, 2014

KAIZEN working climates and cultures in the Technical Institute.

#### 4.2.1 The Kaizen Attitude

Many observers consider kaizen-a philosophy of ongoing improvement involving everyone, from top managers to the lowest level worker-to be the single most important element in Japan's competitive success in manufacturing. The kaizen attitude helps to explain why Japanese firms are so adept at exploiting new technology, even when they are not its originator. Kaizen-driven firms do not suffer from "not invented here" syndrome. Ideas are not the exclusive preserve of R&D, corporate planning, or market research; every new idea is welcomed.

# 4.2.2 Kaizen and Audit Service in Management Technical Institute

A Technical Institute is a service organisation. It provides services to students, to parents, to the community and to the adults who work within it. Everyone has a 'customer' to whom they provide service. A professor provides services to students, parents. In order to examine the effectiveness of quality improvements, there is a need to establish baseline data for each service element. While coordination of such an audit is essential, it is equally essential that the data produced fully reflects the baseline standards actually experienced by clients. Involvement of Professors, students, parents and management in such an audit process can be very helpful and illuminating.

# **5. CONCLUSION**

By understanding and applying Kaizen properly will benefit educational institutions as it encourages meaningful dialog, facilitates a structured approach, Small improvements which are realized can add up to major benefits for the institute's improvements, which lead to changes in the institute's quality, encourages cross functional team work and identifies actions that will improve the course. Thus Kaizen ensure positive results without being a burden to the organization.

A programme for Technical Institute broads quality improvement, to be successful, has to engage each individual in the Technical Institute in some way. To do this, each unit within the Technical Institute should be asked to identify one role for which it has primary responsibility. For example, laboratory assistants can identify setting up experiments as a role; support staff can identify telephone calls from parents reporting absences as role; professor can identify marking assignments as a role, and so on. Each unit should then be asked to focus upon this one role and to develop ways of improving the experience of this role.

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# Nation Building by Human Resource Development through Kaizen

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# ABSTRACT

In present scenario, our country has progressed a lot in technology and other materialistic development. It is not hidden; everybody is facing turmoil on this earth. PEACE is being forced to be PIECES. Large numbers of degradation activities, knowingly or unknowingly, are being carried out by us. If these aspects are not taken care of, we may lose human values drastically. Human minds are to be reengineered to get modernized from within. If human minds are well controlled and used in positive activities, great developments will take place on this earth. Without reformation in human minds, we cannot enjoy materialistic achievements in right way. This paper highlights the use of KAIZEN philosophy for the development of human resource. KAIZEN means incremental positive changes on continuous basis without investment. This approach will bring lot of positive changes in individuals, families, houses, society and nation.

*Keywords:* Human Resource, development, degradation, modernization, Kaizen, Human minds.

# 1. Introduction

Experience is the best teacher because first you take the test and second you are taught the lesson.. All over the world the Kaizen techniques have been distinguished as the best methods of performance improvement within organizations since the implementing costs were negligible. It is now a days

more than ever that the relationship between manager and employee is crucial and the Kaizen techniques have a major contribution to the reinforcement of this relationship since the achievements of organization are the result of the team work. These methods bring together all the employees of the company ensuring the improvement of the communication process and the reinforcement of the feeling of membership.

Presently, considering the global phenomenon, the products and services are comparable to one another, the life cycle of products is more and more reduced whereas the service intervals are more and more extended. The Kaizen management originates in the best Japanese management practices and is dedicated to the improvement of productivity, efficiency, quality and, in general, of business excellence. The Kaizen methods are internationally acknowledged as methods of continuous improvement, through small steps.

The small improvements applied to key processes will generate the major multiplication of the company's profit while constituting a secure way to obtain the clients' loyalty/fidelity. The companies that want to have performance must keep their leading position on the market by increasing the quality level of the services provided, reducing costs and last, but not least, motivating the whole staff in order to implement the concept of performance-oriented organization. Within the present economical context, cost reduction is one of the major objectives. Kaizen is a solid strategic instrument which is used to achieve and overcome the company's objectives. The 5S techniques are fundamental techniques which allow the increase of efficiency and productivity while ensuring a pleasant organizational climate. The Kaizen methods and techniques are valuable instruments that can be used to increase productivity, to obtain the competitive advantage and to raise the overall business performance on a tough competitive market like the one in the European Union. We must permanently think of the fact that the way in which we fulfill even the daily tasks today is not the most efficient way to perform. Therefore, we must continuously look for new ways of achieving our objectives in the easiest manner and, of course, at the lowest costs.

# 2. Implementation of Kaizen philosophy

Success of Kaizen philosophy in any organization starts with human resource from top level to bottom level in the hierarchy. It is based on change management. It is natural that people resist change. If we want to be creative & productive we have to change our attitude and present style of working. Resistance in mindset will lead to failure of Kaizen philosophy. Every positive incremental change in human being at work place can have big effects on overall performance.

Incremental change could be as under:

- **Super Ego**: One should develop super ego to overcome EGO. Ego is the main hurdle in change process.
- Admit Mistakes: Unknowingly or knowingly if we commit some mistakes, we should admit those mistakes in first attempt only without delay response otherwise it will lead to new problems at workplace.

- **Self-Motivation**: It comes from within. Employee should have a sense of empowerment. They should feel loyal to the organization. They should be highly enthusiastic for change internally as well as externally.
- Self-Assessment: Every human being should realize that whether they met the requirement at workplace. They should feel whether they have done justice so far as work content is concerned. One should do self-monitoring of ones output for the day. At workplace one should focus on following points.
- Did we perform as per plan? If not, one should realize it and compensate accordingly.
- Did we obtain + Δx (incremental change in outcome) at the end of the day? If not, one should rethink in that direction. If we do not obtain this, a day will come, we will become obsolete.
- What we did? For customer For organization For self
  - For the concerned department

If we did not perform for any of the above, it will become a big question mark for good future.

- Did we participate or involve or order? Result will be as per the nature of actions such as participation, involvement and order.
- Did we under estimate others at workplace? If yes, it is a big mistake. Rather one should encourage and motivate others.
- Did we harm others? If we cannot help others, one should not harm others.
- Whether present way of working is efficient? If not, one should do brain storming session with seniors as a team member and make little good changes for betterment in service / product / environment / work culture, etc.
- Do we have resistance at workplace? If yes, on should be fully prepared to follow 3H (HEAD, HEART and Hand) principle. These three organs of the body should be highly coordinated to delete the command of resistance in mindset.
- Do we participate voluntarily? If not, one should come forward and take initiative in various activities. This will reflect the self-motivation of the person.
- Do we want experience? Without involvement one cannot get experience.
- Do we blame others? There is a general tendency of people to play blame games. People get easily attracted towards comment, remarks and negative things. One should blame oneself first and things will change faster.

Kaizen can address all the issues if one control all the points discussed above. It lets people to be creative. It lets people to be productive.

One should also understand the concepts of innovation and traditional methods along with Kaizen for quality improvement in any organization, as mentioned below.

KAIZEN VS. INNOVATION								
FACTOR	KAIZEN	INNOVATION						
Size of improvement	Small improvements	Major improvements						
Basis of improvement	Conventional knowledge	Technology or equipment						
Main resource	Personal involvement	Money investment						
People involved	Many people	A few champions						
Orientation	Improve the process	Improve results						
Economy	Even in slow economy	Mainly in good economy						

Ch a racteristics	Kaizen	Traditional
Purpose	<ul> <li>employee involvem ent and development</li> <li>communication</li> <li>economic benefits</li> </ul>	<ul> <li>economic benefit its</li> </ul>
Focus	<ul> <li>m any very sm all changes (e.g. revising a form)</li> <li>elimination of daily hassles</li> </ul>	<ul> <li>few very large changes (e.g. changing a manufacturing process)</li> <li>"breakthroughs"</li> </ul>
Awards	<ul> <li>few dollars</li> <li>m erchandise</li> </ul>	<ul> <li>usually thousands of dollars</li> <li>cash</li> </ul>
Participation	<ul> <li>50% and higher</li> <li>m any ideas accepted</li> </ul>	<ul> <li>5% and lower</li> <li>many ideas not accepted</li> </ul>
Implem entation	<ul> <li>employees implement most of ownideas</li> <li>quick</li> <li>suggestion implemented = improvement idea</li> </ul>	<ul> <li>Management, engineering driven</li> <li>slow, drawn-out employees less accountable</li> <li>suggestion = improvement idea</li> </ul>
Adoption rate	<ul> <li>near 100%</li> </ul>	<ul> <li>approximately 25%</li> </ul>
Administrator	<ul> <li>m ajority of time spent processing implemented ideas and issuing awards</li> <li>specialist</li> </ul>	<ul> <li>Majority of time spent investi- gating un-implemented ideas and explaining "rejected" ones</li> <li>manager</li> </ul>
Suggestions received per year	<ul> <li>Thousands</li> </ul>	<ul> <li>Hundreds</li> </ul>
Highest award	<ul> <li>Varies (or merchandise valued at)</li> </ul>	<ul> <li>Large am ount</li> </ul>
Motivators	<ul> <li>Intrinsic satisfaction — personal development and recognition</li> <li>frequent feedback and awards</li> </ul>	<ul> <li>extrinsic rewards money infrequent</li> </ul>

# 3. 5 S of Kaizen

The definitions and significance of the five Japanese words are given below:

- SEIRI Sorting making the difference between useful and useless things.
- SEITON Ordering/Arrangement the ordering of all the items after SEIRI.
- SEISO Cleaning and disturbance detection the working areas/equipments will be clean.
- SEIKETSU Standardizing- the extension of the cleaning concept to each individual alongside with the continuous practice of the three steps 3S.
- SHITSUKE Disciplining getting self-discipline.

#### 3.1 Obstacles to 5S

It has been generally noticed that, at the moment the organization decides to implement the Kaizen concepts, the employees show resistance to change with following reactions :

- What is so special about sorting and arranging?
- Why should we clean since it gets dirty again?
- Sorting and arranging will not increase the results.

- We have already implemented order and cleaning.
- We applied 5S years ago.
- We are too busy to deal with 5S actions.

## 3.2 Kaizen Culture

KAIZEN – must be a way of being, an attitude, a spirit to be permanently present within each team; Our lifestyle, both at home and at work, should focus on our constant efforts to improve; The application of the Kaizen principles supposes a continuous dialogue between the manager and the employees (vertical communication) on the one hand, and between the employees on the same hierarchical level (horizontal communication), on the other hand.

The application of the Kaizen principles involves no major expenses, but only more attention to details and practical ways to do things better and more efficiently; Problems should not be connected to people because blaming people does not solve the problem; Each approach should start with highlighting the positive parts; We should not judge or blame; we should use feed-back techniques. The Japanese management focuses on the active involvement of all staff categories in the process of continuous improvement.

Productive staff members are particularly encouraged so that they can suggest and make improvements. After a detailed analysis, it has been noticed that, even in the areas where we consider no improvements are needed; there are still plenty of possibilities to improve. A good management of human resources in the organization is one of the strategic objectives of the organization which should be clearly defined and accepted by all its members. The Kaizen principles are the resistance structure that should be built on, so that we can get to a continuous, step by step improvement.

Kaizen concept also requires changes in "the heart of the business", corporate culture and structure, since Kaizen enables companies to translate the corporate vision in every aspect of a company's operational practice.

According to Imai (1986), an important advocate of Kaizen, "Kaizen means improvement. Moreover it means continuing improvement in personal life, home life, social life, and working life. When applied to the workplace Kaizen means continuing improvement involving everyone - managers and workers alike." Believers of this theory maintain that managers of production operations cannot stand still; continuous development and improvement is critical to long term success.

The principles in Kaizen implementation are: human resources are the most important company asset; processes must evolve by gradual improvement rather than radical changes, improvement must be based on statistical/quantitative evaluation of process performance.

Support throughout the entire structure is necessary to become successful at developing a strong Kaizen approach. Management as well as workers need to believe in the Kaizen idea and strive toward obtaining the small goals in order to reach overall success. Therefore, all members of an organization need to be trained in a manner to support this idea structure. Resources, measurements, rewards, and incentives all need to be aligned to and working with the Kaizen structure of ideas.

# 3.3 Small Changes Can Have Big Effects

Kaizen attracts and develops people who are capable of creating and sustaining high performance. By its nature, it draws to it people who are achievers at heart—people who are internally driven to make a difference, to perfect something. These people are focused on their work, frustrated by waste, and delighted by the opportunity to improve what they are about so that it excels. Their pursuit of excellence is only excited more with each step toward its achievement. Equally important, Kaizen attracts people who also are inclusive in their thinking and doing. Kaizen, as we implement it, demands a broad view of the connection of an activity to all activities that surround it and so, in its factfinding steps, it describes the context within which the target work process operates. It also constructs its teams to include people who speak from the different perspectives that populate the workplace, and it pursues its solutions with openness to every voice. People who find Kaizen a gratifying experience are not only pioneering in their attitudes but also inclusive in their disposition.

The kinds of people that Kaizen attracts and develops are the heart and soul of high-performing organizations. The broad and sustained application of Kaizen can lead to a rapid emergence of the central element needed for a company to become high performing.

# 3.4 Kaizen as Creator

Kaizen believes in development of the right people, the right focus, and the right attitude toward everybody.

#### (i) The Right People

Kaizen attracts people energized by the opportunity to make a difference and equips them with knowledge and skills that empower them to realize that opportunity. Further, it encourages performers to challenge the usual way of performing work and to devise better methods that enhance the value of work from the perspective of the customer. It provides these people an opportunity to exercise their qualities and grow in their capability, involvement, and contribution.

#### (ii) The Right Focus

Each Kaizen event roots its direction in producing business benefits and uses learning as its means of achieving those benefits. It emphasizes a focus on enterprise and learning.

#### (iii) The Right Perspective

Kaizen continuously challenges people to question the value of each element in a work process. It raises the question of necessity for every action and every resource. Each element in the workplace either adds value or it is waste.

#### 4. Kaizen as Guidelines

In order to make continuous improvements in productivity, worker performance and client satisfaction, you, as a leader, must:

- Be willing to let go of the status quo. Don't make excuses for why a longstanding practice isn't working. Remember that your goal is to continually improve processes, not defend ideas that don't work anymore.
- Realize that creative ideas beget even more new creative ideas. Even bad ideas can be the start of good ideas. During brainstorming sessions, record every new idea, no matter how impractical it may seem.
- Be an endless source of support and encouragement. Find ways to acknowledge and celebrate your team as they try new ways of doing things.
- Promote laughter, healthy humor and playfulness during brainstorming sessions. Although you may be working on complex, serious problems, laughter in the workplace has been proven to promote creative thinking.
- Lead by example. Correct your mistakes immediately and take responsibility for any errors that you've made. Support your team to do the same. Cultivate an environment of support and encouragement, not blame and finger-pointing
- Stop seeking absolute perfection. Instead, congratulate yourself and your co-workers for trying something new.
- Work collaboratively with others. Instead of seeking the advice of one "expert," ask your staff for their ideas. Host a brainstorming session and get everyone involved in finding a solution.
- Avoid throwing money at the problem. Rely on both your knowledge and your staff members "on the ground" experience to solve the problem before spending money on pricey new tools, equipment or external consultants. The Kaizen method is about finding simple, cost-effective solutions. If a consultant is needed, do hire one, but not before you've drawn on your team's inner resources and strengths first.
- Defect and rework loss producing defective work that must be scrapped or redone.
- Start up and yield loss machines take longer to warm up as they get older.

## 5. Conclusions

If we look at various aspects of Kaizen, we find that it is source of pleasure and happiness both. It renovates human minds and inculcates good motive force within for accepting any challenges / changes within an organization. It focuses on simplification by breaking down complex processes into their sub-processes and then improving them. It can be applied in every walks of our lives. Most of the problems start with human being. If human being is well trained and developed as per Kaizen philosophy, its implementation will become easier. By practicing this human mind will get reengineered slowly. Whatever disorders / disturbances / losses we come across, internally (within) and externally (materialistic), will get reduced. By doing so, human being can play vital role for the development of the nation.

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# Modal Analysis of Crankshaft using 1D, 1D & 2D, 3D Elements and their Comparison.

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## ABSTRACT

Analysis of Crankshaft for measurement of natural frequency in FEM using 3D element is more difficult and time consuming (estimated time is 55 hours or 10 days), so for quick result 1D beam element are used for modal analysis in industry (estimated time is 1 hours), but this gives 15% of error. To improve this accuracy the 1D beam element is modified by combination of 1D & 2D elements which gives 1-2% of error with less time (estimated time is 2 hours). While designing the crank shaft it not only important to know the failure region of crank shaft (i.e. fillet stress) but also to study the major affecting parameters (inertia forces, radial or tangential forces etc) and its behavior, which is more important.

#### Keywords

Finite element analysis, Modal Analysis, Stress analysis, Crankshaft.

#### **1. INTRODUCTION**

Till recently crankshaft torsional vibration analysis was done by the empirical formulae and iterative procedures, but the simplifying assumption that a throw of crankshaft has one degree of freedom is only partially true for torsional modes of vibrations. More degrees of freedom are required to get information about other modes of vibration and stress distribution. Since last decade advent of powerful finite element analysis (FEA) packages have proven good tool to accurately analyse them. The complicated geometry of crankshaft and the complex torque applied by cylinders make their analysis difficult. But optimised meshing and accurate simulation of boundary conditions along with ability to apply complex torque, provided by various FEM packages have helped the designer to carry torsional vibration analysis with the investigation of critical stresses. FEM enables to find critical locations and quantitative analysis of the stress distribution and deformed shapes under loads. However detailed modelling and specialised knowledge of FEM theory are indispensable to perform these analyses with high accuracy. They also require complicated meshing strategies. Simulation of actual boundary conditions to equivalent FE boundary conditions has to be done carefully because a wrongly modelled boundary condition leads to erroneous results. The solution of such large scale FEM problem

requires both large memory and disc space as computing resources.

