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Speech Automated Examination for Visually Impaired Students

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***Abstract:** We that know education is not a luxury but a necessity in today's life. It's a human right and every individual including blind and visually impaired people should also take it. It is very difficult for them to manage their education and learning process. According to recent study it has been found that over 200+ million blind people and visually impaired people are there and the number is growing. so the user have develop a learning application in which a blind or visually impaired student can study on their own without including third party in it. The student will be able to separately operate the application. Here they will be able to study various subjects of their choice, they will be able to take their own notes, and also take tests on the subject. The prime goal of this application is to solve the problem of the blind students regarding their education or studying pattern. Here they will be able to move the cursor anywhere on the desktop and the text will be dictated in the human synthesized AI voice using TTS conversion. They can easily make notes by simply dictating their points to the system, and the system will be convert into text format and also we can listened to it in an audio format. Once the learning part is done, and the student have to revise the particular topic then he/she can give test on that topic by using hand gestures. So here the system will help the visually impaired/blind student to learn and operate the system independently and also they will be able to use it as per their suitable time preference. So, the system is developed to resolve the problem of students being dependent on the third party in their studies and to increase their interest in studies. Hence, not only blind people but also other handicapped people will be able to use this application.*

***Keywords -** Speech Recognition, Speech Synthesis, Speech to Text, Text to Speech, Voice Recognition*

I. INTRODUCTION

The senses of humans are our interaction with the world. The human brain incorporates into a meaningful whole the fireworks of the neurons of seeing, hearing, feeling, tasting, and touching. But when an organ stops functioning, we don't worry about our senses. There are five senses for human beings: eyes to see, tongue to taste, nose to smell, ears to hear, skin to touch. The most important sensory organs are our eyes, by far. Using our sight, we interpret up to 80% of all experiences. And if different senses quit functioning such as style or odor it is the eyes that fantastic shield us from risk. But sadly, not everyone is rewarded with a sense of sight. As there were about 285 million visually impaired people in the world up until a few years ago, a figure that is now rising and is projected to exceed up to 115 million by 2050.

Recent survey has concluded that at least 200k children's are visually impaired or blind in India, and about 15,000 are in blind schools. Unfortunately, due to disability and impairment they face difficulty in education. Due to this it has large amount of impact on economy of countries. As Education is a human right and every individual including blind and visually impaired people should also take it. It is very difficult for them to manage their education and learning process. This paper will provide a feasible solution, for the blind students which will help them to study on their own without taking help of any third person. They will be able to study independently.

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For visually impaired learners, looking for a scribe leads to Stress of review. The new systems also depend on scribe. Assist the student in the entire process of exam-taking. Thus, it is also important for scribes to produce a variety of different Documentation. At times, several times due to this involved process, People are not prepared to apply as a scribe. There are various other problems like related to their punctuality and insufficient knowledge.

Therefore, there is a need of a device which will scan and read any kind of text by changing the text into audio format which will help student to read any kind of text. This system will help the visually impaired people to listen to the document, academic textual content, diagrams and any other text-based source which they are not able to read. This will enhance their learning skills and will create a curiosity to learn various things. The TTS technology helps the users to read the written material by listening to the audio output generated by the system. In the TTS system, the content is taken as input and after that it converts graphemes into phonemes and ultimately changing the phoneme into speech. Graphemes are the fundamental unit of the writing machine of a language phonemes are the smallest significant sound element of the language. Phonemes are the smallest meaningful sound element of the language. The TTS machine converts text content to a phonemic illustration and then converts the phonemic illustration to waveforms that can be acquired in output as sound. There have been many approaches and algorithms to implement TTS conversion. Text and diagrams are detected using the input, which could be in the form of PDF or IMAGE (JPEG).The extracted text and diagrammatical statistics will be provided to the TTS conversion component and as a end result the audio file will be generated which reads out the text content using human synthesized AI voice present in TTS. Reading and writing text is inherently difficult for visually impaired.

