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Text Extraction and Translation from Image using ML in Android

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ABSTRACT: There are several OCR applications and Translation applications available for various OS i.e. iOS and android. But there isn't an Application that combines both these unique features in one application. An Android application will be developed to translate the text which is present in an image and generate a new file for translated text. This application will be different from other applications in terms of efficiency and accuracy. And an extra feature of translating text(English) to Braille language file i.e. (.brf) file which is used by handicapped (partially blind/ blind) people. The prime objective of this project is to provide user with multiple functionalities in a single application such as text extraction from an image, translating the text present in an image, generating the text file from translated text and speech out the translated text for handicapped/ illiterate people.

KEYWORDS: OCR, Smartphone, Image Processing, accuracy, Text Extraction, Machine Learning.

I. INTRODUCTION

As we know Today smartphones Camera have developed so much that it can capture minute details and are able to capture Image of as high quality as of Digital Camera. Which gives user tons of options that that can be performed on these images. These Images can be used to develop a printed books from a soft copy and can be used for editing a text printed papers.

Using OCR for Extraction of text from an Image is really useful for today's life as everything cannot be memorized or can be written. Capturing an Image is the best alternate option to save important Information. By updated Data from WHO (World Health Organization) Obtained on October 2017, estimated 253 million people live with Visual impairment. So, to help them to read text, they need Braille language to understand words.

Hindi, the official language of India, used by 400 million people in world. This project provides an English to Hindi Text Translation because, many legal Government documents, Hospital bills, papers, etc. are printed in English language. Carrying a pocket Dictionary is not a solution to this problem. So, to provide a handy solution for this problem is provided in this project.

II. RELATED WORK

OCR is the main topic of concern here, here we are implementing the project in Android application. There are apps present to do the same work like Google Translate, Mobile OCR, and simple OCR. But they don't talk about the accuracy of detecting Text. In this project, two different approaches will be chosen for implementation of OCR. One approach is by implementing Tess-Two tesseract library in Android studio and another approach is with Google Vision API. Before performing OCR, different Image processing techniques will be used to enhance the image quality by removing noise from an image, improving contrast and brightness of an image and a cropping image feature will also

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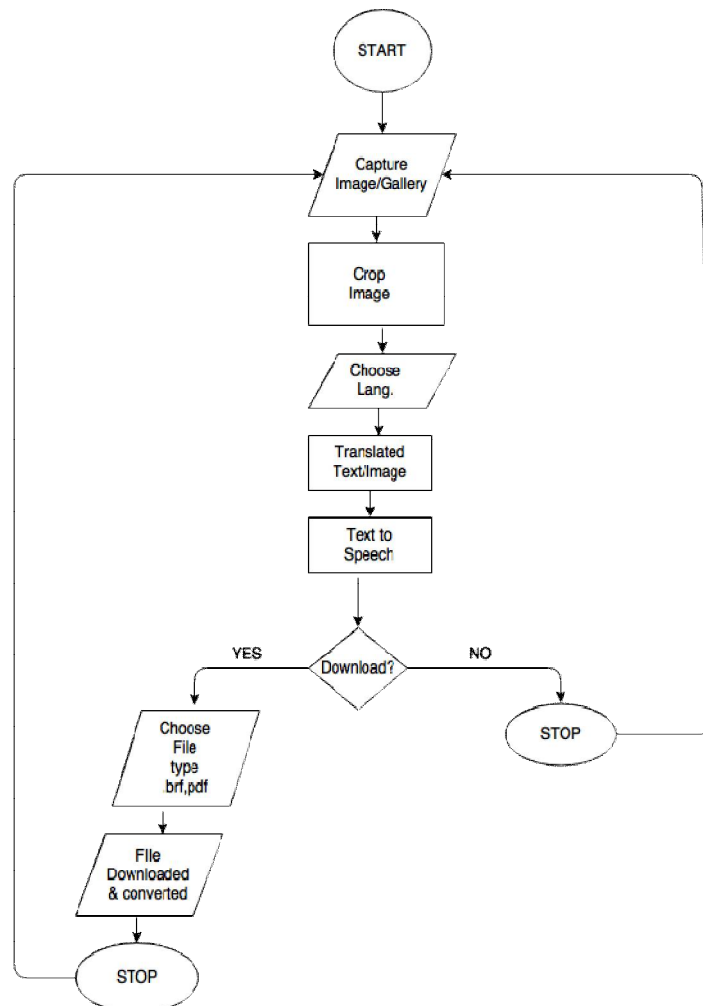
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be provided for increasing the accuracy of detection of text from an image. After image processing, above mentioned two approaches of implementing OCR will be tested and one with higher efficiency and accuracy will be chosen. There are many translation apps available online but none of them provide the translation from English to Braille language. For translation from English language to Braille language, python libraries will be used and will be integrated with the android application. Since the handicapped (blind / partially blind) and illiterate people cannot read the translated text, the project will provide a speech out feature for the problem. The built-in feature of smartphone i.e. text to speech will be used for reading the translated text. A special feature of voice input (yes/no) for handicapped people will be provided for different options like “Download translated file?” etc.