# 2. OBJECTIVE

The overall objective of the paper is to present natural frequency using 1D beam element, combination of 1D & 2D element and using the 3D element which is more time consuming, and for validation frequencies are calculated using conventional mathematical Holzer method. Also the effect of masses i.e. flywheel and pulley are measured. To study the fillet stresses and behavior of affecting parameter (i.e. inertia forces, radial and tangential forces) on it. 1. Modeling of crankshaft in ProE Wildfire. 2. Model analysis of 1D and 2D element. 3. Calculation of natural frequency by holzer method 4. Evaluation of Connecting Rod forces using Fourier series which is coded in metlab for every five degree of crank rotation. 4. Calculation of fillet stresses on crankshaft.

## 3. Holzer Method

The principle of Holzer method is, when an undamped system is vibrating freely at its natural frequency, no external force or torque is necessary to maintain its vibrations. Recognising this fact Holzer developed a method of calculations of natural frequencies and mode shapes of torsional system by assuming a trial frequency and starting with unit amplitude at one end of the system and progressively calculating the torque and angular displacement to the other end. The frequencies that result into zero external torque or compatible boundary conditions at the other end are natural frequencies of the system. Fig.1, helps to understand the same.



Fig. 1 General Variation of Residual Torque Vs Trial Frequency

#### 4. Modal Analysis

We use modal analysis to determine the vibration characteristics (natural frequencies and mode shapes) of a structure or a machine component while it is being designed. It also can be a starting point for another, more detailed, dynamic analysis, such as a transient dynamic analysis, a harmonic response analysis, or a spectrum analysis.

## 5. METHODOLOGY

- 1. Natural frequency by holzer method
- Natural frequency calculation by Fem approach -By using 1D beam element - By using 1D & 2D element - By using 3D solid element - Comparison of Natural frequency with 1D, 1D & 2D, and 3D element.
- 3. Effect of masses ( pulley, Flywheel ) on natural frequency in each case 4. hormonic analysis of crank shaft by converting Connecting Rod forces to radial & tangential component using Fourier series which is coded in matlab for every five degree of crank rotation.



Fig. 3 Modified by 1D & 2D element



# 6. NATURAL FREQUENCY CALCULATIONS BY FEM APPROACH

Mode No	1	2	3	4	5
Freq	327	1200	1790	2687	3377



Fig.2 Using 1D Beam Element



Fig .4 Solid modeling & Meshing

## Modal analysis result

System 1:A simple crankshaft (free-free) without flywheel, pulley

System 2: System 1 is modified by including flywheel

System 3: System 1 is modified by including Pulley

System 4: System 2 is modified by including pulley

Table 1: A simple crankshaft (free-free) without flywheel, pulley

Mode no	3D Model	1D Model	1D,	2D
			Model	
1	571	542	568	
2	937	947	925	
3	1047	1022	1032	
4	1425	1334	1410	
5	1832	1710	1835	

Table 2: System 1 is modified by including flywheel

Mode	3D Model	1D model	1D, 2D Model
no			
1	505	437	498
2	840	607	930
3	1018	949	1026
4	1336	1108	1425
5	1667	1634	1654

Table 3: System 1 is modified by including Pulley

Mode no	3D Model	1D Model	1D, 2D Model
1	452	447	438
2	757	607	593
3	998	949	1012
4	1387	1108	1128
5	1758	1634	1621

Table 4: System 2 is modified by including pulley

Mode	3D Model	1D Model	1D,	2D
no			Model	
1	282	398	383	
2	695	447	682	
3	970	947	981	
4	1234	949	936	
5	1664	1558	1563	

# Holzer Method verses FEM Approach

Mode No	Frequency				
	Holzer	FEM			
1	327	408			
2	1200	1054			
3	1790	1832			
4	2687	2659			
5	3377	3416			

## CONCLUSION

• Results from FEM are in well agreement with results from Holzer method, also the modes which cannot be obtained from Holzer method are obtained from FEM method.

• Natural frequency of crank shaft with beam element model over estimate or under estimate resonance where as addition of 2D element gives better results. Where as 3D finite element model requires greater computational resources but provide accurate estimate of resonance frequency.

• Effect of masses (pulley, flywheel) shows reduction in natural frequency.

• The addition of masses decrease the torsional made and increases the bending mode.

• Effect of tangential force on fillet stresses is more significant than radial forces.

• It can be observed that the Beam element model overestimates or underestimates the resonances by as much as (6 - 10% error) where as addition of 2D element gives better estimation of natural frequencies up to (1 - 2% error).

• The 3D model, though requiring greater computational resources, provides accurate estimate of the resonance frequencies and also provides better insight into the coupled vibration behavior.

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# Biodiesel feasibility study: An evaluation of material compatibility; performance; emission and engine durability

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# ABSTRACT

Biodiesel is derived from the trans esterification of vegetable oils or animal fats. It is composed of saturated and unsaturated long-chain fatty acid alkyl esters.

It is a promising non-toxic and biodegradable alternative fuel used in the transport sector whose use is rapidly expanding around the world.

This paper has collected, from scientific literatures, the following data and analysis.

- 1. Parameter deciding suitability as a bio-fuel.
- 2. Fuel profile of bio-diesel.
- 3. Engine testing and performance using bio-diesel.
- 4. Reduction of emission
- 5. Enhanced corrosion of automotive parts due to use of biodiesel

## Keywords

Biodiesel, energy conversion, material compatibility, performance, emission and engine durability.

# 1. INTRODUCTION

Recently, world has been confronted with an energy crisis due to fossil fuel depletion and environmental degradation. Biodiesel is one of the most promising alternative fuels to meet these problems. It is renewable, biodegradable, nontoxic and has almost very close property to that of diesel fuel, It can be produced form vegetable oil as well as animal fats. Oils/fats are basically triglycerides which are composed of three long-chain fatty acids. These oils/triglycerides have higher viscosity and is therefore cannot be used as fuel. In order to reduce viscosity, triglycerides are converted into esters by transesterification reaction. By this means, three smaller molecules of ester and one molecule of glycerin are obtained from one molecule of fat/oil. Glycerin is removed as by product and esters are known as biodiesel.

Just like petroleum diesel, biodiesel operates in compressionignition engines with little or no modification. Moreover, biodiesel offers advantages regarding the engine wear, cost, and availability. When burned, biodiesel produces pollutants that are less detrimental to human health. In addition, it provides better lubricity as compared to that of diesel fuel. But, due to its unsaturated molecules and compositional Niyati Raut Head of Department, Dept. of Mechanical Engineering, VIVA Institute of Technology, University of Mumbai.

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effects, it is more oxidative and causes enhanced corrosion and material degradation.

In some cases, use of biodiesel in internal combustion engine may lead to engine durability problems including injector cocking, filter plugging and piston ring sticking, severe engine deposits etc. In order to assess the durability of different engine components, many researchers conducted their studies by static engine tests as well as field trials. National Biodiesel Board (NBB) has reported that in 100Dh durability test of engine with B20 (Soyester blend) caused some technical problems like failure of engine pump, softening of fuel system seals, deposits on air box covers, piston components and injectors. Kenneth et al. and Kearney et al. conducted different field trail tests by using B20 and they found no unusual engine wear as compared to that in diesel fuel. Similar results have also been reported by Chase et al. even for B50 biodiesel blends in long term field trail test. However filter plugging, injector cocking were the common problems in most of the studies. The aim of this study is to characterize the function of different factors of biodiesel and thereby to evaluate its feasibility in automobile application.

# 2. Material compatibility

Depending on applications where sliding contacts are involved, wear and friction are occurred. The common sliding components in automobile engine are cylinder liner, bearing, cam, tappet, crankshaft journals, pistons and piston pins, valve guides, valve systems etc. Lubricity of these components is normally provided by the fuel itself. Biodiesel inherently provides better lubricity than diesel fuel. However, wear and friction may increase if the fuel is hygroscopic in nature. Biodiesel is such type of fuel, which can absorb moisture and thereby can increase corrosive wear. In addi-tion, autooxidation of biodiesel is most likely prone to influence wear characteristics. To understand the comparative wear in diesel and biodiesel, several laboratory investigations with four ball wear machine, pin-on-disk wear testing machine, reciprocating wear tester etc. have been performed by some researchers. All these lab-oratory tests basically have been conducted in order to simulate the wear in engine parts that are in contact with biodiesel. The lab-oratory wear test data for biodiesel as compared to that in diesel fuel has been summarized in Table 1.

Masjuki and Maleque have investigated the anti-wear characteristics of palm oil methyl ester (0%. 3%, 5%, 7%, 10%) in lubricant. They observed that 5% POME can provide better



Fig.1- corrosion rate of stainless steel, aluminium and copper in diesel and biodiesel after immersion for a) 600 h and b) 1200 h at  $80^{\circ}$  C

lubricity. Lubricant containing more than 5% POME causes higher wears damage due to oxidation and corrosion. According to Knothe and Steidley, Holser and Harry-O'Kuru biodiesel always provides better lubricity than that of diesel fuel. Trace components found in biodiesel fuels including free fatty acids, monoglycerides, diglycerides are reported to improve the lubricity of biodiesel. Oxygen containing compounds such as free fatty acids, esters are superior wear and friction reducing agents. These compounds adsorb or react on rubbing surfaces to reduce adhesion between contacting asperities and thereby limit friction, wear and seizure.

Like laboratory wear tests, many studies have also been done by static engine or field trail tests (Tables 2 and 3). In addition to inspection of the wear affected components, some studies have analyzed oil and ash to find out the sources of wear materials and their amounts. It is seen from Table 4 that wear in biodiesel is almost similar or less with relative to that in diesel. In fact, due to having higher lubricity property in biodiesel, it causes overall reduced wear. But some metals like copper, zinc, and aluminum have been found in higher percentage and are therefore considered as incompatible with biodiesel. Clark et al. have investigated wear in diesel fuel, methyl and ethyl soyate (with and without additives) by oil analysis and by weight, dimensional measurement of parts before and after running engine. The rod and main bear-ings have been weighed for loss of material and obtained results showed normal wear. They have found no notable differences in wear for individual fuels. But Agarwal have shown 30% less pitting corrosion in biodiesel at 70 °C after 10 h of operation. Corrosion attack for turne sheet metal was also

reported even for lower biodiesel (2%) blend levels while diesel shows no corrosiveness. Fazal et al. investigated the corrosion behaviour of different automotive materials in palm biodiesel. They observed that copper and aluminium were subjected to corrosion while stainless steel was not (Fig. 1). Fiiel properties such as density and viscosity were also changed a lot due to the metal contact (Fig. 2). Thus, biodiesel upon exposure of different metals not only shows its aggressive corrosiveness but also undergoes degradation in fuel properties.

# 3. Engine Performance

Engine performance with biodiesel or its blends depends largely on the combustion, air turbulence, air-fuel mixture quality, injector pressure, actual start of combustion and many other singularities that make test results vary from one engine to another. In addition, it can vary depending on the quality and origin of biodiesel as well as engine operating parameters like speed, load etc. Most of the studies that are available in; literature have evaluated the performance of biodiesel-fuelled engine by determining engine power/torque, brake thermal efficiency, brake-specific fuel consumption or energy consumption.Refer TABLE 1 and TABLE 2.

Gumus compared the performance of four-cylinder turbocharged DI engine for diesel and biodiesel/its blends. Results showed that brake-specific fuel consumption (BSFC) of biodiesel (367.68 g/kWh) was higher than that of diesel (299.89 g/kWh). On the other hand, brake thermal efficiency (BTE) of biodiesel (26.30%) was found to be lowered as compared to that in diesel (27.82%). Lin et al. observed 0.371%, 0.667%, p.889%, 1.30%, 2.37% and 2.85% increase in brake-specific fuel consumption (BSFC) for B5, B10, B15, B20, B25 and B30 (palm biodiesel), respectively, compared with B0. Ramadhas et al. found decreased brake thermal efficiency and increased BSFC (>14%) when rubber seed biodiesel was used against petroleum diesel. Similar results were also reported by Nabi et al., Benjumea et al., Raheman and Ghadge, and Ramadhas etal. [Table 5], Increasing concentration of biodiesel (derived from used cooking oil) in blends decreases engine power and brake thermal efficiency. Slightly different behaviour was found by Raheman and Phadatare, where it was reported the maximum thermal efficiency with blends B20 and B40 whilst B100 recorded a poorer performance. This is in agreement with Agarwal and Das, who reported that B20 was found to be the optimum biodiesel blend giving maximum increase in thermal efficiency, lowest brake-specific energy consumption (BSEC) and advantage in terms of lower emissions.

This is not surprising that many studies also have reported increased power and torque when using biodiesel. Altiparmak et al. tested different blends of tall oil methyl ester and diesel in a single cylinder direct injection diesel engine at full load condition. They observed that the engine torque and power output with tall oil methyl ester-diesel fuel blends ;(B50, B60 and B70) increased up to 6.1% and 5.9%, respectively. Similarly, Usta observed an increase in torque and power when using biodiesel from tobacco seed oil in different blends with diesel fuel in four cylinder, four stroke turbocharged indirect injection diesel engine. According to Pal et al., 30% biodiesel blend of thumba oil shows relatively higher brake power, brake thermal efficiency, reduced BSFC and smoke opacity as compared to diesel Hasimoglu et al. observed that though engine torque decreases from 0.9% to 4.4% at medium and high engine speeds (1800-2800 rpm), it increases from 1.5% to 2.6% at low engine speeds (1100-1600 rpm). They also added that similar trend was also observed for changing in engine power with respect to speed while both BSFC and BTE were increased by 13% and 3%, respectively. These contradictory results may be attributed to fuel properties like density, viscosity; composition, origin of biodiesel as well as

#### TABLE 1.PERFORMANCE STUDY AT 100% DIESEL

S R N O	L O A D C U R R E N T	L O A D P O W E R	TI ME FO R 25 CC FU EL CO NS UM PTI ON	B P	T F C	SF C	I P	M E C H · E F F I.	B T E	I T E	B M P	I M P
	( A M P )	K W	Sec	K W	K G / H	K G/ K W H	K W	%	%	%	B ar	B ar
1	0	0	80	1 0 9 6	0 9 3 7	0.8 54	4 9 9 6	2 1 9	9 7 1	4 4 2 7	0. 4 6 1	2. 1 0 3
2	2 0	2 2 0 0	58	3 3 9 4	1 2 9 2	0.3 8	7 4 6	4 6 5 3	2 1 8 1	4 6 8 8	1. 4 2 9	3. 0 7 1
3	4 0	4 4 0 0	43	5 8 3 9	1 7 4 3	0.2 98	9 7 3 9	5 9 9 5	2 7 8 1	4 6 4	2. 4 5 8	4. 1
4	5 0	5 5 0 0	39	7 1 1 7	1 9 9 2	0.2 7	1 1 0 1 7	6 4 6	3 0 7 5	4 7 6	2. 9 9 6	4. 6 5 8

#### 4. Engine durability and emission

In order to assess the raised problems due to use of biodiesel, a number of long term durability tests have been conducted with B20 as well as higher percentage of blends. Several of these studies have been conducted by some researchers in National Renewable Energy Laboratory, sponsored by U.S. Department of Energy and two of the most significant are reviewed here. Kenneth et al. operated nine identical 40 ft. transit buses on B20 and diesel for a period of two years - five of the buses operated exclusively on B20 and the other four on petroleum diesel. They have shown 1.2% lower fuel economies for B20 and this is expected due to lower energy content of B20 as compared to diesel fuel. Their oil analysis results indicate no additional metal wear for B20, rather soot the test condition. However, it is difficult to determine the effect of any single fuel characteristics alone on engine performance since many of the characteristics are interrelated.

#### TABLE 2.PERFORMANCE STUDY AT 80%D+20%J

S R N O	L O A D C U R R E N T	L O A D P O W E R	TIM E FO R 25C C FU EL CO NS UM PTI ON	B P	T F C	SF C	I P	M E C H E F F I	B T E	I T E	B M P	I M P
	( A M P)	K W	Sec	K W	K G / H	K G/ K W H	K W	%	%	%	B a r	B a r
1	0	0	82	1 0 9 6	0 9 4 5	0.8 62	4 9 9 6	2 1 9	9 4 1	4 2 9 3	0 4 6 1	2 1 0 3
2	20	2 2 0 0	62	3 3 9 4	1 2 4 9	0.3 68	7 2 9 4	4 6 5 3	2 2 0 6	4 7 4 2	1 4 2 9	3 0 7 1
3	40	4 4 0 0	49	5 8 3 9	1 5 8 1	0.2 7	9 7 3 9	5 9 9 5	2 9 9 9	5 0 0 2	2 4 5 8	4 1
4	50	5 5 0 0	40	7 1 1 7	1 9 3 7	0.2 69	1 1 0 1 7	6 4 6	2 9 8 3	4 6 1 9	2 9 9 6	4 6 5 8

levels in the lubricant were significantly lower for B20 vehicles. But, fuel filter plugging was the major problem for B20 buses which was seemed to cause by the presence of high levels of plant sterols in the biodiesel or other fuel quality issues. In conclusion, they have shown engine and fuel system related maintenance costs were nearly identical for both diesel and biodiesel blend groups until the final month of the study. But component replacements like injector and cylinder head near the end of the study on one B20 bus caused average maintenance costs to be higher for the B20 group (\$0.07 vs. \$0.05 per mile). Another experiment Conducted by Fraer et al. on four 1993 Ford cargo vans and four 1996 Mack tractors (two of each running on B20 and two on diesel) for 4yr in order to investigate the durability of engine partis. No

differences in wear or other issues were noted during the engine teardown. However, the Mack tractors operated on B20 exhibited higher frequency of fuel filter and injector nozzle replacement. Biological contaminants may have caused the filter plugging. A sludge buildup was noted around the rocker assemblies in the Mack B20 engines. The sludge contained high levels of sodium, possibly caused by accumulation of soaps in the engine oil from out-ofspecification biodiesel.

