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A Distinctive Multilingual Messaging Application with OCR

Ajaykumar Yadav¹, Shubham Waingankar², Kshitij Salvi³, Prof. Monali Pimpale⁴

¹(Computer Engineering Department, VIVA Institute of Technology, India)

²(Computer Engineering Department, VIVA Institute of Technology, India)

³(Computer Engineering Department, VIVA Institute of Technology, India)

⁴(Computer Engineering Department, VIVA Institute of Technology, India)

Abstract: In today's world, Chat application is the most common means for distant communication and to connect to individuals. Many people face language barriers during chatting, especially in a country like India where there are 22 official languages are present. The problem of language difference has hindered effective information communication over the years. This project will try to solve this issue. The proposed system eliminates the need to have a common language for text communication. With advancement of technology, it is possible to apply some techniques to perform text detection and text translation. Thus, these OCR Messaging Application will not only convert text message into one language to another but also convert the languages inside the images by extracting it into text with the help of OCR method and then converting it into other language which the user will select according to his/her preference.

Keywords – API, Multilingual Messaging Application, OCR, Text detection, Text translation

I. INTRODUCTION

The problem of language difference has hindered effective information communication over the years. There have been difficulties in information communication amid countries over the years. In modern times, language interpreters must understand and speak both the language been translated to and verse-visa. While communicating, the difference of language between the end users creates barriers for conveying their thoughts to others and leads to unsuccessful communication. Over the decade's humans have developed different ways of translating languages in other to solve the problems associated with language differences. The first approach which was implemented in solving this language problem was by using human translators that will be able to understand and translate both languages to the involved parties. This method was the first method introduced and has been used for decades, which has proven not to be the most efficient and effective method of language translation proven over the years. For solving this problem, we have introduced this application named "Multilingual Messaging Application". Android makes it easier for consumers to get and use new content and applications on their Smart phones. This project focus to develop an Android-platform based text translation application that is capable to recognize the text present on images taken with a mobile phone camera, translate the text from any language, and display the translation result back onto the screen of the mobile phone. Smartphones have been known as most commonly used electronic devices in daily life today. As hardware embedded in smartphones can perform much more task than traditional phones, the smartphones are no longer just a communication device but also considered as a powerful computing device which able to capture images, record videos, surf the internet and etc. With advancement of technology, it is possible to apply some techniques to perform text detection and translation. Therefore, an application that allows smartphones to capture an image and extract the text from it to translate into other language. OCR is a technology that allows users to convert text or documents in images captured by an input device into an editable, searchable and reusable data type for further image processing. This technology enables a machine to recognize the characters automatically through an optical mechanism just like a human being use eyes to see an object in the world. Thus, these OCR Messaging Application will not only convert text message into one language to another but also convert the languages inside the images by extracting it into text with the help of OCR method and then converting it into other language which the user will select according to his/her preference. It has the inbuilt feature of Translating the message sent by the end user to convert it in user preferred language, so the user can understand the exact thought which end user wanted

to convey which as a result automatically leads to successful communication. Text translation is mainly used for converting the text from one language to another because the purpose of translation is to convey the original tone and intent of a message, taking into account cultural and regional differences between source and target languages. Translation has been used by humans for centuries, beginning after the appearance of written literature. For letting users understand the text of an image we have used the OCR technology. Optical Character Recognition (OCR) is used to extract the text from images and then we show that text to the user in his/her preferred language. This image extraction is used to understand the language of sentences which are into image.

II. RELATED WORK

Yuming He [1], OCR is a technology that admit users to change from text or documents in images captured by an input device into an editable, searchable and reusable data type for other image processing. This technology give authority to a machine to acknowledge the characters automatically through an optical mechanism just like a human being use eyes to see an object in the world. In recent years, deep learning has been increasingly popular and it has begun to be applied to various areas ranging from facial recognition to target detection, OCR included. Researchers continuously apply target detection networks of different types such as Faster and RCNN to the OCR area, in order to detect texts. Compared with traditional text recognition, text recognition embedded by deep learning is more accurate with stable noise immunity and robustness. It is able to resist influences such as changes in backgrounds. The end-to-end network of deep learning is more accurate when used in the area of text detection, compared with traditional image processing and cutting, and character classification enabled by machine learning. Apart from text detection and text recognition, table recognition has also gained attention from researchers. The diverse styles of tables and their internal structures make it no less difficult to recognize them than those recognized by OCR in natural scenes.