III. SYSTEM DESIGN

Fig. 1 Flowchart of the proposed system



There are two back jumps in the flow. First, if the user doesn't want to save the translated file. Second, after the translated file is saved and converted.

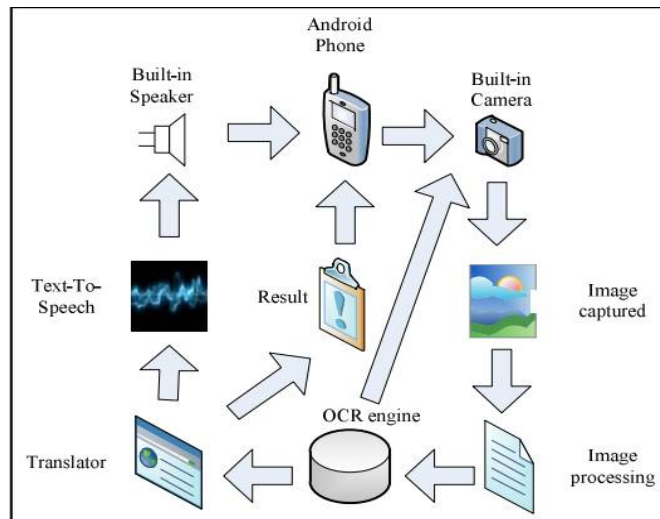
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Fig. 2 Architecture of the proposed system



The picture taken from camera will be enhanced and processed for OCR. After which the translator will translate the text and forward it for documentation and/or TTS engine.

IV. TESTING AND EVALUATION

The applications testing focused on processing speed and accuracy of text recognition compared with original printed text. The image will be captured from any paper-printed book. The device that was used to examine the framework related to OCR is as follows:

- (1) ASUS (Android 6.0), (2) Redmi mi 4 (Android 6.0)

First prototype includes a standalone OCR using Tess-two Tesseract Library.

Research Institute at UNLV for the Fifth Annual Test of OCR Accuracy First formula to count text accuracy:

$$\text{Accuracy} = \frac{\text{NC} - \text{EC}}{\text{NC}}$$

NC= Number of character
EC= Error of read character

Second formula to count format accuracy:

$$\text{Accuracy} = \frac{\text{NW} - \text{EF}}{\text{NW}}$$

NW= Number of word
EF= Error of read format

Format accuracy measures format detection such as Italic, sub/superscript, bold, and underline format. In this case, most of these formats are ignored. When the value of format accuracy is 0%, this indicates that no text format was detected by the application.

When performing OCR on a single page, the application uses the directly captured image and continues to the recognition process.

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V. SYSTEM DESCRIPTION

The application will work in both Offline and Online mode. First user will be asked to input an image either from camera or from gallery. Once image is uploaded then crop feature is enabled to apply cropping (if needed) to translate or extract text from specific part of an image. Then a Voice input is taken from user as “DO YOU WANT A BRAILLE FILE TO BE DOWNLOADED?” this option is for visually impaired people. Then if “YES” then a braille file will be downloaded in system. If “NO” then further language Translation will be asked from user. Once translation is completed then downloadable file type extension will be asked and selected type will be downloaded in system. Google drive upload option will also be enabled to share file with others.

VI. APPLICATIONS

- [1] This app will be useful for everyone who don't understand English and want to translate it handy.
- [2] The app will help handicapped people (blind / partially blind) in reading and understanding the text either by Braille language or by text to speech feature.
- [3] It will help users to share the translated file with other people by downloading the file or by uploading it on Google Cloud.

VII. CONCLUSION

In this paper, an Android application was developed which provides different functionalities such as image capturing, image enhancement, text extraction and translation from English language to Hindi Language and Braille Language (for Handicapped people), option for downloading the translated file and choice for uploading the translated to the Google cloud.

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