Several numbers of studies have been done to investigate the effect of the biodiesel on exhaust emissions as compared to diesel. Many of these studies [Table 6] have shown that using of biodiesel in diesel engines can reduce hydrocarbon (HC), carbon monoxide (CO) and particulate matter (PM) emissions, but nitrogen oxide (NO<sub>x</sub>) emission may increase. Few studies have also reported about the decreasing of NOx. In addition, the percentages of decreased or increased exhaust emission for biodiesel as compared to those in diesel fuel are different for different studies. The reasons explained by different researchers are also different. The heterogeneity in the results and explanation obtained by different authors can also be attributed to differences in the origin of biodiesel as well as the test condition of engine.Refer TABLE 3,TABLE 4,TABLE 5,TABLE 6 and TABLE 7.

#### TABLE 3:

Analyzer Used-KM 900 Combustion Analyzer

Performance of exhaust emission:CO2 EMISSION(%) Vs BLENDS

LOA	100%	80D+20	60D+40	50D+50	40D+60
D	D	J	J	J	J
0	2	2	2.2	3.9	4.1
20	2.6	2.9	2.9	4.4	4.8
40	3.2	3.4	3.6	5.7	5.8
50	4.2	4.5	4.8	6.1	6.3

#### TABLE 4:

Performance of exhaust emission:NO EMISSION(PPM) Vs BLENDS

LOA	100%	80D+20	60D+40	50D+50	40D+60
D	D	J	J	J	J
0	64	71	88	105	120
20	121	127	145	160	170
40	221	242	261	295	310
50	288	304	321	340	345

#### TABLE 5:

Performance of exhaust emission:NOX EMISSION(PPM) Vs BLENDS

LOA	100%	80D+20	60D+40	50D+50	40D+60
-----	------	--------	--------	--------	--------

D	D	J	J	J	J
0	67	77	86	99	124
20	125	138	200	215	230
40	234	266	278	298	312
50	319	296	334	340	345

#### TABLE 6:

Performance	of	exhaust	emission:CO	EMISSION(PPM)	Vs
BLENDS					

LOA D	100% D	80D+20 J	60D+40 J	50D+50 J	40D+60 J
0	3	4	4	4	5
20	2.5	3	3.8	3	5
40	2	3	3	4	4
50	2	6	3.2	4	4

#### TABLE 7:

Performance of exhaust emission:O2 EMISSION(%) Vs BLENDS

LOA	100%	80D+20	60D+40	50D+50	40D+60
D	D	J	J	J	J
0	18.2	18.3	18.2	15.6	15.8
20	17.2	17.2	17.3	14.6	14.5
40	16.3	16.3	16.7	13.4	13.2
50	15.2	14.7	16.1	12.6	12.8

#### 5. Conclusions

The following conclusions can be drawn from the study:

- 1. In laboratory investigation, biodiesel from different origins is always seen to provide better lubricity than that of diesel fuel. However, in long term test it loses its lubricity due to its corrosive and oxidative nature.
- 2. Auto-oxidation, hygroscopic nature, higher electrical conductivity, polarity and solvency properties of biodiesel cause enhanced corrosion of metals and degradation of elastomers. In addition, presence of free fatty acid, degree of unsaturation, impurities remaining after processing can also increase corrosion of automotive materials. In turn, upon exposure to metals, fuel properties of biodiesel can also be changed.
- Semi-refined Jatropha Curcas oil gives better performance in 80:20 blend.
- 4. The running cost of blended fuel is cheaper than pure diesel.
- 5. Im the semi-refined jatrapha curcas oil the viscosity and free fatty acid values are decreases.

Biodiesel can improve combustion and hence has higher brake thermal efficiency than petroleum diesel. Engine power is reduced slightly or not at all because the consumption of biodiesel increases enough in order to compensate its lower heating value. However, overall biodiesel permits acceptable

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# Green (Eco-friendly) Supply Chain Management

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#### Abstract

The green supply chain management (GSCM) is a powerful way to differentiate a company from its competitors and it can greatly influence the plan success. With increased awareness to corporate responsibility and the requirement to meet the terms with environmental policy, green supply chain management (GSCM) is becoming increasingly important for Indian manufacturers. Companies that have adopted GSCM practices with a focus on distribution activities have successfully improved their business and environmental performance on many levels. Today's also some of remaining companies have not adopted green supply chain management, due to this environmental performance index (EPI) ranking of India is not good. Today's environmental performance index (EPI) of India and the major four activities of the green supply chain management; namely green purchasing, green manufacturing, green marketing and reverse logistics are being covered throughout the paper.

#### **1. Introduction**



Fig 1: Layout of Green Supply Chain Management

Green supply refers to the way in which innovations in supply chain management and industrial purchasing may be considered in the context of the environment. Environmental supply chain management consists of the purchasing function's involvement in activities that include reduction, recycling, reuse and the substitution of materials. The practice of monitoring and improving environmental performance in the supply chain can be integrated by environmental thinking into a supply chain management, including product design, material resourcing and selection, manufacturing processes, delivery of the final product to the consumer as well as endof-life management of the product after its useful life. From these four definitions we see that there is a range of author focus and purpose on green supply chains and their management. The lack of consensus in practice and definition of green supply chain is not surprising, since its foundational elements of corporate environmental management and supply chain management are both relatively new areas of study and practice.

**GSCM** = Green purchasing + Green manufacturing/materials management + Green Distribution / marketing + Reverse logistics.

#### 2. Green Purchasing

Environmental issues are becoming important part of business today, while there are environmental regulations as well as the increasing demand of environmental friendly goods from buyers, the environmental issues are becoming non-tariff barriers for export though Europe and Japan are shifting to ecofriendly products but presently there is a limited market for eco products, there are definite sign that this would grow big way. In many countries, government with industries and civil society organizations are working together to purchase eco-products. Environmentally preferable purchasing (EPP) or green purchasing is process of selection and acquisition of product and services which minimize negative impact over the life cycle of manufacturing, transportation, use and recycling.

#### 3. Green Manufacturing

Green manufacturing has become the newest item in the mission statement of several manufacturing companies. The controversy between manufacturing companies and global warming tends to often dominate conversations between manufacturing companies and environmentalists. Several manufacturing companies have begun going green, in order to reduce waste. In Green manufacturing, manufacturing equipment is made to be fast, reliable, and energy efficient. One of the examples is the energy-efficient light bulb. These bulbs use almost half the energy as a standard light bulb and yet they still produce a good amount of light. Manufacturing companies are using this example and re-designing their machines. Green manufacturing can benefit your manufacturing company in many ways. Not only it will benefit the environment, but it will impact your consumer, the shareholders, and the company perception in the market. The first benefit of the green manufacturing is the impact it will have on the environment. Insurance companies are actually giving better rates to manufacturing companies that are taking steps to go green. The government is also offering tax breaks for green manufacturers.

The second benefit of the green manufacturing is the money it will save. Manufacturers can look for machinery that is earth friendly. Wind and solar energy can save your company thousands of rupees. The reality is that if you can save money on energy, your product costs can go down and your customers will not need to pay as much. In addition you can always maintain the same costs and turn a great profit on your products, helping out your shareholders.

The third benefit of the green manufacturing is the help it will provide to the community at large. Renewable energy sources are considered to be one of the fastest growing job markets. New manufacturing plants that are opening with renewable energy sources are offering many more jobs to their communities, giving them a larger respect in their market. Studies show that manufacturing companies that have gone green are expected to employ almost 70 percent of the new jobs in the future. Green manufacturing will be a large investment, for this some questions are arises here: i. why researcher's going for green manufacturing? ii. Green manufacturing has some advantages or not? It is important to know that there are also safety concerns that come with going green, especially if you are re-designing a facility that is currently in use. You may need to shut down parts of the facility while you install new equipment and transform your power source to renewable energy. Although the costs can be high initially, the benefits will far outweigh them. Both the manufacturing company and the environment will benefit greatly from going green. It has been shown that employees that work for companies that have gone green highly value the company and they often have a higher performance level than other company's employees. Going green can also produces a better air quality for the employees and the community. Better air quality may be one of the biggest benefits of going green. With the public awareness surrounding going green, it is also important to go green to keep your manufacturing company competitive. Some customers have begun making purchasing decisions based on products that are manufactured at facilities that have gone green and they boycott the other companies that do not have green manufacturing plants. Comparison table is constructed by us based upon the very useful and meaningful factors are shown below. The current damage to the earth has many concerned about global warming and the air quality. Going green is not only important for your employees and your community, but can be better for the bottom line.

## 4. Green Marketing

Green marketing can be viewed as adherence to ethical and social responsibility requirements in marketing. This approach emerged as a response to increased environmental challenges in recent years. This marketing approach has emerged in response to a global increase in concern about protecting consumer rights, and a concurrent growth of organized movements to address environmental trends in such a way that people will be protected and assured a clean and safe environment in which to live. The antecedents of green marketing were developed through many stages since the 1960s. These movements paved the way for the emergence of green marketing in the late 1980s.Green marketing involves a commitment from the organization to deal with environmentally friendly products (i.e., products that do not harm society and the environment) and to conduct marketing activities in a way that reflects the organization's commitment to environmental responsibility through adherence to specific controls to ensure the preservation of the natural environment Most definitions of green marketing deal with this dimension. For example, green marketing is defined by researcher as any marketing activity of an organization that aims to create a positive effect or remove a negative effect of a particular product on the environment. Pride and Ferrell define green marketing as any developing, pricing and promoting process for a product which does not cause any damage to the natural environment. After this, researchers clearly indicate that adoption of a green marketing approach achieves many benefits for organizations and may place an organization at the top of the competitive pyramid. It provides them with market leadership, especially in the context of increasing environmental awareness in the market. Adopting a green marketing philosophy brings an organization close to its clients, particularly those clients who have other environmental concerns besides maintaining the environment and rationalizing the use of natural resources. In this context, the study by researcher indicates a number of advantages resulting from green marketing practices.

#### 5. Reverse Logistics

Reverse logistics has been defined as "the term most often used to refer to the role of logistics in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal, and refurbishing, repair and remanufacturing.

# 6. Environmental Performance Index (EPI)

It measures the effectiveness of national environmental protection efforts in 132 countries. Reflecting our belief that on the- ground results are the best way to track policy effectiveness, EPI indicators focus on measurable outcomes such as emissions or deforestation rates rather than policy inputs, such as program budget expenditures. Each indicator can be linked to well-established policy targets. The 2012 EPI ranks 132 countries on 22 performance Indicators that capture the best worldwide environmental data available on a country scale. India Ranks at 125 of 2012 Environmental Performance Index, which is worst rank22.

## 7. Conclusion

Cost and complexity are perceived as the biggest barriers to implementing Green SCM, which highlights the need for cost effective and easy to implement solutions. Brand building is one of the top incentives for green SCM, highlighting the importance of public perception of how companies operate. Recycling of raw materials and component parts are the top green manufacturing and production focused initiatives Adoption of green practices is highest in those areas of the supply chain where there is a direct relation to cost savings and efficiency, for example in inventory reduction, recycling of raw materials. Almost a third of respondents are not collaborating with their extended supply chain on green practices. Most of the Indian manufacturing small and medium enterprises like cutting and hand tools and auto parts and spare parts and industrial equipments and machinery manufacturer and various other products manufacturer are seem to be quite advanced in the implementation of green warehousing and distribution initiatives, most likely because these initiatives often also mean

added efficiency. While green supply chain management shows direct cost and efficiency benefits, then why more companies have not adopted them up to now? EPI-2012 rank of India is worst, this also shows that awareness of green supply chain management and greening in India is

poor, so there will be need to spread the knowledge of green supply chain management, with the help of this green supply chain management, Indian manufacturing enterprises get their cost and efficiency benefits.

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# DESIGN OPTIMIZATION OF SAVONIUS ROTOR FOR WIND TURBINE

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# ABSTRACT

Increasing demand in energy facilitated the need of clean energy. Residences, buildings and commercial establishments need more power every day and also continuous power. This study was done to investigate the design and development of a micro Vertical Axis Wind Turbine (VAWT)-Savonius Type. In regions where wind speed is limited Horizontal Axis Wind Turbines (HAWT) do not have a practical application due to high wind speed requirement. VAWT provide operational abilities at lower speeds and do not require an alignment mechanism.

The influence of a modification is studied, such as the presence and the geometry of an external chassis. The influence of the velocity is investigated. These considerations make it possible to define an optimal geometrical configuration.

Modified forms of the conventional Savonius rotors are being investigated in an effort to improve the coefficient of power and to obtain uniform coefficient of static torque. The modification are made in the shape of the conventional Savonius rotor, and for different velocity ranging from 2m/s to 8m/s the effect on the torque generated is examined and compared with the conventional Savonius rotor, with small change in the shape of the conventional Savonius rotor we observe the drastic change in the power generation by theoretical calculation and analysis by software.

Keywords: Savonius rotor, Solid works, CFD.

## **1. INTRODUCTION**

## **1.1Wind Power**

Wind power is the conversion of wind energy into a useful form of energy using wind turbines. A wind turbine is a machine that converts the kinetic energy of the wind into mechanical energy. If the mechanical energy is used directly by machinery such as, a pump or a grindstone, the machine is usually called a wind mill. If the mechanical energy is converted to electricity, the machine is called a wind generator or a wind turbine.

Wind energy is the most potential alternative source for renewable energy. This is mostly Pollution free and abundantly available in the earth's atmosphere. The interest in wind energy has been growing and many researchers have to introduce and develop cost effective and reliable wind energy conversion systems. In practice, however there are many difficulties to introduce wind turbines into the community because of lesser wind energy source, noise pollution etc. Renewable energy sources like wind energy are indigenous and help in reducing our dependency on fossil fuels. Wind is an important source for power generation and many developing countries have taken measures to tap this significant and clean source. There are two types of wind machines, namely, horizontal axis machines and vertical axis wind machines.

Horizontal axis wind turbines have their shaft and electric generator at the top of a tower and must be pointed into the direction of the wind. Larger horizontal axis turbines use wind sensors that are coupled to a servo motor. They include a gear box which turns the slow rotation of the blades into a quicker rotation that is more suitable to drive an electric generator. These machines in general have a higher efficiency when compared to vertical axis machines. Since the position of the axis can be adjusted depending on the direction of the wind, the turbine collects the maximum amount of wind energy for a given time. However, the horizontal axis wind machines possess some disadvantages in terms of difficulty in transportation and installation. The blades are often subjected to severe cyclic stresses and fatigue.

Vertical axis wind turbines have the main rotor shaft arranged vertically. The main advantage offered by this type of arrangement is that the turbine does not need to be pointed in the direction of the wind to be effective. This is useful in a site where the wind direction is highly variable. Since the shaft is vertical, the gear box and the generator can be placed near the ground so that the tower does not need to support it and is hence, more accessible for maintenance. They are difficult to mount on towers and hence, they are installed near the base, like a building rooftop. Since they are located closer to the ground than horizontal wind machines, the arrangement can take an advantage of the natural constructions and surrounding buildings to funnel the air and increase the wind velocity. The main disadvantage of the vertical axis wind machines is that the stresses in each blade change sign twice during each complete cycle. This reversal of stresses increases the likelihood of blade failure by fatigue. The objective of the present work is to study the characteristics of a specific type of vertical axis wind machine, namely, the Savonius rotor. The following section gives an introduction to this rotor and the definitions of the performance characteristics associated with it.

#### **1.2 Savonius Rotor**

Savonius wind rotor is a vertical axis wind machine. It is a drag type rotor and its basic configuration consists of an 'S' shape formed by two semicircular blades with a small overlap between them. This structure has the ability to accept wind from any direction. Savonius rotor is not popular for large power production because of its low aerodynamic efficiency compared to other wind machines and hence, its performance is lower than other rotors. It has very high starting torques. They are suitable for pumping water and for small scale power generation. They act as efficient starters for other wind machines due to their high starting torque characteristics. Various blade shapes and designs like semicircular type, lebost type etc. have been studied by researchers over the years in order to improve the efficiency of the Savonius rotor. The Savonius rotor is a drag type rotor, i.e., the main driving force on the rotor is the drag force acting on its blade.



Figure 1: Basic Structure of a Conventional Savonius Rotor
[1]

Figure1 shows the structure of a conventional Savonius rotor. The semicircular plates are held in place with the help of two flanges as shown in the figure. There are several performance parameters associated with the Savonius Rotor. They have been defined in the following section.

# 2. COMPUTATION OF ROTOR PERFORMANCE

The optimal values of rotor dimensions are described in exhaustive literature survey, it is found that the conventional rotor and the modified Savonius rotor have higher coefficient of power in comparison to other modifications on the rotor. In the present chapter, the dimensions of the rotor are computed for two cases, one for conventional and other for modified rotor shown in Figure 1. The final section states the conclusions drawn on the basis of result obtained.