Sai Spandhana Reddy Emmadi et.al [2], Communication is a mean for people to exchange messages. The application has a login page through which the user can register and login themselves. Home page of the application contains the previous messages if any. The user can be able to search for the other user. User can send and receive text messages. The user can create chat rooms and can search for the content or information. With these chat rooms users can exchange views and information about various topics. The final system will result as a real time communication application which provides the users to communicate to each other with an ease.

S Uthayashangar et.al [3], The three major modules of the application are Artisans, Agencies of MoTA and Commoners. Artisans, the agencies of MoTA and the commoners can register in the mobile application and they can select the language of their choice. The application supports multiple Indian languages with a voice assist feature. After selecting the language, the application will support only the language chosen by them. The artisan can upload images in the platform. Chat session is provided for asking queries to the MoTA agencies. The MoTA acts as an intermediary for the artisans and the commoners. Agencies of MoTA can view the data and files of the registered tribes. They can ask or reply for the queries made by the artisans and also by the commoners. This application helps the agencies of MoTA to provide training and promotion for the artisans. Commoners can view the documents of the tribal people. They can also view or buy the products. The application creates a direct link between the local artisans and the agencies of MoTA. This project makes the tribal people easier to use and access, better than any other mobile application in order to reach out the agencies of MoTA. This project helps the local artisan to improve their skills to fullest, as well as promote their skills for their welfare.

Muhammad Ajmal et.al [4], OCR stands for Optical Character Recognition. It is a worldwide technology to recognize text inside images, such as scanned documents and photos. OCR technology is used to convert virtually any kind of image containing written text (typed, handwritten, or printed) into machine-readable text data. In the application, OCR algorithm is used for image extraction and recognition. After capturing an image, it will extract the text from the image and then recognize the characters. When this process cycle is completed, it looks up for the text in its database for translation. If it finds the text in its database, it gets translated if not the application will automatically search online translation for the text.

Robi Sanjaya et.al [5], These chatbot increase pace of user to chat with person who don't share same language. The person with different language can communicate using this chat application. It is a chat-based application which convert language to English instantly using google API. When user A sends a message in one language, the message is sent to a server installed with Google Translate API and begins translating the appropriate language

based on the language setting on the server. The server then translates to user B-based speech before forwarding the message to user B. Likewise, procedure also occurs when user B sends a message to user A.

R. Gayathri et.al [6], In this paper an android application has been made that captures an image from user's smartphone and extracts the text from it and translates it into English and Chinese and if the user wants it can also speech out the text. This application can also be useful for visually impaired users. OCR and translator are the important modules of this application. OCR is a technology that allows users to convert text or documents in images captured by an input device. This technology enables a machine to recognize the characters automatically through an optical mechanism. The steps involved in this application during OCR are image capturing and preprocessing and then text segmentation and then text recognition is done. After all this steps then text is translated using a translator and the text to speech is also done.

Diptesh Kanojia et.al [7], The application consists of highly scalable chat server ejabberd based on Extensible Messaging and Presence Protocol (XMPP) and it is extensible via modules which provide support for additional capabilities such as saving offline messages, connecting IRC channels, etc. The application handles the chat requests, users and message transactions from one user to another user. The application was build using publicly available smack library APIs which is easily portable to Android devices. The user logs in to the server with their respective chat client and gets an option to select language of his/her choose for their chats. The user then sends message which is transferred via XMPP protocol to the server where it is processed and then shown to the other end user. The steps involved in the system are compression, then normalization, then spell checking, then translation and then finally transliteration. The application is a client-server IM architecture-based chat system with multiple Statistical Machine Translation engines working towards efficient translation and transmission of messages.

A.A. Tayade et.al [8], In this paper an android-platform based text translation application has been made that is able to recognize the text present on sign board images taken with a mobile phone camera, translate the text from Marathi to English and display the translation result back onto the screen of the mobile phone. Text recognition and Text translation are the important modules of this system. The steps involved during optical character recognition are pre-processing, segmentation, feature extraction, classification and post processing. The methods involved in classification process are decision-theoretic and structural method. The methods involved in post processing are grouping and error detection and correction. In the text translation phase, translator module is used to translate the extracted text from Marathi to English. Instead of using Google API for text translation, translator module is used in the system. The algorithms used for segmentation of Marathi script are Line segmentation, Word segmentation, Character segmentation and template matching.