II. LITERATURE SURVEY

M. Murali[1], Paper states that work has done for visually impaired and blind peoples for reading text and detecting objects in their surroundings. In recent years, technology grows very much but this technology is no use for disabled people which provide help. As we know, education is very important in factor in human's life. The education receives normal people that level of education can't receive blind or visually impaired peoples. Blind peoples read books that scripted in Braille language, but the cost of the books is around 1300 rupees. So, imagine that how costs the education for them. Braille language is not efficient as it takes long time to learn. For that assistance is developed for blind people. The Reader (Blind people) is like a live tutor. Computer vision with IOT raspberry pi is used. By this reader can read whatever they want. Raspberry pi acts as a microcontroller for processing. Detection is also done by tensorflow, with the help of camera; images are captured and then analyzed through tensorflow and with various datasets. And with the help of audio output people knows what exactly is around them.

M. Fatih Adak [2], Authors have developed a distance schooling portal for the blind the place they can get entry to a wide variety of training applications alongside with their contents and additionally the length of the path coverage. They have used the modern day technological know-how such as PHP, MySQL for database and JAWS as display analyzing equipment with HTML5 and CSS3 to diagram where the blind can use the device and engage for academic records.

C. Jayawardena[3], authors have put forth but some other viewpoint of lookup in current-day the place visually impaired schooling and laptop imaginative and prescient to go hand in hand such that it aids the blind to lift out their duties greater easily. They aimed to acquire this by means of creating an utility that can assist young people between the a long time of 6 to 14 years to discover objects besides any different human support. They have used the modern-day technological know-how of artificial talent and pc imaginative and prescient alongside with Deep Region Convolutional Networks alongside with Recurrent Neural Networks in addition to Speech fashions.

MiliosAwad[4], there is an increase in the number of visually disabled and blind people, as we all know. While they have many applications and different features, most of them are for the sighted and are not available to blind people. The main problem faced by them is identification of things used in their daily life or to read a text or a book. Therefore, this application provides various functions such as light detection, color detection, object budget recognition, and bank note recognition. Here the color detection was related to our topic; in it color detection approach works on images taken by color detection activity and by using open CV library. The RGB color of the area on the screen that is reached by the user and the color name is recorded to the user by the text to the speech engine available on the Smartphone according to the unique RGB values that are detected. New colors are detected and announced by audible means to the user as the user moves his / her finger on the device. Since the application targets visually impaired persons, the performance results are read out loud. It uses the cell phone's built-in voice engine to read out the results loudly, so that the user can hear them clearly.

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M. Naveen[5], Authors have additionally developed android software which presents a Chabot for the blind so that they can acquire solutions to queries associated to education. To get the solutions, they will be educated for the use of the functions the usage of Google voice search which additionally offers them with answers. These can be both bill layout or can be bought in textual content layout too.

Pooja Nawandar[6], globally, the technologies used to help people with disabilities are either difficult or inexpensive. However current advances in the medical world claim that they provide alleviation and make their lives unbiased however the lack of information coaching and realistically complexity often leads to consumer frustration. This article presents a comprehensive study of the current system called the Internet of Things (IoT). The system is a programmable and synchronized network of various electronic devices, sensors, mechanical and digital machines and highly functional communication networks. Used the Internet of Things to help the visually impaired (blind) people and to boost their self-confidence not only in a well-known environment, but also in unfamiliar places that would be easily accessible to them. is going. In this preliminary strategy a variety of probabilities for designing a multi-sensory community primarily based on inter objects have been proposed. This method now not solely solves the technical issues associated with handy applied sciences but additionally gives low price and person pleasant functions that can be without problems used to grant comfort.