-Standard Overlap Ratio ( $\beta$ ) = 0.15

- -Rotor blade inner radius (R) = 175 mm
- -Thickness of blade material (t) = 5 mm
- -Calculation of rotor overlap (a) =  $\beta x 2R = 52.5$  mm
- -Calculation of rotor diameter D = 4R + 2t a = 0.6575 mm
- -Height of blade H = 1620 mm = 1.62 m
- -Area of wind turbine  $A = D \times H = 1.064 \text{ m}^2$
- -Power output (p) = 0.5 A x  $\rho$  x V<sup>3</sup> x Cp = 21.24 watt

From the above calculation the power generated theoretical by the conventional Savonius rotor is 21.24 watt. This is less some modifications in the shape of Savonius rotor helps to improve the power generation capacity of the turbine. In this work the suggested change in the shape of the Savonius rotor is as shown in figure



Figure 2. The modified shape of Savonius turbine

-Length of Blade = 1620 mm -Width of Blade = 350 mm -Number of Blade = 3 NOS -Radius of Turbine = 1 m -Air Velocity = 6 m/s -Material = FRP (Fiber Reinforced Plastic) -Weight of Blade = 5.5 KG -Arm Section = 50 X 25 X 3 mm Rpm generated by turbine blade from software at 6m/s = 33 rpm V tip = 3.14 x D x N / 60= 3.45 m/sTSR = V tip / v = 0.57 (cp = 0.154) Power Out Put = P = 0.5 x A x  $\rho$  x v<sup>3</sup> x cp= **65 watt** 



Figure 3.The modified shape of Savonius rotor.

# 2.1 Theoretical power generation

Force generated by blade -F =  $0.5 \times v^2 \times A \times density \times drag \ coefficient= 28.16 \ N$ -Torque of blade = F x R = 28.16 Nm -Speed of turbine blade = 33 rpm Power of wind turbine

#### $-P = 2 \times 3.14 \times N \times T / 60 = 97.26$ watt

From the above calculation it is observe that the power generated by modified savonius rotor is much greater than the theoretical power generated by the conventional savonius rotor.

## 2.2 Design of Arm

Section of arm 50 x 25 x 3 mm Force generated by blade -F = 0.5 x v2 x A x density x drag coefficient= 28.16 N -Length of arm = 470 mm -So torque of arm = F x L = 13235.2 N mm= 13.2 N m

# 3. SIMULATION AND ANALYSIS OF MODIFIED SAVONIUS ROTOR

In this work, one kind of simulation and analysis were done i.e. Computational Fluid Dynamics and using SolidWorks Flow Simulation/cosmos.

# **3.1 Computational Fluid Dynamics (CFD)** Analysis

The purpose of this simulation is to obtain the torque at the rotor surfaces for modified Savonius rotor induced. The pressure difference between concave and convex blade surfaces induces force that turns the blade. The torque induced was obtained by implementing Computational Fluid Dynamics (CFD) analysis on SolidWorks Flow simulation. The flow types in this work are internal flow analysis. The analysis was static analysis.

The engineering goals for the internal flow analysis and external analysis are two surface goals and four global goals are dealing with total pressure for both concave and convex surface. The four global goals are dealing with total pressure, for both concave and convex surface. The four global goals are deal with total pressure, velocity, normal force and force.

In this work the flow analysis was done for the different inlet velocities on the rotor blade and the torque generated for the different velocities are used to calculation of the power to find out the improvement in power transmission capacity of modified Savonius rotor as compare to the conventional Savonius rotor.

#### **3.2 Result and Discussion**

The flow analysis for the modified Savonius rotor is done for the range of wind velocity from 2 m/s to 8 m/s, and the computational domain is  $5m \times 5m \times 15m$  for the internal flow analysis. Flow through the Savonius rotor blade, and then exit through the outlet that is set to environmental conditions. The Savonius rotor blade is placed in the middle of wind tunnel. In internal analysis, the computational Domain is automatically enveloped the model wall, which is the wind tunnel size for this work. The lids are used to apply boundary condition.

The lid thickness for an internal analysis is usually not important. However, the lid should not be so thick until the flow pattern is affected downstream in some way. If the lid is created to be too thin, this will make the number of cells to be very high. For most cases the lid thickness could be the same thickness used to create the neighboring wall the figure shows the flow pattern for the inlet velocity of 6 m/s.



Figure 4.Flow pattern for velocity V= 6 m/s



Figure 5.flow pattern for velocity 6 m/s (Isometric view)

Input Pa	arameters	for the	e CFD	analysis	of	the	Savonius	rotor	for
velocity	6 m/s are	e as giv	en in t	he follow	ing	tab	le.		

Table 1.Input parameters for CFD analysis at velocity v= 6

	<b>m</b> /	m/s.						
Parameter	Minimum	Maxi-	Surface					
1 arameter	wiiminum	mum	area(m2)					
Pressure(Pa)	101295	101357	0.503087					
Temperature(K)	293.216	293.219	0.503087					
Density(kg/m3)	1.19499	1.19554	0.503087					
Velocity(m/s)	0	0	0.503087					
Mach number	0	0	0.503087					
Shear Stress(Pa)	1.693E-09	0.42349	0.503637					
Fluid Tempera- ture(K)	293.216	293.219	0.503087					
Condensate Mas Fraction	0	0	0.503087					
Heat Flux(W/m2)	0	0	0.503637					

Output parameters from the analysis at V= 6 m/s are given in table below.

Parame- ter	Value	X- compo- nent	Y- compo- nent	Z- compo- nent	Sur- face ar- ea(m <sup>2</sup> )
Heat Transfer Rate(W)	0	0	0	0	0.503
Normal Force(N)	7.324	6.355	0.0277	3.6406	0.503
Shear Force(N)	0.0067	0.00373	4.30E-4	-0.0056	0.503
Force(N)	7.324	6.358	0.0272	3.634	0.503
Torque (N-m)	9.0261	-0.4561	8.9842	0.7394	0.503
Surface Area(m <sup>2</sup> )	0.503	-0.297	-3.73E- 5	-0.167	0.503
Toque of Normal Force (N-m)	9.0249	-0.4566	8.9830	0.7392	0.503
Toque of Shear Force (N-m)	0.0012	5.01E-4	0.00117	1.37E-4	0.503
Uni- formity Index	1				0.503
CAD Fluid Ar- ea(m <sup>2</sup> )	0.518				0.518

#### Table 2. Output parameters at V= 6 m/s

#### The result by CFD analysis, P = $2 \times 3.14 \times N \times T / 60 = 31.75$ watt

#### **4. CONCLUSION**

In this paper from the calculations and analysis we can see that the power generation capacity of modified Savonius rotor is more as compare to conventional Savonius rotor.

The theoretical power generated by the conventional Savonius rotor is 21.24 watt. And for the modified Savonius rotor the theoretical power generated is 97.26 watt and power generation calculated by analysis of modified Savonius rotor is 31.75 watt which is much greater than the power generated by conventional Savonius rotor.

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# Study of Effect of Process and Design Parameters on the Shear Strength of Spot Weld by using Taguchi method

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Sheets [9] and [11].It increases contact area between electrode and specimen, gives more strength as discussed above. Combined effect of all these parameters can be seen on cause effect diagram

# ABSTRACT

The effect of the nugget diameter, no. of spots, and distance between two spots on the tensile shear strength of spot weld of two similar sheets are investigated through experiments. For designing experiment we have been used taguchi method. Similar sheets of uncoated AISI 304 (SS304) are welded by resistance spot welding under different processing conditions and these joints populations are tested for tensile shear loading condition. Specially designed and fabricated fixtures are used to load the lap shear specimen in the universal testing machine. The experimental result indicate that the failure load of spot welds in lap-shear specimens increases when nugget diameter, number of spot, welding current, spacing between spots and sheet thickness increase for the selected ranges.

**Keywords**–Distance between spots Number of spots, Nugget diameter, Sheet thickness, and Shear strength, Taguchi Method

# **1.INTRODUCTION**

Resistance spot welding (RSW) is a process of joining metal components through the fusion of discrete spots at the interface of the work pieces. It is one of the most useful and practical methods for the manufacture of sheet metal assemblies. This process is common for welding sheets of aluminium, stainless steel, titanium alloys etc. A typical automobile consist of more than 5000 spots [1]. Strength of spot weld defines the quality of integrated structure of automobile and improves the reliability of assembled sheets. Major problem is that inconsistent quality from weld to weld. Another problem is spatter generation due to excessive current and electrode contamination. Many parameters affect strength of spot weld. So to study effect of parameter on strength of spot weld is key to improve design of spot weld joint. Spot welds made at low welding currents gives less size of fusion zone, grain structure become more coarser than that of base plates, less hardness of fusion zone and small fusion zone size led to experiencing interfacial mode during the shear tensile test i.e.less strength of spot weld joint[2]. For those spots welds made at high welding currents gives higher hardness of fusion zone due to marten site formation, grain size become less and larger fusion zone led to pull-out failure mode during the tensileshear test.Spot welds made at low electrode pressure gives less strength because strength is dependent on cooling rate. If cooling rate is high, material becomes brittle and viceversa. This extra air increases cooling rate thereby decreasing strength. Spot welds made at less to flow current for less time through work piece.

This in turn causes the volume expulsion of the metal. This expansion is responsible for the electrode penetration into the



#### Fig.1.Cause-effect diagram

The diameter of the spot weld nugget, d is chosen based on an empirical formula recommended by the American Welding Society (AWS), diameter of nugget is considered as follows.  $d \ge 4\sqrt{t}$ 

However, several author claim that this equation is not safe for thickness beyond 1.5mm. Through the effect of the process parameters on the mechanical behaviour of resistance spot welds on steels is well documented, study of failure modes of spot weld. For the analysis purpose we have used AISI 304 steel standard material as a specimen material. The Chemical Composition of AISI304 material is given in following table

Ch	Chemical composition of uncoated AISI 304steel								
	Alloyir	ng elemen	nt (wt %)	)					
	С	S	Ph	Mn	Si	Cr	Ni		
	0.057	0.004	0.028	1.02	0.45	18.06	8.54		





# **Fig.2. Dimensions of tensile-shear strength test specimen** (Not to scale, dimensions are in mm)

Resistance spot weld has to be performed in controlled atmospheric condition that it shouldn't affected by moisture while nugget formation take place moisture content may cause defect in weld which won't give required information while testing and analysis performed .Three series of spot welded joints are tested. Each series consists of 9specimens, changing the weld current and time. The welds were done using a RSW electric resistance spot welding machine, with a nominal welding power of 10 kVA. Forge force is kept constant in all tests .For particular process parameters is best key to design spot weld, process parameters is best key to design spot weld, based on the strength of jointCircular cone tip electrode is selected for welding the specimen, shown below in figure 3.



Fig.3.conet

#### ype Electrode

2. TAGUCHI METHOD

Design Of Experiments (DOE) is a powerful statistical technique introduced by R. A. Fisher in England in the 1920's to study the effect of multiple variables simultaneously. In his early applications, Fisher wanted to find out how much rain, water, fertilizer, sunshine, etc. are needed to produce the best crop. Dr. Taguchi's standardized version of DOE, popularly known as the Taguchi method or Taguchi

approach, was introduced in the USA in the early 1980's. Today it is one of the most effective quality building tools used by engineersinall types of manufacturing activities. the experimental data will allow you determine:-

- How to substitute a less expensive part to get the same performance improvement you propose
- How much money you can save the design
- How you can determine which factor is causing most variations in the result
- How you can set up your process such that it is insensitive to the uncontrollable factors
- Which factors have more influence on the mean performance
- What you need to do to reduce performance variation around the target
- How your response varies proportional to signal factor (Dynamic response)
- How to combine multiple criteria of evaluation into a single index
- How you can adjust factor for overall satisfaction of criteria an adjust factors for a system whose of evaluations
- How the uncontrollable factors affect the performanceetc.,

#### **APPROACH: ROBUST DESIGN**

• Reduce variation without actually removing the cause of variation. Achieve consistent performance by making product/process insensitive to the influence of uncontrollable factors.

#### WHAT DOES IT DO? -

Optimize design, solve problems, build robust products, etc.

#### AREAS OF APPLICATION:

- Analytical simulation (in early stages of design).
- Development testing (in design and development).
- Process development. Manufacturing.

• Problem solving in all areas of manufacturing and production.

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# **3.EXPERIMENTAL PROCEDURE**

Chemical compositions of AISI 304 are given in table 1. Resistance spot welding lap joints were done on specimens of three series of spot welded joint are tested. Each series consists of 9 specimens. Specimens loaded. Table 2 spot welding design and process parameters and corresponding shear strength values. Resistance spot welding lap joints were done on specimens of 120mm x 120mm x 1mm in size. Figure 2 shows the geometry and dimensions of the welded.



Fig.4. Local display of experimental set up

#### Table 2. Ranges of parameters

Sr. No	Parameters and Designations	Ranges			
		Low	Middle	High	
1	Number of spots(n)	2	4	6	
2	Distance between two spots(X)	9	11	13	
3	Thickness(t)	0.71	0.91	1.21	
4	Nugget diameter(d)	3.1	3.5	4.1	

5	Current(I)	2.67	3.2	4

# Table 3. Resistance spot welding parameters and corresponding strength (Taguchi's $L_{27}$ Array)

Run	n	X	t	I	d	Shear Strengt h (N)
1	2	9	0.76	4	3.2	5203
2	2	9	0.76	3.2	3.2	12543
3	2	9	0.76	2.67	3.2	13748
4	4	11	0.91	4	3.45	19234
5	4	11	0.91	3.2	3.4	20867
6	4	11	0.91	2.67	3.2	20823
7	6	13	1.21	4	3.15	23543
8	6	13	1.21	3.2	3.5	24936
9	6	13	1.21	2.67	3.6	35088
10	2	11	1.21	4	3.1	10729
11	2	11	1.21	3.2	3.75	12119
12	2	11	1.21	2.67	4.1	15734
13	4	13	0.76	4	3.2	17433
14	4	13	0.76	3.2	3.2	20567
15	4	13	0.76	2.67	3.2	22023
16	6	9	0.91	4	3.28	28534
17	6	9	0.91	3.2	3.8	27035
18	6	9	0.91	2.67	3.2	31613
19	2	13	0.91	4	3.4	12436
20	2	13	0.91	3.2	3.9	15113
21	2	13	0.91	2.67	3.2	12712
22	4	9	1.21	4	3.33	17916
23	4	9	1.21	3.2	3.51	19214
24	4	9	1.21	2.67	3.7	26614

25	6	11	0.76	4	3.2	23610
26	6	11	0.76	3.2	3.2	25830
27	6	11	0.76	2.67	3.2	27930

Table 4. 27	' Tested	specimen	with	their	modes	of failure
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01[1]	10[I]	19[I]
02 [ P ]	11[I]	20[ P ]
03[ P ]	12[I]	21[ P ]
04[I]	13[ P ]	22[I]
05[ P ]	14[ P ]	23[1]
06[ P ]	15[ P ]	24[I]
07[ I ]	16[ I ]	25[ P ]
08[ I ]	17[ P ]	26[ P ]
09[I]	18[ P ]	27[ P ]

Where,

I= Interfacial failure of multi-spot welded specimen P= pullout failure of multi-spot welded specimen

Twenty seven specimens spot welded joints are tested. Table 2 shows spot welding parameters and corresponding shear strength values. The shear strength testing has been carried out in a servo hydraulic Universal Testing machine at a constant cross-head speed of 1.31mm/min up to the final failure of the joint. Specimen failed partially and completely by pull out failure mode under constant loading velocity. Equation (2) is regression equation of experimental data.

Fs = K + 3895 n + 44.90 X + 1691.42 t - 3553.06 I	
+ 2650.53d	(2
Where,	
Fs = Shear Strength in N.	
K = Constant = 5138.81	
n = No of spots	
X = Distance between two spots (mm)	
t = Component sheet thickness (mm)	
I = Current supplied (KA)	
d – Nugget diameter (mm)	

= Nugget diameter (mm)

# **4.RESULT AND DISCUSSION**

It is currently assumed that the mechanical strength of the RSW is mainly influenced by the nugget diameter, no. of spots and distance between two spots. The mechanical properties of the nugget and HAZ of the welds, where weld failures happen, also play a relevant role in the performance of the welds. Both nugget diameter and mechanical properties of the welds are directly affected by, the welding parameters such as welding current. An approximately linear relationship was observed between nugget diameter failure load.



#### Fig.5.Nugget diameter

Fig.5. shows nugget diameter .It is observed that as the nugget diameter increases shear strength also gradually increases. Because of the contact area between the weld and specimen surface is increasing due to which shear strength also increases. Fig.6.shows relationship between shear strength and nugget diameter.



Fig.6. Relationship between shear strength and

#### Nugget diameter

Fig.7. shows relationship between shear strength and sheet thickness. Current is kept constant while sheet thickness is varies within specimen welding. It is observed that there is gradually increase in strength after as the thickness of sheet is increased. Because of the more thickness more surface contact area is get in between weld and specimen.



Fig.7. Relationship between shear strength and Sheet thickness

Less thickness sheets are failed in nugget pullout failure because nugget diameters here stronger than the sheet thickness so there are not any separation of joint but sheet pullout. Below shown in figure.8



Fig.8. Pullout Failure mode

A considerable bending of specimens is observed when component fails in pull out failure mode. Pull out failure of specimens is observed only at higher level of process parameters.