Eri Hosogai et.al [9], A multilingual chat system is developed which is Multilingual Chat with Helpful Images (MCHI) which is based on machine translation and is included with a presentation function of images related to the contents of the messages and the users will be able to notice the mistranslation. The system supports English, French, Chinese, Japanese, and Korean languages and it uses Google API to retrieve related images from the image posting site Flickr. The development language of the system is php and ajax (prototype.js). The development environment is XAMPP for Windows Version 1.7.1, MYSQL 5.1.33-community, php 5.2.9, and Apache 2.2.11. For multilingual communication Tree Tagger, Yahoo API, and KLT version 2.0 are used and Images related to the keywords are retrieved by using Google API.

Er. Kavindra Singh et.al [10], In this paper a web education chatting system is developed which matches users based on interested keyword. The main purpose of this paper is to create online platform where educationalist and all type of student such as research scholar and academics children can communicate each other in chatting box based on their interested keyword such as Mathematics, Economics etc. A user can filter keyword on typing history then a list of experts in history will be filtered and student can easily communicate on sending them text message and typing problems whatever they have. The system provides Username and Password based authentication security to protect communication of teacher and student. The three main modules in this system are chat server, interested keywords and messaging chat. PHP language is used for the system and mysql is used for storing the database of users and Editplus and Netbeans is used for coding the program.

Autin Pravin et.al [11], The primary objective of this system is to introduce a methodology to provide messaging service over the internet which allows android-based smartphone and tablet users to chat with any person in this world. The system is an android application, to facilitate communication between multi-users. This application provides very fast messages and images transfer between users. This project uses google firebase server site

database and SQL-lite client site database for the communication of data. This application provides camera, real time data access and all the other features that enable a mobile phone to chat globally.

Arun Gopi et.al [12], The system in this paper is based on Machine Translation (MT) which automatically translates a sentence from one language to other and the users can also make use of speech as interaction mode between users in their mother tongue. The user speaks in their own language after selecting the language of their comfort or mother tongue and the audio will be recognized in real time. Then the text is translated to the language opted by end user and the system synthesizes it.

III. METHODOLOGY

We are implementing the text-to-text, image-to-text, notification push and firebase database in our chat application. The translation of text will be shown when the user selects the message and chooses the language, he wants to translate the text to. For image translation the user can either upload an image from the gallery or from his camera. We have used flutter, dart language and android studio to develop this application. We have used firebase for database and firebase is a no sql database. Firebase provides services such as cloud storage, cloud messaging, authentication, hosting and crash reporting, etc. Detailed system architecture is shown in Fig. 4.1.

The proposed system has three essential phases:

1. Image capturing
2. Algorithm
3. Translation

1. Image Capturing

User will just need to click the application. Device camera will start automatically and user can focus and take a snapshot of text easily.

2. Algorithm

Optical Character Recognition (OCR) algorithm has been used for extraction and recognition of text in our application. It is already known that the OCR algorithm has made great advances in the field of pattern recognition and pattern extraction. It is being widely used in security, scanning documents, image processing and many more applications world-wide providing 99% accuracy rate for printed characters and more than 90% for handwritten characters. OCR algorithm is designed to convert scanned images into digital documents that are editable. OCR includes following phases: 1. Pre-processing: It is a very important phase in which it changes the effective processing. After capturing the data, pre-processing phase decreases the reduction using normalization and reduces the variations that otherwise causes the low recognition rate. It uses grayscale techniques to convert the input image into binary format. This process is known as binarization or digitization of images. 2. Extraction: In this phase, the relevant information is extracted from the image. It extracts each character of text embedded in the input image. The pre-processed image is referred to as the input image. 3. Recognition: In recognition phase, each character in the extracted image is converted into the code labelled as the letter. Each text is considered as a meaningful object. 4. Post-Processing: This is the last phase, which gives meaning to unrecognized text or character and eliminates the abnormal object. Abnormal object is any unrecognized and distorted object. This phase only demands the meaningful labelled letters. The process is shown in Fig. 4.2.