Shah Khusro[7], basically blind people faces n number of challenges while operating smart phones, laptops, etc. So in this paper they have discussed on how to designed useable interface for blind people to perform various activities like placing and receiving messages, emails, etc .So, there are certain requirements user has to meet while developing useable interfaces for blind people. Here one of the most important factor of usability requirements is the division of touch screen in such a way that blind people to locate objects and non-visual items on the screen easily and comfortably. So, this includes dividing touch screen into two, three, four, five, eight, and nine partitions with respect to finger placement. The main aim is to design useable user interfaces for blind people to perform similar activities on Smartphone. The Smartphone services provide many opportunities to blind people to operate Smartphone using screen-reading software and also text to speech system and visual information are transformed into non- visual representation through speech and voice based representation.

Mihai Oproescu[8], in this paper Both software and hardware solutions are given for blind users. But we mainly focus on software solution. As we know, the blind users received information of computer and communication technique by hearing and by touching. So here we will have a look on few software applications which help blind users to communicate with computer. 1. Voice synthesis, it is more efficient, here we can received more information in shorter time. 2. Screen reader, it is an application which help to identify the properties of an object and by using graphical interface; it converts them into text and can be transmitted by a speech synthesis program.3. Convert documents to audio file, by using TTS (Text-To-Speech) we can read some typed text or some programs present in the window, through voice synthesis. Eventually, the app can save the result of conversion into one of the audio formats for later listening. So there are two software solutions discussed in this paper, one of this is Keyboard learning software application: the main aim of this application to create sound when the user presses any key. So whenever we press any key, a character is displayed. So the application compares this character with English database and generates a specific sound. At the same time, the Braille shape of the character is displayed. So after starting this application, the last character in the text box is read, Braille code is searched, and character sound is generated. Here we have one drawback with this application that is; it does not recognize the punctuation marks and the capital letters. And the second solution is Application for testing the typing capabilities of blind person; the objective of this application is to test the rapidity and fairness to writing a text heard by the user. Here we need a person's help to insert a text snipped into that particular box. Here a test is taken in which the spelling errors are calculated, in which all characters are cross-checked and if any character is missing or is extra then all the characters starting from that point are considered wrong. So from these tests, many errors are faced by the blind people. So, this software application needs to be more advanced for the blind users to become useful in typing contests.

Sasirekha S [9], the number of blind or visually impaired peoples is so high due to this it affects on the growth and economy of the country. Project works in two ways: 1) Navigation 2) Face Detection. This paper states that it uses GPS module for navigation, Image processing for face detection and Raspberry pi for inputs. GPS and raspberry pi trace the location by latitude and longitude values received by the antenna. OpenCv used for processing of captured images which approximately 20 different images take before processing. LDR used for detection of light and dark but it is inefficient. IR sensor detects the objects by using motion sensor which detects the heat released by our body. After that Raspberry Pi code, the output in voice message. This device helps to give directions for the stored path of destination. It also monitors the GPS current locations.

M., Yahya [10], RFID tags are attached to various objects inside the house for tracking and identification purposes. The user has an RFID reader that can detect the tags in the user's proximity and inform the user about

the name of the object on which the detected tag is placed. The user's device then sends the tag-id to the nearby computer. The computer looks up the tag ID in the database that is maintained. This database has an audio clip, which is associated with each tag id, contains the name of the object.

III. METHODOLOGY

Braille is the code for the blind to research and is on hand in many languages. As many benefits Braille might also have, it additionally comes with disadvantages- it can't be examine by using a sighted man or woman who has no longer discovered it, and blunders can't be erased as soon as made. It can also now and again be regarded an impediment for a sighted character to differentiate an error from a non- error. As a consequence, suggesting the utilization of Braille for examinations would be unfitting. At present, visually impaired college students take checks with the useful resource of a scribe, who is a character accountable for transcribing solutions of questions for a pupil in college exams. Although this approach would appear satisfactory, there are several drawbacks to using a scribe for examination purposes. The scribe may now not apprehend what the scholar is saying, transcribe an reply incorrectly unintentionally, function malpractice, or cancel an appointment at the closing moment. Moreover, it is tough to locate a scribe because many humans are unwilling, as a quantity of archives want to be produced to practice to turn out to be a scribe. To overcome these limitations, this paper pursuits to supply higher solution. In order to attain this answer sure speculation is formulated. The speculation being, the proposed answer works in diverse type environments mainly centered on the consumer being in its proximity. Applied lookup used to be achieved to boost a product to resolve this sensible problem. Both major and secondary lookup techniques have been undertaken to recognize the genuine necessities of the establishments and their students. The facts was once procured via visits to more than one blind institutions, interacting with college members, acquiring unique views thru surveys, a couple of questionnaires and one on one interactions with blind college students.