Fig.9 Distance between two spots Vs Shear strength

Fig.9 shows relationship for distance between two spots and

Shear strength. For selected range of number of spot, it is observed that as the distance between two spots is increased and shear strength of weld is increased. In practice, shear strength increases with increasing spot spacing up to certain limit after this shear strength starts decreasing.



Fig.10.Relationship between Shear strength and Number of spots

Above Fig.10.shows the relationship between Shear strength and number of spots. It is observed that there is gradually increases in strength after the no. of spots are increased.

# **5.CONCLUSION**

Here we have been used taguchi method to design experiments further we have performed on UTM. The influence of the process and design parameters on the tensile-shear strength of resistance spot welds on uncoated mild steel is studied. The conclusions obtained are summarised as follows:

- I. A simple regression equation is proposed to predict the shear strength of spot weld.
- II. A significant increase in the failure load in static shear lap tests is observed in welds done with increasing distance between two spots, the failure changes from interfacial mode to pullout mode.
- III. Increase in no. of spots causes increases in shear strength and considerable bending of specimens is observed in pullout failure mode.
- IV. Increasing sheet thickness affects increasing in shear strength.

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# **6. BIOGRAPHIES**



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# Flow pattern and heat transfer in Agitated Thin Film Evaporator

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## **Abstract:**

Agitated thin film evaporator is a device often used to purify liquids, to separate temperature sensitive mixtures, or in general to provide short residence time in heated zones. The heat transfer and flow pattern mechanisms involved in it are poorly understood. This paper discusses the flow pattern and heat transfer in an ATFE. The flow of feed in the ATFE undergoes helical path while flowing through the annular part of evaporator. The ATFE is described stage wise and the parameters such as physical

## **1. Introduction:**

Agitated Thin Film Evaporators, often referred to as scraped film evaporators, can be used in chemical process operations where heat and mass transfer steps are rate limited since they can be adapted to treat liquids with a wide range of viscosities while maintaining short residence times. For example, both Heimgartner (1980) and Biesenberger (1983) indicate in reviews on the applications of such devices that they can operate at liquid viscosities Ranging from I poise to 105 poise. Above this point high viscosity in the film decreases the efficiency of mass transfer, and can lead to increase in power costs that make operation economically unfavorable. Since they provide a high ratio of surface area per unit volume of solution, they can also act as polymerization reactors and as devices for solvent and monomer removal from polymer melts at moderate production rates.

properties, scraped surface heat transfer co-efficient, and evaporation rate are derived using stepwise model equations. The penetration theory is used to obtain the scraped surface heat transfer co-efficient.

#### **Keywords:**

Agitation, Mixing, Evaporator, Thin Film Flow



# 2. Flow pattern in ATFE:

ATFE is a wiped surface assembly with a rotor having 3 or 4 rows of blades. The shaft rotates with a given angular velocity and the blades layout a thin film on inner wall of the dryer. If the volumetric feed flow rate is relatively high enough, the film formed on the inner wall will be thicker than the clearance between the wiper blade and the inner wall which results in a fillet/bow wave of liquid on blades front edge.

The flow can be either laminar or turbulent depending on fluid properties and operating conditions. Several authors have studied the flow behavior of various feeds in the scraped surface geometry.



• *Bott and Romero* observed the continuous fillet in front of the blades along the height of vertical

scraped surface heat exchanger for water as well as water-glycerol mixture.

- *Abichandani*has observed the fillet in front of the blade tip for horizontal geometry.
- Zeboudjhas reported that the hydrodynamic condition of flow affects the film thickness and residence time of fluid elements in wiped film evaporators.
- Mckelvi and Sharps examined the velocity profile and flow structure of the bow wave in wiped blade evaporator and studied the dependence of blade clearance film thickness and throughput.
- *Komaristudied* the flow structure and mixing mechanism in the bow wave both theoretically and experimentally in wiped film evaporator.

The authors examined the effect of fluid viscosities upto 13 Pa-s and found that from 70 to 90% of fluid flow in the device lies in the bow wave when the evaporator was equipped with vertically aligned blades.

McKenna presented a model for the design of a wiped film evaporator. The model considered the fluid transport and mass transfer aspects of devolatisation of polymer solution. He observed a limiting rotational speed for mixing in WFE above which significant gain in mass transfer was obtained at the expense of very large power consumption.

From the above observations, it can be said that flow pattern in ATFE is a combination of the rotational film flow induced by the mechanical action of blades, and an axial flow. The pitched blades move the fluid in bow wave both tangentially and axially. The dimensions of bow wave depend on the feed flow rate and its physical properties. When the thin film flow is of concern in a scraped geometry, the flow can be distinguished in two sections

- The bow wave which constitutes the major portion of feed
- The thin film adhering to inner wall.

The concept of *Reynolds number* (Re) is well defined for a straight pipe to characterize the flow behavior of *Newtonian fluid*. Subsequently, it is also defined for other geometry configuration such as a stirred tank or an annulus based on the impeller tip speed and equivalent diameter concept. The *rotational Reynolds number* for an annular flow can be given by

$$Re_R = \frac{D_e(R_r\Omega)\rho}{\mu}$$

Where D<sub>e</sub>= equivalent diameter given by

 $D_e = 4 \times r_h = 4 \times \frac{Crosssectional area of channel}{Perimeter of channel incontact with fluid}$ function of axial and rotational Reynolds nos. for laminar

$$D_e = 4 \times \frac{\frac{\pi (D_s^2 - D_r^2)}{4}}{\pi D_s + \pi D_r} = D_s - D_r$$

In the case of thin film flow, only the outer wall (stator) remains in contact with the fluid and the equivalent diameter can be written as

$$D_e = 4 \times \frac{\frac{\pi (D_s^2 - D_r^2)}{4}}{\pi D_s} = \frac{(D_s^2 - D_r^2)}{D_s}$$

Thus, the rotational Reynolds no. derived in the case of thin film would be higher as compared to that obtained for conventional annulus.

#### 3. Heat transfer in ATFE

#### 3.1 Penetration theory

The penetration theory is the key to the analysis of heat transfer in scraped surface geometry. Several authors have used the penetration theory in its original form or with some modification to model the scraped side heat transfer coefficient. The correlations based on the Nusselt number have been also developed considering the laminar and turbulent flow in such devices. The heat transfer is controlled by conduction into a thin layer at the heat transfer surface and by the speed of mixing of this laver into the bulk of fluid. The basic approach of heat transfer from hot wall which is scraped by a blade is provided by the penetration theory. The theory is based on conductive heat transfer. The mass flow rate and viscosity of the process medium have no influence on the heat transfer coefficient. The heat transfer process can be divided into following 2 steps :

- Only molecular conduction transfers the heat at the surface during the time between 2 scrapings.
- At the end of scraping, the film at surface gets perfectly mixed with the bulk flow.

Each blade scrapes a certain amount of fluid and accelerates it along the inner hot wall surface. At any given instant, the fluid pushed by blade is partly in the form of film behind the blade and partly in the form of fillet in front of the blade. The penetration theory assumes the temperature equalization in bow wave/fillet after the film is scraped off. Hence, it has been found that penetration theory works well for low viscosity fluids. The heat transfer depends on the flow regime. The values of heat transfer coefficient are usually low in case of laminar flow because of low radial mixing and high in turbulent flow because of high radial mixing. Generally, the axial and rotational Reynolds nos. decide the flow regime in a scraped surface geometry and hence the heat transfer coefficient is a Previously, the studies of heat transfer in scraped surface heat exchangers were based on the application of the penetration theory to calculate the overall heat transfer coefficient. It has been assumed that

- the scraper only removes the boundary layer
- bulk mixing is ideal
- the flow pattern is completely rotational

In order to describe the total heat transfer process with this relation, the time between two scraper passages should be smaller or atleast equal to the time needed for full penetration of heat into the boundary layer/film.

The temperature profile across the boundary layer can be given by Fourier equation as follows:

With Boundary conditions

$$\begin{array}{l} \succ \quad z=0, \ T=T_w \\ \succ \quad z \rightarrow \infty, \ T=T_B \end{array}$$

and initial condition

> 
$$t=0, T=T_B$$
 for all z

the above equation can be solved with given boundary conditions which results

$$\frac{T-T_w}{T_B-T_w} = \frac{2}{\sqrt{\pi}} \int_0^{z=\frac{\pi}{2\sqrt{\alpha t}}} e^{-z^2} dz \dots (2)$$

The steady state conductive transport of heat can be described by

$$Q_{\rm w} = -k \frac{dT}{dz} \dots (3)$$

Combining equation (2) and (3), the heat flux can be expressed as

$$Q_W = -k \frac{dT}{dz_{atx=0}} = (T_B - T_W) \sqrt{\frac{k\rho C_F}{\pi t}} \quad \dots (4)$$

Hence, the heat transfer coefficient can be expressed as

when the heat transfer mechanism between two scraper actions is described by the penetration theory, the time mean value of the heat transfer coefficient can be calculated by the following equation

Combining equations (5) and (6) results in

$$\overline{h} = 2\sqrt{\frac{k\rho C_z}{\pi t_{sc}}}....(7)$$

Expressing the time between two scraper actions in terms of number of blades (*B*) and the rotational frequency (*n*),  $t_{sc}$  can be written as

$$t_{sc} = \frac{1}{nB}....(8)$$

Combining (7) and (8), the scraped side heat transfer coefficient can be given by following equation

$$h_{pen} = 2 \sqrt{\frac{k\rho C_p n \bar{B}}{\pi}}....(9)$$

The fluid passes through the ATFE in several forms such as liquid feed, paste, wet powder and dry powder at the dryer outlet. The scraped side heat transfer coefficient can be obtained by assuming the average properties throughout the dryer which are the function of moisture content. It can be assumed that the wet powder formed in the dryer lies in the form of thin layer adhering to the wall until the outlet of the dryer the scraped side heat transfer coefficient decreases from top to bottom as the solid content tends to increase in the processing fluid along the height of the dryer. The ATFE is used to produce the powder from some specific types of feeds which generally have 10 to 30% solid content with viscosity in the range of 10 to 100 times that of water. Particularly ATFE is used for the drying of organic and inorganic salt solution, pharmaceuticals and bulk drugs, dyes and pigments, etc.

#### **3.2 Process Side Heat Transfer Coefficient**

The heat transfer coefficient on the scraped side in ATFE can be estimated using the penetration theory. As the penetration theory does not depend on the viscosity, it can be used to calculate the heat transfer coefficient for slurry and paste type feed materials. The scraped side heat transfer coefficient depends on thermal conductivity, density and specific heat of the material.

The average values of thermal conductivity, density and specific heat are considered at saturation temperature for the given pressure condition. These properties can be written as,

$$k_{process} = X_i k_{i_{avg}} + (1 - X_i) k_{o_{avg}}$$

$$\begin{split} \rho_{process} &= X_i \rho_{i_{avg}} + (1 - X_i) \rho_{o_{avg}} \\ c_{p_{process}} &= X_i c_{p_{i_{avg}}} + (1 - X_i) c_{p_{o_{avg}}} \end{split}$$

The heat transfer coefficient by the penetration theory is then calculated as follows,

$$h_{process-side} = 2 \sqrt{\frac{k_{process}\rho_{process}C_p nB}{\pi}}$$

#### 3.3 Overall Heat Transfer Coefficient

The thermal design of ATFE is similar to the conventional heat exchanger where in the first step is to obtain the overall heat transfer coefficient (U) and then calculate the desired heat transfer area for a given capacity. In the present experimental setup the heat transfer area is fixed  $(0.05 \text{ m}^2)$  and it is required to calculate the overall heat transfer coefficient. The process side heat transfer coefficient is calculated using the penetration theory. The overall heat transfer coefficient can be represented by following equation

$$\frac{1}{U} = \frac{1}{h_{process-side}} \left(\frac{D_{so}}{D_{si}}\right) + \frac{1}{h_{jacket-side}} + \frac{D_{so}ln\frac{D_{so}}{D_{si}}}{2k_w}$$

The metal wall resistance can be neglected because of the high thermal conductivity of wall material and small thickness.

When applying the penetration theory, the process of heat transfer from the wall to liquid layer can be considered as molecular conduction to semi-finite solid. Those who were suspicious of applicability of penetration theory have developed the Nusselt type correlation which are based on rotational Reynolds number and/or Prandtl number the penetration theory is independent of the velocity (mass flow rate) and the viscosity of liquid. The penetration theory works well for low viscosity liquid such as water in turbulent regime (Rer>6000). The theory is based on assumption of temperature equalization in bow wave immediately after scraping which might not happen in the case of high viscosity liquid. In contrast, the assumptions are quite realistic in the case of wiped thin film flow rather than the full liquid flow such as in a scraped surface heat exchanger. With the hold up of 15-20% in AFTD/ATFE the complete mixing is possible even for the high viscosity liquid because of turbulence created by the rotor ...

It is assumed that the evaporation occurs on the interface of thin film only and any bubble formation is suppressed by scraper. The feed behaves as a paste type material throughout the dryer. The heat transfer coefficient is likely to change with respect to the percentage of dissolved solid in the feed. The properties and fraction of dissolved solid in the feed solution can greatly affect the heat transfer coefficient along the height and hence its average value.

#### 4. Conclusion:

The only way to identify the flow regime in ATFD is the bow wave in front of the blade which occurs because of low axial Reynolds number the bow wave forms in front of the blade irrespective of the viscosity of fluid and flow regime. Thus it is difficult to express the flow regime in the agitated thin film dryer. Hence, the rotational Reynolds number has been defined to characterize the thin film flow in ATFE/ATFD. The assumptions of the penetration theory are quite realistic in the case of wiped thin film flow rather than the full liquid flow in a scraped geometry. The theory can be used to model the conductive heating from the wall to the wet particles in a scraping geometry provided the wet particles form thin film over the scraping wall. The dependence of the penetration theory over the speed of the rotor signifies that the heat transfer coefficient increases with an increase in the speed of the rotor. However, in actual practice after some optimum speed of the rotor.

#### 5. Acknowledgements:

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#### 6. Nomenclature:

- A Cross Sectional area $(m^2)$
- $A_h$  Heat transfer area(m<sup>2</sup>)
- $A_i$  Cross Sectional area of the annulus(m<sup>2</sup>)
- B No. of blades
- C<sub>p</sub> Specific heat capacity(J/kgK)
- D<sub>e</sub> Equivalent diameter(m)
- D<sub>r</sub> Diameter of the rotor(m)

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- D<sub>s</sub> Diameter of the shell(m)
- D<sub>t</sub> Diameter of scraper(m)
- Fr Flow rate of Fluid in process side(kg/s)
- H Length of Dryer(m)
- h Heat transfer co-efficient( $W/m^2K$ )
- $h_h$  Jacket side heat transfer coefficient (W/m<sup>2</sup>K)
- $h_{cc}$  Process side heat transfer co-efficient(W/m<sup>2</sup>K)
- k Thermal conductivity( $W/m^2K$ )
- $k_w$  outer wall Thermal conductivity(W/m<sup>2</sup>K)
- M<sub>v</sub> Total water evaporated(kg/s)
- Q heat transferred(W)
- Re<sub>R</sub> Rotational Reynolds No.
- T Temperature(C)
- T<sub>w</sub> Wall temperature(C)
- t time(s)
- X<sub>i</sub> Mass Fraction of solvent(w/w)
- µ Viscosity(kg/ms)
- $\rho$  Density(kg/m<sup>3</sup>)
- z Axial direction
- i inlet condition
- o outlet condition

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# VERTICAL MATERIAL HANDLING SYSTEM

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## ABSTRACT

The purpose of this research is to design and suggest a new mechanism other than the very conventional methods used for material handling. Nowadays value and requirement of land in India has grown very rapidly. Thus effective space utilization is given prime importance in industrial design. Various manufacturing processes are carried out on multiple floors. For example while manufacturing wafers, soaps, biscuits and other cookies and also on various assembly lines different processes are carried out at multiple stations. These stations are built on multiple floors for optimizing the space utilization. Also the finished goods are stored at a higher level on racks. Thus the need of an efficient and compact material handling system in vertical direction is arising day by day which will transfer the material at higher rate than some existing material handling system.

Organizations are trying to utilize every inch of space often consider vertical carousels and vertical lift modules because of high storage density they provide.

The paper involves the design of an efficient system which will transfer the material from lower level to higher level. It also includes the static analysis carried out on the most critical component, crank using Solid works and Ansys.

Keyword: Material Handling, static analysis, Solidworks, Ansys.

## 1. INTRODUCTION

We are focusing on the material handling which takes place between two manufacturing stations which are placed one above the other. For doing so nowadays inclined conveyors are used. Conveyors take longer to transfer material and also consume more space. Thus we have developed a system working on a mechanism which is obtained by fixing the crank of a single slider crank chain. The system is compact and works on inversion of single slider crank chain similar to piston cylinder arrangement in I.C. engine. The system transfers the material vertically in n number of steps. Each step consists of crank, connecting rod and piston arrangement. As the crank rotates piston reciprocates inside the guides provided. Height of piston is increased in every step. Here six cranks are mounted on one crankshaft at 180 degree to each other. Resembles to six piston cylinder mounded on one crankshaft. The top of piston is inclined at an angle with the horizontal. The object is

transferred from one piston to next piston after every 180 degree of crankshaft revolution. Thus after every step a certain height is achieved by object. After reaching the peak in every step the material is transferred to the next piston which is at its bottom most position. To move the material up, piston height is increased in every step by certain calculated value. The height achieved by piston in every step is equal to diameter of crank.

To transfer the objects with small width this system is more effective. As the width of the object goes on increasing the length of system will also increase. The length can be reduced by increasing the crank diameter which will reduce the number of steps required and thus reduces the length.