3. Translation

After applying OCR algorithm, the extracted text is translated with the help of dictionary embedded in the software database. In Text translation we take text as input and convert it into another language. The base language is English. The text is split into words and then it is search in the dictionary and the corresponding matched text/word from the dictionary is displayed. The language selection module is developed for such purpose. If any string is not found in its database, then the application will automatically use Microsoft Translation Application Programming Interface (API) for output translation which is shown on your mobile screen. API is a connection or interface between other computer programs or other software. The process is shown in Fig. 4.3.

When the user opens the application, splash screen will be shown and then the user will be sent to registration page then after successful registration the user can click login and an opt will be sent to user registered mobile number which the user has to enter for login. After successful login the user has to select his/her preferred language

from settings for translation. So, while messaging the user has to just click on the text or text-image then it will get translated in the language selected by the user. This application is a real time communication application and is also a real time text and text-image translation.

IV. FIGURES AND TABLES

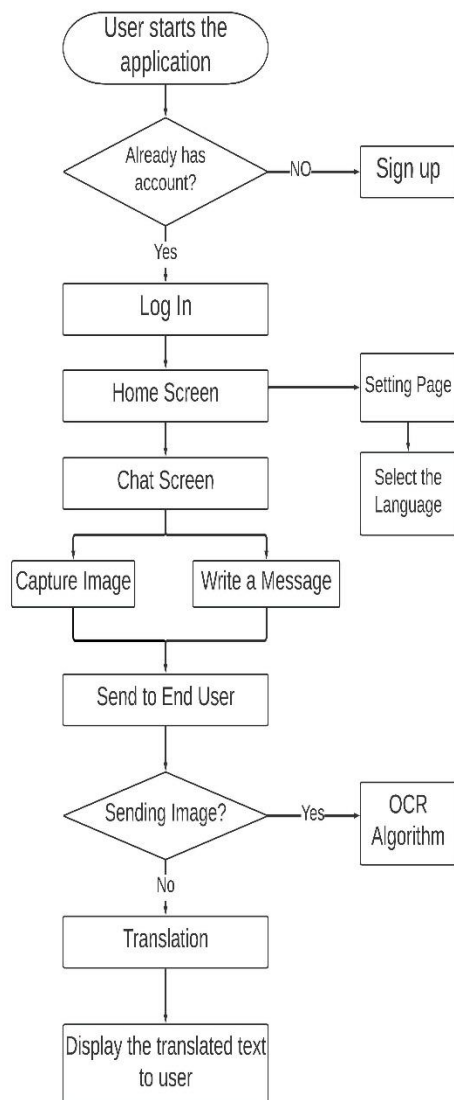


Fig.4.1 System Architecture

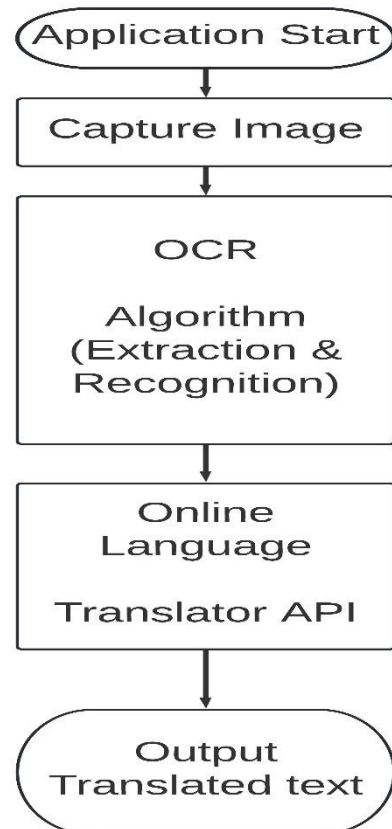


Fig.4.2 Basic algorithm

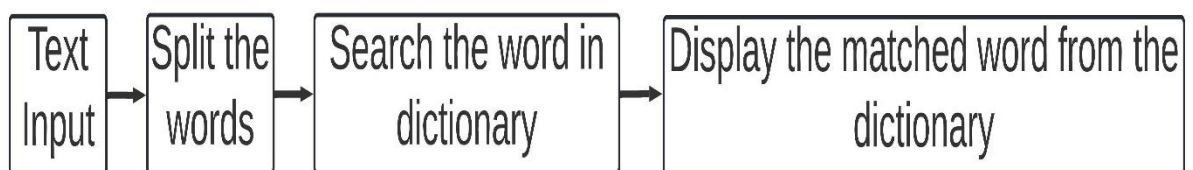


Fig.4.3 Block diagram for text translation

V. CONCLUSION

In this proposed system, we implemented the application for the user who is facing the problems of language barrier. The application's UI is also user friendly so that users can easily interact with this application because of this application user don't need to use a dictionary for understanding the meaning of sentences. This automatically reduces the user task for understanding the languages for communication. There is always some place for enhancements in any software application, however good and efficient the application may be. Many chatting applications are emerging these days and are being used by people very effectively.