IV. ANALYSIS TABLE

Table 1 shows the analysis of survey of existing system by stating the Title of Paper, Summary, advantages, Techniques Used.

Table 1: Analysis Table

Sr.no	Title of Paper	Summary	Advantages	Techniques Used
1.	Reader and Object Detector for Blind	Project aims to cover broader aspect of life and hence reading and assisting done in one.	People read whatever they want and also detect objects easily.	It uses IOT, Raspberry pi, Tensorflow and SSD technique.
2.	An education portal for visually impaired	A distance training portal avails educational materials and resources effortlessly accessible. It permits ease of training packages with specific contents and duration	The portal would provide many possibilities to the visually impaired humans for the dynamic and interactive education	JAWS, PHP, Mysql

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3.	Learning platform for visually impaired children through artificial intelligence and computer vision.	With the help of various compartments children's can get detailed information without getting confused.	Gives detailed descriptions and interaction using voice commands.	AI, R-CNN, Computer Vision, TTS Module
4.	Intelligent Eye: A Mobile Application for Assisting Blind People	Several features of different application are combined to make it easy.	Detects objects accurately.	Android studio, Convolutional Neural Network, Database, OpenCv.
5.	Android based educational Chatbot for visually impaired people	As it gives audio output so user can easily search any topic	Uses the voice recognition for input and speech for output	NLP, TTS,
6. .	Design and Development of Multisensory Smart Assistive Technology for Blind Persons	Paper describes identification of persons and currency, provides indoor navigation for users	Inexpensive and user friendly, simplest algorithm for identification	IOT, Multisensory System

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7.	Evaluating Smartphone Screen Divisions for Designing Blind-Friendly Touch-Based Interfaces	The aim is to identify the interaction experience of blind people on a smartphone by the proposed screen division partitions	Output of the respondent has been mapped on the bar charts to make the analysis effective and easy	HCL model, Android studio
8.	Software and hardware solutions for using the keyboards by blind people	Application enhanced to become usable in typing	It is useful for people with visual impairments in order to learn how to use a PC keyboard.	TTS, Voice synthesis, Screen reader, Visual studio
9.	Smart Eye for Visually Impaired-An aid to help the blind people	Since all data feed to internet connectivity not needed for face detection and navigation	It helps to identify peoples based on previous images and easily access the device	GPS, IOT, Raspberry Pi, Image processing, OpenCv
10.	RFAIDE—an RFID based navigation and object recognition assistant for visually impaired people	System comprises a cellular RFID reader module with an built-in ZigBee transceiver for transmitting the tag's statistics.	With the help of this system any reader comes closer to RFID tag then it sends audio message	Zigbee, Navigation, Radio

V. CONCLUSION

The proposed machine affords speech attention and speech synthesis in order to limit human intervention and allow such college students to take up their tests greater confidently. With the creation of assistive and adaptive technology, the latest years have considered an ascent in such gadgets and software program applications, which has removed many access barriers for people with vision impairment. This has created surroundings that allow independence as activities duties can be carried out with restrained assistance. An computerized machine should overcome these disadvantages. Elimination of a third party scribe may also additionally lead to a feeling of self-sufficiency in these students. The proposed machine is additionally convenient to combine and is user-friendly. It is now not solely really useful for each blind college students and different bodily disabled students.

Acknowledgements

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