The model which we have prepared lifts a 50 mm wide object to a height of 1150 mm consuming 0.5 meter horizontal length. This system can be modified as per the applications.

The system looks like staircase to climb from one floor to another with its steps reciprocating vertically.

#### 1.1. About Material Handling

Starting from the time, raw material enters the factory gate and goes out of the factory gate in the form of finished products, it is handled at all stages between, no matter it is in stores or on shop floor. It has been estimated that average material handling cost is roughly 20 to 60 % of the total cost. It thus, becomes clear that the cost of production of an item can be lowered considerably by making a saving in the material handling cost.

#### 1.2. About Slider Crank Mechanism



Figure 1 Single slider crank chain

As shown in figure 1, when one turning pair of a four bar chain mechanism is replaced by sliding pair, it becomes a single slider
crank chain or simply slider crank chain. It is one of the cheapest mechanisms.

Applications of slider crank mechanism

- Reciprocating engine
- Rotary engine
- Oscillating cylinder engine
- Hand pump
- Scotch yoke
- Oldham coupling
- Eliptical Trammel

### **1.3.** About The Square Cam Mechanism

In this system the rotation of the motor is to be stopped after every haft revolution for certain time period so that the material gets transferred. Then motor should start and complete the next haft revolution and again stop. To achieve this square cam mechanism is used.

### 2. LITERATURE REVIEW

Several definition of material handling exists. Material handling is defined in Compton's Interactive Encyclopedia as "The moment of raw material, Semi-finished goods and finished article through various stages of production and warehousing is called material handling."

Traditional view of material handling sees material handling operation as non-value adding and only contributing to the cost of product. The modern view recognizes the space and time utility of material handling operation. Material handling equipment is used to increase output, control costs, and maximize productivity.

The various methods used for material handling in vertical direction are inclined conveyor, lift, robots, spiral conveyors etc. The angle of inclination in case of inclined conveyor is limited to certain value. The inclined conveyor also consumes large amount of space. The lift is another equipment to transfer the material from ground to first floor. The height achieved is higher compared to others. Robots are also used to transfer precise parts from one level to other. Lift and robot are effective but are expensive.

Spiral conveyor is also an important development in vertical material handling system. Push bar conveyor is another system in which a bar supports the object on an inclined conveyor.

Recent development in material handling is automated storage and retrieval system. This includes:

- Unit load AS/RS
- Mini load AS/RS
- Micro-load AS/RS
- Vertical lift Modules
- Horizontal carousels
- Vertical carousels

AS/RS saves up to 85% + of otherwise wasted floor space. It also reduces the labor requirements and enhances product security.

There is a need of improvement in these conventional methods. An alternative to all these methods is to be found. There is a need to achieve maximum height consuming minimum surface area.



Figure 2 Conveyor Layout

Figure 2 shows conveyor Layout. Consider the workers are working on ground and first floor. The scope of our system is to transfer the material from the conveyor on ground floor to the conveyor on first floor automatically and continuously.

A storage and retrival system is shown in figure 3. Our system can be used to transfer the material to these multi-level racks. The system can be made mobile so that it can be moved.



Figure 3 Storage and retrieval System

### Theory on crank and connecting rod mechanism

The invention of the crank and connecting rod system is considered by historians of technology to be the most important mechanical device of the early fifteenth century in Europe. Bertrand Gille says that this system was unknown before that date and this had considerably limited the applications of mechanization.

Conrad Keyser (D. C. 1405) described in his book Bellifortis a hand mill operated by the crank and connecting rod system. But Francesco di Giorgio Martini (1439 – 1502) in his treatise on architecture illustrated a saw for timber driven by a water wheel in which the crank and connecting rod system was applied for the first time in a continuously rotating machine. Leonardo da Vinci (D. 1519) incorporated a crank and rod in his designs. Ramelli also used the crank and connecting rod system was fully developed in two of al-Jazari's water raising machines.

### 3. DESIGN CALCULATION

Specifications of system designed and manufactured by us are given in table 1.

### Table 1 Specification of designed system

Width of the object	50 mm	
Radius of crank	100 mm	
Weight carried by one piston	25 N	
<b>RPM for Crank</b>	30 RPM	
Total surface area consumed	$0,15 \text{ M}^2$ ( + motor area)	
Total height achieved	1150 mm	
Number of steps required	6 steps	

Assumptions

- 1) Crankshaft is supported by bearings at its two ends.
- We have designed the system to transfer five objects having total weight of 25 N at a time.
- The bottom surface area of 1 object will be equal to (50 x 50 mm).
- 4) All the parts except pistons are made up of Forged steel.
- 5) Coefficient of friction for wood is 0.5 ( $\mu = 0.5$ )

#### 3.1. Crankshaft



**Figure 4 Crankshaft** 

When the piston is at bottom dead center the bending moment on the crankshaft will be maximum. In this position the radial force is maximum and tangential force is zero. A 3D model of Crankshaft is shown in figure 4. We have considered the crankshaft as a simply supported beam. The maximum bending moment will be at center. For this maximum bending moment crankshaft diameter is calculated using following formula.

Bending stress,  $\sigma b = \frac{M}{7}$ 

Where M = maximum bending moment

Z = section modulus = ( $\prod / 32$ ) x D<sup>3</sup>

Considering the crank at a position where tangential force is maximum. From the figure 5 when,  $\theta + \phi = 90$  tangential force will be maximum.

Due to this maximum tangential force torsional shear stress will be developed in crankshaft.



Figure 5 radial and tangential forces

Considering this torsional shear safe diameter is calculated using following formula.

Maximum turning moment,  $Te = \frac{\pi}{16} dc^3 i$ 

Where,  $\tau = safe shear stress$ 

dc = Crankshaft Diameter

### **3.2.** Connecting Rod

Connecting rod is subjected alternating tensile and compressive force. Compressive force for the connecting rod is much higher hence the connecting rod is designed for maximum compressive stress. We have considered connecting rod as a strut and used the Rankine formula considering both ends of the connecting rod as hinged. Following formula is used.

$$W_{\rm B} = \frac{\sigma_c . A}{1 + a \left(\frac{L}{k_{\rm xx}}\right)^2}$$

3.3. Pistons



**Figure 6 Piston** 

A 3D model of Piston is shown in figure 6. Pistons are made up of wood with their height increasing gradually. The increase in height is selected in such a way that at the end of forward stroke of first piston the top surface of the piston should coincide with the top surface of the second piston which is at its bottom dead center. When top surfaces of the two pistons coincide with each other crank rotation is stopped and the object slides down from one piston to the other due to inclined surface of piston. The angel of inclination is calculated as given below.



Figure 7 Angle of Repose

Consider a body A of weight W resting on inclined plane B as shown in figure 7. If the angle of inclination,  $\alpha$  of the plane to the horizontal is such that the body begins to move down the plane then the angle  $\alpha$  is called angle of repose. It is given by,

 $\tan \alpha = \mu$ for  $\mu = 0.5$ ,  $\alpha = 26.56$  °. Thus we have considered 30° angle of inclination of the surface of piston with the horizontal.

## 3.4. Frame



**Figure 8 Frame** 

We have selected standard ISA2525 (L type) section for frame. We have checked it for bending due to loads coming on crankshaft. Frame model is shown in figure 8

To join the connecting rod with the piston we have used 0.5" bolt. We have considered double shear of the bolt due to load on piston. We have also considered the twisting moment due to tangential force on the bolt.

## 4. ANALYSIS

## 4.1. Procedure Of Static Analysis.

First, we have Prepared Assembly in Solid works for crankshaft and Save as this part as IGES for Exporting into ANSYS Workbench Environment. Import .IGES Model in ANSYS Workbench Simulation Module.

# 4.2. Apply Material For Crankshaft As Forged Steel.

Material Details: Material Type: - Forged Steel Designation: - 42CrMo4 Yield strength (MPa):- 680 Ultimate tensile strength (MPa):- 850 Elongation (%):-13 Poisson ratio:-0.3

## 4.3. Mesh Of The Crankshaft

Mesh statics Number of nodes = 15821 Number of elements = 7349 (586 number of contact elements and 6763 number of contact elements)



**Figure 9 Meshing** 

# 4.4. Define Boundary Condition For Analysis

Boundary conditions play an important role in finite element calculation here; we have taken both remote displacements for bearing supports are fixed. (This has only one degree of freedom (Rotational))

We have done analysis of the crank. The crank is the most critical part of our system. We have considered the crank shaft as a simply supported beam. We have given rotation of 30 rpm to the crankshaft. Six loads are acting on the crankshaft. Figure 10 shows the loading of the crank shaft for doing the analysis.

## 4.5. Define Type Of Analysis

Type of analysis: Structural analysis



**Figure 10 Loading** 

## 4.6. Run The Analysis And Get The Result

Figure 11 shows the equivalent stress developed in the crank according to Von-Mises theory. The maximum value of equivalent stress is equal to 18.397 N/mm<sup>2</sup>.



Figure 11 Equivalent stress analysis using von-mises

The figure 12 shows the total deformation of the crankshaft due to above loading. The nature of deformation is also shown in figure 12. The maximum deformation caused by the load on the piston is equal to 5.466 e-001 mm



### Figure 12 Total deformation

## 4.7. Results

Table 2 Analysis Result

Туре	Result
Von-Mises stress	18.397 N/mm2
Deformation	5.466 x e-001 (1.009
Deformation	mm)

### 5. WORKING

The figure 13 explains the working of the system.



Figure 13 Assembly

Consider the smallest piston at the bottom most position it picks up the object to be transferred from lower level. Then its forward stroke begins when it reaches the top most position its top surface coincides with that of the next piston. At that time the second piston will be at its bottom most position. The crank rotation will stop until the object is transferred from first piston to second piston. As the transfer is complete the crank will start rotating and forward stroke of second piston starts. As the second piston reaches its top most position the object will slide down to third piston which will be at its bottom most position. Similarly material is transferred from one step to other till the last step. In this mechanism if the pistons at odd position are having bottom most position, the pistons at even position will have reached top most position and vice-versa. As explained above the crank rotation is to be stopped after every 180 degree of rotation. This is achieved by means of a limit switch arrangement which will stop the crank rotation for specified time after every 180 degree of crank rotation. The height achieved by the object will almost be equal to six times of crank diameter.

### 6. FUTURE SCOPE

As this is a new system developed there is a huge scope for improvement in future. Some of the improvements are listed below.

i. Rollers can be mounted on the top of every piston so that objects with flat base can slide down easily. This

will reduce the angel of inclination and the object can be transferred in horizontal position.

- A suitable mechanism if can be used to shift the object to the next piston. Using this we can transfer high quality precise objects without damaging them.
- This system can be designed according to its applications. Ex. to transfer spherical objects grooves can made on top of the piston.
- iv. We can also increase the rpm so the material may be transferred at a higher rate (Ex. some rigid objects).
- v. With some modifications this system can be effectively used in coal mines where we see long conveyors being used.
- vi. This system can effectively be used to store the finished goods or inventory on multilevel racks.
- vii. The system can be made mobile and used in industry at different sections.

## 7. CONCLUSION

An efficient and fast system has been developed for material handling in vertical direction. The designing of each and every part has been carried out as per the standards used globally. The structural analysis of the crankshaft has been carried out using Ansys and Solidworks. The system is a better option for current methods used for material transfer in vertical direction such as inclined conveyors, lifts etc. which consume more space, time and money. The figure 14 illustrates the disadvantages of a conveyor system. This system can be used to transfer fluids without spilling out.



Figure 14 convention conveyor

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## **DESIGN OF SUGARCANE EYE CUTTING MACHINE**

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## ABSTRACT

The mechanical cutting properties of sugarcane stalks were studied using a linear blade cutting and size reduction device to determine of the effect of sample orientation with respect to the cutting element and quantify the possible cutting energy reduction. Also the effect of the dimensional parameters on mechanical cutting properties were studied on internodes and nodes for cutting force, energy, ultimate stress, and specific energy of sugarcane stalks. The device was used along with a universal test machine that quantified shearing stress and energy characteristics for applying force on sugarcane stalks through a blade device.

This research was carried out to determine the effect of loading rate and internode position on shearing characteristics of sugar cane stalk. The experiments were conducted at three loading rates of 5, 10, and 15 mm min-1 and at ten internode positions down from the flower. Based on the result obtained, loading rate had significant effect on the shear strength and specific shearing energy of the stalk. With increasing loading rate, the shear strength and specific shearing energy increased. Therefore, lower rates of blades are recommended for reducing energy requirement during harvesting and processing sugar cane stalks. In addition, the internode position had a significant effect on the specific shearing energy, while it did not have significant effect on the shear strength. The specific shearing energy increased towards the lower internodes. The average shear strength was obtained as 3.64 MPa varying from 3.03 to 4.43 MPa.

**Key words:** Mechanical cutting, moisture content, Sugarcane stalk, ultimate stress, Cutting energy.

## **1. INTRODUCTION**

India ranks second in the world, after Brazil, in terms of area and sugarcane production. In India, sugar industry is the second largest industry next to the textile industry is playing a vital role in the socio-economic transformation of the country. In Australia, about 5 million sugarcane cultivators produces ton of sugar. While in India about 50 million sugar cane farmers and their dependants have been involved in sugar cane cultivation. About 0.5 million skilled and unskilled workers are employed by the sugar industry and additional Employment is also generated by the allied industries.

India is an agricultural country, in which 70% people are farmers. As, the population of India is growing, and the demand of food is also increasing. Therefore, we should try to bring more land under cultivation.

For sugarcane node cutting, we are in need of a fast cutting process instead of traditional cutting methods. In past, agrirelated activities were taken care by means of manual force. But now a day in most parts of our country there is scarcity of labours; hence labours are not available when required. So the labour cost has increased as for cutting of sugarcanes only semi-skilled labors are required.

To minimize the labour cost and to get work done in minimum time and cheap cost we have designed the "<u>SUGARCANE</u> <u>EYE CUTTING MACHINE</u>". It is simple in

construction and does not require any skilled labour.

The need of the project focuses that since the agriculture is the back bone of the Indian economy we have projected our focus on the research and development in the field of the agriculture. The reason behind this project is to **decrease the human effort** and **reduce the cost**.

An engineer is always focused towards challenges of bringing ideas and concepts to life. Therefore, sophisticated machines and modern techniques have to be constantly developed and implemented for economical manufacturing of products. At the same time, we should take care that there has been no compromise made with quality and accuracy.

The sugarcane in the nursery is being cut by manual process. This increases the human effort, time to cut the sugarcane, which ultimately decreases the production rate. This results in the loses which reduces the profit margin of the farmers. So as to have sugarcane nodes for further cultivations.

As we know the definition of the machine is to reduce the human efforts this objective is achieved through our project "SUGARCANE EYE CUTTING MACHINE".

## 2. LITERATURE REVIEW

## 2.1 Manual Sugarcane Cutting By Sickle

Generally manual sugar cane cutting involves slicing and tearing action that results in plant structure failure due to compression, tension or shear. This manual sugarcane cutting practice is followed by the majority of the farmers because of the socio economical and agro-technological reasons. Different types of sickles are used in different parts of the country.

## 2.2 Principle of Sickle

Designs of sickles are based on principles of two types of cutting friction and shear. It is assume due to to friction the cutter slips around the stalk. Thpe serrated sickle combines the slicing and sawing action.

## 2.3 Drawbacks Of The Corroded Sickle

The Serrated edge used in cutting devices restricts the sliding action of the plant on the blade for adequate action of the plant on the blade for the cutting.

## **2.4 Single Impact Cutting**

Cutting energy as affected by various engine parameters. The Cutting energy is defined as a energy require to cut the plant stem, a process of cutting of stem is done through shearing action. Liljeghl (1961) while working with element, of shearing energy suggested some variables, which affect the energy required.



Figure 1. existing system in Padegaon

As shown in the pic., this system works on the slider crank mechanism. During the forward and return stroke there will be the cutting of the sugarcane . but the problem regarding to this type of system is that it's a very slow process also involve human interaction and this is unsafe for the worker.

## **3. DESIGN**

### **3.1 Motor Selection**

 $\tau =5 \text{ N/mm}^2$ d=30mm N=60rpm  $\eta$ =0.95

 $F = \tau x A$ =  $\frac{5 x 2 x 3.15 x 30^{2}}{4}$ = 7.1 KN

Energy required to cut the sugarcane E =  $0.5 \times D \times F$ = 0.213 KJEnergy required per min E = E  $\times N$ =  $0.213 \times 60$ = 12.78 KJ/MinMotor power = <u>Energy required per min</u>  $\eta \times 60$ 

 $= \frac{12.78 \text{ x } 1000}{0.95 \text{ x } 60}$ 

= 0.3 HP Selecting 1 HP motor and 1440 rpm

## 3.2 Gear Box

$$\begin{split} N1 &= 1440 \text{ rpm} \\ N2 &= 60 \text{ rpm} \\ \text{Single stage} \\ I &= 24 \\ \text{Since the gear boxes available in the market are of reduction} \\ \text{ratio 25.} \\ \text{Hence selecting reduction ratio 25} \\ I &= \frac{N1}{N2} \end{split}$$

 $N2 = \frac{1440}{25}$ 

N2 = 57.6 rpm

Dimension of stand = 30 cm height

Dimension key way = 6 mm deep and 10 mm wide

Dimension of the cutter = 65 mm height and 95 mm wide

Dimension of the pin = 10mm dia and 50 mm height

Dimension of large disc = 30cm dia and 12 mm thick

Dimension of small disc = 13 cm dia and 12mm thick



As shown in the diagram , it involves four stroke in the single revolution of the disc .