REFERENCES

- [1] Yuming He, "Research on Text Detection and Recognition Based on OCR Recognition Technology", IEEE 3rd International Conference on Information Systems and Computer Aided Education, 2020
- [2] Sai Spandhana Reddy Emmadi, Sirisha Potluri, "Android Based Instant Messaging Application Using Firebase", International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7 Issue-5S2, January 2019.
- [3] S.Uthayashangar, Sowmiya, Dheebhika, Swagatha, "Tribal Welfare Application: A System to Connect Local Artisans & Agencies of MoTA", IEEE International Conference on System, Computation, Automation and Networking (ICSCAN), 2019
- [4] Muhammad Ajmal, Farooq Ahmad, Mudasser Naseer, Martinez-Enriquez AM, "Image to Multilingual Text Conversion for Literacy Education", 17th IEEE International Conference on Machine Learning and Applications (ICMLA), 2018.
- [5] Robi Sanjaya, Abba Suganda Girsang, "Implementation Application Internal Chat Messenger Using Android System", International Conference on Applied Computer and Communication Technologies (ComCom), 2017
- [6] R. Gayathri, C. Kalieswari, "Detecting Text Based Image With Optical Character Recognition for English Translation and Speech using Android", IEEE Student Conference on Research and Development (SCORED), 2015.
- [7] Diptesh Kanojia, Shehzaad Dhuliawala, Abhijit Mishra, Naman Gupta, Pushpak Bhattacharyya, "TransChat: Cross-Lingual Instant Messaging for Indian Languages", Conference: International Conference on Natural Language Processing (ICON), 2015.
- [8] A. A. Tayade, Prof.R.V.Mante, Dr. P. N. Chatur, "Text Recognition and Translation Application for Smartphone", International Journal of Advanced Research in Computer and Communication Engineering Vol. 2, Issue 6, November 2013
- [9] Eri Hosogai, Tsubasa Mukai, Sinyu Jung, Yasufumi Kowase, Antoine Bossard, Yong Xu, Masatoshi Ishikawa, Keiichi Kaneko, "A Multilingual Chat System with Image Presentation for Detecting Mistranslation", 33rd International Conference on Information Technology Interfaces, 2011
- [10] Er. Kavindra Singh, Er. Rajendra Singh, "Enhanced Education Chat Application Based on Interested Keyword with Username and Password Authentication Security", International Journal of Advanced Research in Computer Science and Software Engineering, June 2016
- [11] Auti Pravin, Mahale Sangam, Zanjad Vikram, Dangat Madhuri, Prof. Kandalkar S.A., Dr. Bhushan Borhade, "AN ANDROID BASED INSTANT GLOBAL MESSENGER", International Journal of Modern Trends in Engineering and Research (IJMTER) Volume: 5, Issue: 03, March 2018
- [12] Arun Gopi, Shobana Devi P, Sajini T, Jose Stephen, Bhadhran VK, "Multilingual Speech to Speech MT based chat system", Intl. Conference on Computing and Network Communications (CoCoNet'15), 2015.
- [13] <https://ieeexplore.ieee.org/document/8614240>
- [14] Seung Yun, Young-Jik Lee and Sang-Hun Kim, "Multilingual Speech-to-Speech Translation System for Mobile Consumer Devices", IEEE Transactions on Consumer Electronics, vol. 60, no. 3, August 2014.
- [15] Text based multilingual chat ref, [online] Available: <http://www.labnol.org/internet/multilingual-chat-in-google-sheets/286981>.
- [16] S. Taha, Y. Babiker and M. Abbas, "Optical character recognition of arabic printed text", SCORED 2012-2012 IEEE Student Conf. Res. Dev., pp. 235-240, 2012.
- [17] P. Nagabhushan and S. Nirmala, "Text Extraction in Complex Color Document Images for Enhanced Readability", Intelligent Information Management, vol. 2, pp. 120-133, 2010.