## **4**.FEEDING MECHANISM

The feeding of the sugarcane is done by means of the conveyor arrangement and clamping arrangement. Sugarcane stack is placed in the one side. One by one sugarcane is passed to the conveyor belt.

There is sprocket type arrangement which allow the only single sugarcane to passed to the conveyor belt. There is one pneumatic clamping which provid e the firmness during the cutting operation.

Pieces of the sugarcane are collected at the bin which is provided at the bottom of the stand.

After successful cutting of the single sugarcane the next sugarcane is passed to the conveyor by means of the sprocket arrangement which is activated by means of the sensor signal.

## **5. CONCLUSION**

In this paper from the calculations and analysis we can see that the by means of using sugarcane eye cutting machine we are getting the following advantages

It eliminates the human effort which is required for cutting that section of sugarcane that is used for the seeds in cultivation

The cutting time is minimized.

To minimize the errors produced due to the manual cutting of the sugarcane.

To reduce the losses in terms of finance and time.

To improve the production rate of the cutting pieces.

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## Some Critical Issues Relating To Implementation Of Reengineering in India

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## **1.BACKGROUND AND RATIONALE**

Engineering field has been defined by the Engineers Council for Professional Development, in the United States, as the creative application of "scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behaviour under specific operating conditions; all as respects an intended function, economics of operation and safety to life and property." (1)

The history of engineering can be roughly divided into four overlapping phases, each marked by a revolution:

Pre-scientific revolution: The prehistory of modern engineering features ancient master builders and Renaissance engineers such as Leonardo da Vinci.

Industrial revolution: From the eighteenth through early nineteenth century, civil and mechanical engineers changed from practical artists to scientific professionals.

Second industrial revolution: In the century before World War II, chemical, electrical, and other science-based engineering branches developed electricity, telecommunications, cars, airplanes, and mass production.

Information revolution: As engineering science matured after the war, microelectronics, computers, and telecommunications jointly produced information technology.(2)

India gained highly from the **LPG model** as its GDP increased to 9.7% in 2007-2008. In respect of market capitalization, India ranks fourth in the world. But seeing the positive effects of globalization, it can be said that very soon India will overcome these hurdles too and march strongly on its path of development. The lesson of recent experience is that a country must carefully choose a combination of policies that best enables it to take the

opportunity - while avoiding the pitfalls. For over a century the United States has been the largest economy in the world but major developments have taken place in the world Economy since then, leading to the shift of focus from the US and the rich countries of Europe to the two Asian giants- India and China. Economics experts and various studies conducted across the globe envisage India and China to rule the world in the 21st century. India, which is now the fourth largest economy in terms of purchasing power parity, may overtake Japan and become third major economic power within 10 years. So Globalization has taken us a long way from 1991 which has resultant in the advancement our country.(3)

## **1.1. Business Process**

Business processes are simply a set of activities that transform a set of inputs into a set of outputs (goods or services) for another person or process using people and tools. We all do them, and at one time or another play the role of customer or supplier.

You may see business processes pictured as a set of triangles as shown below. The purpose of this model is to define the supplier and process inputs, your process, and the customer and associated outputs. Also shown is the feedback loop from customers."



Figure 1.1: Business Process Model

## **1.2. Business Process Improvement**

"Improving business processes is paramount for businesses to stay competitive in today's marketplace. Over the last 10 to 15 years companies have been forced to improve their business processes because we, as customers, are demanding better and better products and services. And if we do not receive what we want from one supplier, we have many others to choose from (hence the competitive issue for businesses). Many companies began business process improvement with a continuous improvement

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model. This model attempts to understand and measure the current process, and make performance improvements accordingly.

The figure below illustrates the basic steps(fig 1.2). You begin by documenting what you do today, establish some way to measure the process based on what the customers want, do the process, measure the results, and then identify improvement opportunities based on the data you collected. You then implement process improvements, and measure the performance of the new process. This loop repeats over and over again, and is called continuous process improvement. You might also hear it called business process improvement, functional process improvement, etc."

"This method for improving business processes is effective to obtain gradual, incremental improvement. However, over the last 10 years several factors have accelerated the need to improve business processes. The most obvious is technology. New technologies (like the Internet) are rapidly bringing new capabilities to businesses, thereby raising the competitive bar and the need to improve business processes dramatically.



Continuous Process Improvement Model

#### Fig.1.2 Continuous process improvement model.

Another apparent trend is the opening of world markets and increased free trade.

Such changes bring more companies into the marketplace, and competing becomes harder and harder. In today's marketplace, major changes are required to just stay even. It has become a matter of survival for most companies.

As a result, companies have sought out methods for faster business process improvement. Moreover, companies want breakthrough performance changes, not just incremental changes, and they want it now. Because the rate of change has increased for everyone, few businesses can afford a slow change process. **One approach for rapid change and dramatic improvement that has emerged is Business Process Reengineering (BPR).**"

#### **1.3. Business Process Reengineering**

"BPR relies on a different school of thought than continuous process improvement. In the extreme, reengineering assumes the current process is irrelevant - it doesn't work, it's broke, forget it. Start over. Such a clean slate perspective enables the designers of business processes to disassociate themselves from today's process,

and focus on a new process. In a manner of speaking, it is like projecting yourself into the future and asking yourself: What should the process look like?, What do my customers want it to look like?, What do other employees want it to look like?, How do best-in-class companies do it?, What might we be able to do with new technology?

Such an approach is pictured below. It begins with defining the scope and objectives of your reengineering project, then going through a learning process (with your customers, your employees, your competitors and non-competitors, and with new technology). Given this knowledge base, you can create a vision for the future and design new business processes. Given the definition of the "to be" state, you can then create a plan of action based on the gap between your current processes, technologies and structures, and where you want to go. It is then a matter of implementing your solution."

"In summary, the extreme contrast between continuous process improvement and

business process reengineering lies in where you start (with today's process, or

with a clean slate), and with the magnitude and rate of resulting changes.

Over time many derivatives of radical, breakthrough improvement and continuous

improvement have emerged that attempt to address the difficulties of implementing

major change in corporations. It is difficult to find a single approach exactly matched

to a particular company's needs, and the challenge is to know what method to use when, and how to pull it off successfully such that bottom-line business results are achieved."



Breakthrough Reengineering Model

#### Figure 1.3: Business Process Reengineering Model

## 1.4 Business Process Reengineering Formally Defined

Hammer and Champy have revolutionized the idea of reengineering. They define BPR as, "the fundamental rethinking and radical redesign of business systems to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed." (5)

In this defenition you can find four important key words:

• Fundamental: "Why do we do what we do?" and "Why do we do it the way we do?" Reengineering ignores what is and concetrates on what should be.

• **Radical:** Desregarding all existing structures and procedures and inventing completely new ways of accomplishing work.

• **Dramatic:** Used for quantum leaps in performance, not used for small jumps.

• **Process:** the most important key word, Collection of activities taking multiple inputs to create an output that is of value to the customer.

In the following paragraph three kinds of companies are listed which undertake reengineering:

a) Companies which are already in deep trouble

If the company cost's are higher than competitors, if the customer service is really bad and the customers are

already against it, if the product failure is much higher as the competition's.

b) Companies which are not in trouble yet

If the finacial situation is still good but problems might appear in the future such as new competitors, changing customer requirements and an altered econommic environment.

c) Companies which are in a peal condition

The company is in a healthy condition and not even in the future problems might appear. But the management of such companies are ambitious and aggressive. This companies want to improve their own level in order to stay in lead over their competitors.(4)

Following the publication of the fundamental concepts of BPR by Hammer (1990) and Davenport and Short (1990), many organisations have reported dramatic benefits gained from the successful implementation of BPR.

Companies like **Ford Motor** Co., **CIGNA**, and **Wal-Mart** are all recognised as having successfully implemented BPR.

However, despite the significant growth of the BPR concept, not all organisations embarking on BPR projects achieve their intended result.

Hammer and Champy (1993) estimate that as many as 70 percent do not achieve the dramatic results they seek. Having BPR repeatedly at the top of the list of management issues in annual surveys of critical information systems reflects executives' failure to either implement properly or acquire the benefits of BPR (Alter, 1994). This mixture of results makes the issue of BPR implementation very important. BPR has great potential for increasing productivity through reduced process time and cost, improved quality, and greater customer satisfaction, but it often requires a fundamental organisational change. As a result, the implementation process is complex, and needs to be checked against several success/failure factors to ensure successful implementation, as well as to avoid implementation pitfalls.

## 2. OBJECTIVE OF STUDY

Management thinkers say, is what the new face of business process reengineering (BPR) has to be all about. BPR as a means of boosting productivity has been around since the early 90s and has a loyal fan base. But given that the current slowdown is unlike anything seen before, companies will have to take steps unlike anything done before to be able to ride this one out and come out on top. According to Jim Champy, one of the earliest advocates of BPR, the idea of process reengineering is far more relevant today than it ever was, but companies don't seem to be picking up on it. "Companies today are slower to act, even though they know they need to do certain things. They are afraid to invest even if they have the cash — and this is dangerous," he says.

Even for companies that have been constantly reinventing themselves, this slowdown poses a unique challenge. Vikram Ramakrishnan, principal, Booz & Company, says companies undertaking any kind of BPR must remember that there are huge discontinuities in the market. "The fundamental nature of industries is changing. Before undertaking a restructuring, companies need to look at processes and ask if they are needed at all," he says. Having decided what processes are dispensable, the next step would be prioritisation.

Of course BPR is not always about finding a newfangled way of doing business, but at times just sifting out what has really worked over the years.Till 1990 business organisations operated under protected environment with little choice for customers and seller dominated. There were low concern for needs ,quality,timely delivery with a very few business under world class.

With globalisation and liberalisation Indian businesses faced competition from global giants with question of survival and growth.

To become globally competitive "incremental improvements "may not work and need for radically redesigned businesss practices under Indian context. According to Michael Hammmer and James Champy "Reengineering is here to stay. Until the world stops changing, it will remain an essential business tool". For this some critical issues will be taken up for study purpose and factors which are influencing and becoming barrier to implement reengineering in India should be addressed.

## **3. CONCLUSION**

Given three Cs

a)Customer take charge

b)Competition intensifies

c)Change becomes constant

under which globalised organizations has to work and with a fact that India contributes largest share in developing information technology which is a close partner of Reengineering from its inception what may be some critical issues to implement Reengineering in India becomes a matter of deep concern which needs to be addressed through research and implement the same to become globally competitive.

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# Application of the Antecedent Moisture dependent SCS-CN Model in a Humid Catchment

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### ABSTRACT

This paper specifically evaluates the antecedent moisture dependent rainfall-runoff model which is based on the Soil Conservation Service Curve Number (SCS-CN) method. The study reveals that the modified version of SCS-CN model performs satisfactorily in a humid watershed. Furthermore, this hydrologic forecasting model is also advantageous in that it obviates sudden jumps in the curve number variation with antecedent moisture conditions, which is an unreasonable and undesirable feature of the SCS-CN model. This model has been applied to the catchment Kalu, a tributary of Ulhas River, in Maharashtra State, India. The performance of the model indicates the model works satisfactorily. Also the model is capable of computing the different runoff components as well as the various hydrologic components involved in the runoff generation process.

### **Keywords**

SCS-CN method, antecedent moisture, hydrologic forecasting, long-term simulation, rainfall-runoff model.

### **1. INTRODUCTION**

Modelling of rainfall-runoff is of paramount importance in hydrological design of water resources structures. The major problem in the assessment of relationships between rainfall and runoff occurs when a study is carried out in ungauged watersheds in the absence of hydro-climatic data. There are several approaches to estimate runoff in ungauged watersheds. Examples are the University of British ColumbiaWatershed Model (UBCWM), Artificial Neural Network (ANN), SCS Curve Number (SCS-CN) method and Geomorphological Instantaneous Unit Hydrograph (GIUH) [1]. Among these methods, the SCS-CN method (now called Natural Resources Conservation Service Curve Number method (NRCS-CN)) is widely used because of its flexibility and simplicity [2]. The method combines the watershed parameters and climatic factors in one entity called the Curve Number (CN). However, slope is not considered as an effective parameter on runoff rate in the SCS-CN method.

The SCS-CN methodology developed by United States Department of Agriculture (USDA) has been documented in National Engineering Handbook, Section 4 (NEH-4) which has been revised several times (1956, 1964, 1965, 1969, 1972, 1985, 1993, 2004) since its first publication in 1954. This method [3] was originally developed as a lumped model and up to this date it is still primarily used as a lumped model. This method is a versatile and popular approach for quick runoff estimation and is relatively easy to use with minimum data and gives adequate results [4,5].

In this paper, an attempt has been made to develop an improved SCS-CN model to predict the catchment physics in a better way. The study aims to evaluate the applicability of modified SCS-CN approach in estimating the runoff depth in humid catchment.

The general objectives of the present research are: (i) a modification to the existing SCS-CN method to take care of the variability of daily curve number CN values with an introduction of antecedent moisture factor due to the effect of antecedent rainfall; (ii) proposing a continuous hydrologic simulation model to compute runoff components as well as other hydrologic components involved in the runoff production with a remark of dominancy/dormancy of each process; (iii) testing the model performance by applying the model on humid catchment.

The long term hydrologic simulation model proposed in this study is designated as LTHSM primarily aimed to understand the streamflow generation process in the catchment. The streamflow is conceptualized to have three major components surface runoff, throughflow, and base flow. This continuous simulation model considers a daily time step interval for analysis. In this paper a more general relation between  $I_a$ -S including the effect of rainfall is also introduced, when the number of day advances beyond 5.

## 2. EXISTING SCS-CN MODEL

The SCS-CN method couples the water balance equation (Eq.(1)) with two hypotheses, which are given by Eqs. (2) and (3), respectively, as[4,6,7]:

$$P = I_a + F + Q \tag{1}$$

$$\frac{Q}{\left(P-I_{a}\right)} = \frac{F}{S} \tag{2}$$

$$I_a = \lambda S \tag{3}$$

where, P = total precipitation;  $I_a$  = initial abstraction; F = cumulative infiltration; Q = direct runoff; S = potential maximum retention or infiltration;  $\lambda$  = initial abstraction. In order to simplify the equation and eliminate one variable,  $I_a$  is fixed at  $I_a$  =0.2 S.Combination of Eq.(1) –Eq. (3) leads to the following popular form of the SCS-CN method [4,6,7]:

$$Q = \frac{(P - I_a)^2}{(P - I_a + S)}, \quad Q = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$
(4,5)

Here,  $P > I_a$  and Q = 0 otherwise. The aboveEq. (5) shows that *S* is the only parameter that determines the volume of direct runoff. In practice, *S* is derived from a mapping equation expressed in terms of the curve number (CN). The retention parameter *S* is related to the value of CN by [4,7]

$$S = 25.4 \left( \frac{1000}{CN} - 10 \right)$$
(6)

where S is in mm and CN is non-dimensional. Here curve number CN varies in the range  $0 \le \text{CN} \le 100$ . Since CN indicates the runoff producing potential of a watershed, it should rely on several other characteristics, such as drainage density, slope length, gradient etc. which significantly affect runoff [8,9,10].

## 3. FORMULATION OF MODIFIED SCS-CN BASED LTHS MODEL

The basic SCS-CN hypothesis doesn't explicitly account for antecedent moisture. Therefore this suggested rainfall-runoff model accounts for antecedent moisture by incorporating the effect of rainfall. This suggested lumped conceptual rainfallrunoff model, which is based on the modified concept of SCS-CN, attempts to simulate daily runoff from daily rainfall and evaporation as input data. The model is conceptualized to have two different moisture stores: soil moisture store and ground water store. Also the model consists of three major runoff components: (i) surface runoff, (ii) throughflow and (iii) base flow. Out of these three, the surface runoff is computed based on the modified SCS-CN concept by incorporating antecedent moisture factor without considering different antecedent moisture conditions. The different antecedent moisture conditions (AMC) are well explained by Mishra and Singh (2004), and Mishra et.al.(2008)[11,12].The modified SCS-CN-based lumped model considers various hydrologic components involved in the runoff generation mechanisms and takes into account the temporal variations of curve number. The model formulation and various components of hydrologic cycles are as follows:

## **3.1** Initial abstraction

The initial abstraction  $I_a$  is taken as a fraction of the possible retention in the soil and is computed as[13,14,15]:

$$I_{a(t)} = \lambda S_t$$
, if  $t \le 5$  days (7)

Here,  $\lambda$  is the parameter to be optimised.  $I_{a(t)}$  and  $S_t$  are the daily initial abstraction and daily potential maximum water retention.

Otherwise

$$I_{a(t)} = \lambda S_t \Biggl[ \frac{S_t}{P_t + S_t} \Biggr]^{\alpha} \text{, if } t > 5 \text{ days} \quad (8)$$

Here  $\lambda$  and  $\alpha$  are the coefficient and exponent of the initial abstraction which are to be optimised; and  $P_t$  is the daily rainfall.

## 3.2 Antecedent Rainfall

Here in this model, 5-day rainfall prior to the storm is considered as antecedent rainfall (ANTRF) and is computed as follows [13-15]:

$$ANTRF_{t} = P_{(t-1)} + P_{(t-2)} + P_{(t-3)} + P_{(t-4)} + P_{(t-5)}$$
(9a)

where t is the current day and  $P_t$  is the rainfall of the respective day.

## 3.2.1 Antecedent Moisture

This model also considers the current space available for retention  $S_t^*$  for the first 5-days assuming  $CN_t = CN_0$  or  $S_t^* = S_0$ . The number of days exceeding 5, antecedent rainfall at any time't' (ANTRF<sub>t</sub>) is computed from Eq. (9a). Using the antecedent rainfall value, the antecedent moisture (AM) amount can be computed as follows:

$$AM_{t} = \beta \left( \sqrt{ANTRF_{t}} \right)$$
(9b)

Here,  $\beta$  is the parameter which is to be optimised. With the value of  $AM_t$ , the current day possible water retention  $S_t$  is modified as follows:

$$\mathbf{S}_{t} = \frac{\left(\mathbf{S}_{t}^{*}\right)^{2}}{\left(\mathbf{A}\mathbf{M}_{t} + \mathbf{S}_{t}^{*}\right)}$$
(9c)

Here  $S_t^*$  is the same as  $S_t$  in Eq. (7), but corresponds to  $CN_0$ . The  $S_t$  in Eq. (9c) is again modified by the evapotranspiration loss and drainage from the soil moisture zone and the daily input due to infiltration.

## 3.3 Surface Runoff

Replacing Q by  $RO_t$  (daily surface runoff) in (Eq.4) for clarity in text, (Eq.4) can be re-written for daily runoff with time t as subscript as [4, 13-15]:

$$RO_{t} = \frac{\left(P_{t} - I_{a(t)}\right)^{2}}{P_{t} - I_{a(t)} + S_{t}}$$
or
$$RO_{t} = \frac{\left(P_{e(t)}\right)^{2}}{P_{e(t)} + S_{t}}$$
(10)

where;

 $P_{e(t)} = P_t - I_{a(t)} \qquad (11)$ 

$$I_{a(t)} = \lambda S_t \tag{12}$$

$$S_t = \frac{25400}{CN_t} - 254$$
(13)

where  $P_t\!\!=\!\!daily$  rainfall;  $I_{a(t)}\!\!=\!\!daily$  interception;  $P_{e(t)}\!\!=\!\!daily$  effective rainfall,

### **3.4** Routing of rainfall excess

When the number of days exceeds 5, to transform the surface runoff, the rainfall excess  $RO_t$  in Eq.(10) is routed using a

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single linear reservoir concept, as given below in (Eq.14). [4, 13-15].

$$SRO_{t} = D_{0} \times RO_{t} + D_{1} \times RO_{t-1} + D_{2} \times SRO_{t-1} \quad (14)$$

where

$$D_0 = \frac{(1/K)}{2 + (1/K)}$$
(14a)

$$D_1 = D_0 \tag{14b}$$

$$D_2 = \frac{2 - (1/K)}{2 + (1/K)}$$
(14c)

Here  $SRO_t$  is the routed surface runoff at the outlet of the catchment; K is the storage coefficient.

### 3.5 Infiltration

This amount of water reaching the ground after initial abstraction and not produced as surface runoff is assumed to infiltrate into the upper soil.

 $F_{t-1}$  is the previous day infiltration (mm), computed using water balance equation [4, 13-15]:

$$F_{(t-1)} = P_{(t-1)} - I_{a(t-1)} - RO_{(t-1)}$$
(15)

Here, if  $P_{e(t)} \ge 0$ ,  $F_t \ge 0$ .

### **3.6** Evapotranspiration

The evapotranspiration can be computed by summing up the daily evaporation from the water bodies and transpiration from the soil zone in the watershed.

### 3.6.1 Evaporation

The daily evaporation EV<sub>t</sub> is computed as follows [4, 1-15]:

$$EV_t = PANC \times EVP_t \tag{16}$$

where  $EVP_t$  is the potential evaporation based on the field data and PANC is the Penmann coefficient [10,11]

### 3.6.2 Transpiration

Transpiration from the soil zone is considered as a function of water content available in the soil store above the wilting point of the soil [16]. It is computed as:

$$TR_t = K_1 \times \left(S_{abs} - S_t - \theta_w\right) \quad (17)$$

Where  $K_1$  = coefficient of transpiration from soil zone,  $\theta_w$  = wilting point of the soil,  $S_{abs}$  = absolute maximum potential water retention. The total actual evapotranspiration is taken as the sum of evaporation and transpiration as follows:

$$ET_t = EV_t + TR_t \tag{18}$$

### 3.7 Drainage

The term drainage is used as the outflow from a linear reservoir only when the moisture content in the soil zone increases and exceeds the field capacity  $\theta_f$  [16] as:

$$DR_t = K_2 \times \left(S_{abs} - S_t - \theta_f\right) \quad (19)$$

where  $K_2$ =subsoil drainage coefficient,  $\theta_f$ = field capacity of the soil, and DR<sub>t</sub> is the drainage at any time't'.

### **3.8** Throughflow

The outflow from the unsaturated soil store is partitioned into two components: (i) subsurface flow in lateral direction and (ii) vertical percolation into ground water zone. The former component representing the through flow is taken as a fraction of the above drainage rate [16]:

$$THR_t = K_3 \times DR_t \tag{20}$$

where  $K_3$ = unsaturated soil zone runoff coefficient and THRt = throughflow at time't'

### **3.9** Percolation

The remaining water gets percolated in the vertical direction, and it is estimated as [11-13]:

$$PR_t = (1 - K_3)DR_t \tag{21}$$

### **3.10** Deep Seepage

The saturated store is considered as a non-linear reservoir and from this saturated store, outflow occurs at an exponential rate in the form of deep seepage  $DS_t$ . This is modeled as follows [16]:

$$DS_t = \left(\psi_t - \psi_f\right)^E \qquad (22)$$

where  $DS_t$  = deep seepage at any time 't';  $\psi_t$  is the ground water content at any time 't';  $\psi_f$  is the field capacity of the ground water store; and E = exponent of ground water store.

### 3.11 Base Flow and Deep Percolation

This active ground water flow which is also known as delayed flow can be modeled as outflow from a non-linear storage in the form of base flow  $(BF_t)$  [16].

The remaining amount of deep seepage which goes into aquifers in vertical direction is considered as a loss from saturated store and is taken as deep percolation DPr<sub>t</sub> [16]:

$$BF_t = BCOEF \times DS_t \tag{23}$$

$$D\Pr_{t} = (1 - BCOEF) \times DS_{t} \quad (24)$$

where  $DPr_t$  = deep percolation at any 't', BCOEF= ground water zone runoff coefficient.

### **3.12** Total Stream Flow

The total stream flow  $(TRO_t)$  on a day t, is obtained as the sum of the above three components, surface runoff, throughflow, and base flow [13-15].

if 
$$t \le 5$$
 days

$$TRO_t = RO_t + THR_t + BF_t$$
(25a)

if t> 5 days

$$TRO_t = SRO_t + THR_t + BF_t$$
 (25b)

### **3.13** Water retention budgeting

The water balance in the soil and ground water store is worked out as follows [13-16]

$$\frac{d\theta}{dt} = F_t - ET_t - DR_t$$
(26a)

$$\frac{d\psi}{dt} = PR_t - BF_t - D\Pr_t \qquad (26b)$$

where  $\frac{d\theta}{dt}$  and  $\frac{d\psi}{dt}$  are change in water content in soil

moisture store and ground water store respectively. This proposed model designated as LTHSM consists of fifteen parameters:  $CN_0$ ,  $\lambda$ ,  $\alpha$ ,  $\beta$ , K,  $S_{abs}$ ,  $\theta_f$ ,  $\theta_w$ ,  $K_1$ ,  $K_2$ ,  $K_3$ ,  $\psi_f$ ,  $\psi_{t(1)}$ , BCOEF, and E (Tab.1).

### 4. MODEL EFFICIENCY

The Nash-Sutcliffe efficiency (NSE) was used to assess the SCS-CN model performance. The efficiency of the model is computed using [17]:

Efficiency = 
$$\left(1 - \frac{RV}{IV}\right) \times 100$$
 (27)

where

$$RV = \sum_{i=1}^{n} \left( Q_i - \hat{Q}_i \right)^2 \tag{28}$$

$$IV = \sum_{i=1}^{n} \left( Q_i - \overline{Q_i} \right)^2 \tag{29}$$

Here, RV is the remaining variance; IV is the initial variance;  $Q_i$  is the observed runoff for i<sup>th</sup> day;  $\hat{Q}_i$  is the computed runoff for i<sup>th</sup> day; n is the total number of observations; and  $\overline{Q}_i$  is the overall mean daily runoff.

### 4.1 Error Criteria

The relative error (R.E) is also computed to see the deviation between the observed and simulated runoff with respect to the observed runoff [4, 13-15].

Relative error 
$$RE(\%) = \frac{(Q_o - Q_c)}{Q_o} \times 100$$
 (30)

Here  $Q_o$  is the observed runoff and  $Q_c$  is the computed (simulated) runoff.

### 5. STUDY AREA AND DATA USED

The study area selected is the Kalu catchment, a tributary of Ulhas, Thane district in Maharashtra State, India (Fig.1.). The drainage area of the catchment Kalu is 224sq.km.

For Kalu catchment, daily data of three years i.e 1990-1992 are used for calibration and the remaining 1-year (1993) data is used for validation of the model. Hydrologic data collected for this study consists of daily rainfall, evaporation and runoff data of monsoon period i.e.6-months data (June-November).



Fig.1 Drainage map of catchment Kalu

### 6. MODEL APPLICATION

The modified SCS-CN model LTHSM has been applied on study watershed to explain the catchment behavior. The optimal estimates of model parameters were obtained by using non-linear Marquardt algorithm coupled with trial-and-error [4]. The ranges/initial estimates are chosen appropriately. Table 1 shows the ranges and initial estimate of each parameter and also the optimised values of the parameters involved in the model formulation.

Table 1. Estimates of parameters and Efficiency of LTHSM

Sl.	Para-meter	Kalu catchment		
INO.		Range	Initial Values	Optimised Values
1	$CN_0$	0-100	-	50.00
2	λ	0-1.0	-	0.002
3	α	0-7.00	-	1.400
4	β	0.5-4.0	1.0	2.200
5	К	0.1-2.0	0.5	0.766
6	<b>K</b> <sub>1</sub>	0-1.0	0.2	0.003
7	<b>K</b> <sub>2</sub>	0-1.0	0.01	0.139
8	<b>K</b> <sub>3</sub>	0-1.0	-	0.273
9	BCOEF	0-1.0	-	0.550
10	Е	0-1.0	0.2	0.935
11	S <sub>abs</sub>	200-900	500	870.09
12	$\theta_{\mathbf{w}}$	40-100	-	60.00
13	$\theta_{\rm f}$	200-500	300	589.16
14	$\Psi_{\rm f}$	200-600	300	289.78
15	$\Psi_{t(1)}$	40-300	-	150.00
16	Efficiency (Calib.)	-	-	60.52%

17	Efficiency (Valid)	-	-	76.17%
18	Runoff factor	-	-	0.964

The model efficiency obtained by using Nash and Sutcliffe method along with the runoff coefficient is also presented in Tab.1.

It is seen that the catchment Kalu shows runoff coefficient as 0.964 and hence can be classified as a high runoff producing catchment. The model yields an efficiency of 60.52% in calibration, and 76.17%, in validation respectively. The higher efficiency reveals that the modified SCS-CN model is efficacious to high runoff producing Kalu catchment.

Table 2 presents annual values of rainfall, observed and simulated runoff using monsoon data and also computes error in percentages of runoff. It is seen that catchment Kalu receives annual average rainfall of 2887.22mm, falling in humid region. The annual average relative error (R.E) is also computed and ranges from 9.84% to 25.65% with an average error of 17.49% (Tab.2). These values generally exhibit a satisfactory model performance.

Fig.2. shows the daily variations of estimated and observed runoff with respect to daily average rainfall for the catchment Kalu. While comparing the rainfall and runoff, it is apparent 6<sup>th</sup> & 7<sup>th</sup> March, 2014

that there is a good match between observed and simulated runoff.

Model performs satisfactorily in the catchment except few peaks, where the computed runoff is lower than observed runoff (Fig.2). This is due to mainly the optimisation of the parameters by minimising the error based on a large number of other data points than peak.

Table 2.	Annual rainfall,	observed runoff,	simulated
	runoff and	relative error	

Sl. No	Year	Rainfall (mm)	Obser- ved Runoff (mm)	Simulated Runoff (mm)	Rela- tive Error (%)
1	1990	3347.65	3527.65	2622.79	25.65
2	1991	3169.24	3058.41	2515.80	17.74
3	1992	1902.97	1601.10	1443.56	9.84
4	1993	3129.00	2943.91	2451.32	16.73
A	verage	2887.22	2782.77	2258.37	17.49



Fig 2: Daily variations of rainfall, observed runoff (O), estimated runoff (E) with average relative error (R.E) of catchment Kalu for model LTHSM using monsoon data.

Fig. 3 presents the annual estimates of rainfall, observed runoff and simulated runoff in the catchment Kalu using 4-year monsoon data. It is apparent from Fig.3 that the model computes runoff very close to the observed runoff which emphasis the efficiency of the model.



Fig 3: Yearly estimates of Rainfall, Observed Runoff and Simulated runoff using Monsoon data

Table 3 presents the percent estimates of all hydrological processes involved in the runoff production. This revised SCS-CN model LTHSM computes the different components of runoff such as surface runoff, throughflow and base flow as well as determines the dominancy/dormancy of the various processes. It is apparent from Tab.3 that the dormant process (marked as \*) is only initial abstraction. High amount of runoff is generated in the catchment Kalu in the form of surface runoff as compared to throughflow and base flow. It is also observed that nearly 96% of rainfall is turned as runoff (observed) and the model computes nearly 78% which is transformed as runoff (simulated).

The advantages of the proposed method are more evident in Figs. 2 and 3, where a better agreement between the observed and estimated runoff is demonstrated. As it can be clearly seen, satisfactory runoff predictions can be obtained by the proposed modified SCS-CN methodology.

#### Table 3. Percent estimates of hydrological components of Kalu catchment for model LTHSM using Monsoon data

SI. No.	Components	Catchment Kalu
1101		
1.	Rainfall (P <sub>t</sub> )	100
2.	Initial abstraction $(I_{a(t)})$	0.43*
3.	Effective rainfall $(P_{e(t)})$	99.57
4.	Infiltration (F <sub>t</sub> )	52.80
5.	Drainage ((DR <sub>t</sub> )	48.70
6.	Percolation (PR <sub>t</sub> )	35.39
7.	Deep seepage (DS <sub>t</sub> )	32.97
8.	Deep percolation (DPr <sub>t</sub> )	14.84
9.	Surface runoff (SRO <sub>t</sub> )	46.77

10.	Throughflow (THR <sub>t</sub> )	13.31
11.	Base flow (BF <sub>t</sub> )	18.13
12.	Simulated runoff (TRO <sub>t</sub> )	78.22
13.	Observed runoff (Q <sub>obs</sub> )	96.38

### **Dormant process**

This study estimates the annual water yield of various processes considered usually helpful in planning for utilization of resources and identification of dominant/dormant processes.Figs.4 and 5 present the percent estimates of runoff components as well as hydrologic processes involved in the runoff generation mechanism like initial abstraction, infiltration, drainage, percolation, deep seepage, and deep percolation.

It is apparent from Fig. 4 that surface runoff is significant as compared to other runoff components such as throughflow and base flow. In other words, surface runoff is the major contributor to the total runoff. Fig. 5 indicates that a good amount of water gets infiltrated into the soil and is computed as nearly 53%. This study also reveals that the initial abstraction i.e loss from the catchment is very negligible, and is considered as insignificant in the catchment.



Fig 4: Percent estimates of runoff components of catchment Kalu



## Fig 5: Percent estimates of hydrologic processes of catchment Kalu

## 7. CONCLUSION

A long term hydrologic simulation model, designated as LTHSM was suggested with a modification to the existing SCS-CN original and applicability of this model was investigated on a humid catchment, River Kalu, a tributary of Ulhas River in Maharashtra State, India to predict the behaviour of catchment. The model performance was tested with Nash-Sutcliffe method. The following conclusions are drawn from the study:

- The suggested long term hydrologic model (LTHSM) modifies the value of daily potential water retention (S) by incorporating the effect of rainfall on antecedent moisture and thus a better relation between I<sub>a</sub> and S is developed.
- This modified SCS-CN model obviates the limitations of the original SCS-CN model and is capable of simulating various runoff components other than direct surface runoff.
- Observing the performance of the model application in catchment Kalu, using annual data set, the investigation shows that the model with large number of parameters simulates the catchment response successfully.
- This long term continuous simulation model is capable of computing streamflow generated from catchment as well as various other

hydrologic processes involved in the runoff production.

- This model also identifies the dominancy/dormancy of the hydrologic components involved in the runoff generation process.
- The model yields higher efficiency nearly 61% and 76% in calibration and validation respectively, implying that model performs satisfactorily in this study watershed.
- The average annual relative error computed as nearly 17.49% which is tolerable and indicates model is efficacious to high runoff producing catchment.
- While comparing the daily variations of rainfall, observed and simulated runoff, it is seen that though the model shows a good fit, but does not capture few peaks where the observed runoff is very large as compared to the simulate runoff.

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Dr K.Geetha secured her B.Tech (Civil) from Calicut University, Kerala, M.Tech and Ph.D in Water Resources Engineering (Civil) from IIT, Bomaby. She has got 28 years of experience including Teaching, Administration, Research and Industrial. She worked in various positions as Principal, Professor & Head of Department (Civil Engineering), Dean (Academics) in various Engineering Colleges under Mumbai University. She has also got experience as Research Fellow in a prestigious Research Organisation, CWRDM, Calicut, Kerala.

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