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An Android Based Detection of Text Extraction from Image

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Abstract :*The goal of text extraction from an image is to develop an Optical Capture Recognition (OCR) and Natural language processing (NLP) for Android-based mobile devices. Content reports, pictures put away in cell phones having Android as a working framework, and pictures taken by any Android gadget are the most focal point of this application. Also, the recognized data is sent further for converting it into speech using Android mobile phone text to Speech for a blind person. The purpose of this application is to recognize text in scanned text documents, text images or any picture taken by an Android-based device to reuse it later. This application will permit its clients to perform numerous activities in a couple of moments minutes.*

Keywords: *OCR, NLP, Tesseract, MobileDevices, TTS.*

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I. Introduction

Mobile application grew drastically in the last two decades to realize the status of the most important information repository in human history. By providing efficient, fast, consistent and authentic tools within the sort of internet and mobile applications, information technology is penetrating human life and is playing a crucial role in changing the lives of numerous people around the globe. Nowadays there is a huge demand for storing any information available on papers, like books or newspapers on mobile phones. Things like government and hospital forms still tend to be printed on paper, and can't forget business cards. Since not all things have moved to advanced media, the most profitable arrangement is essential to rapidly change any paper you're given into computerized duplicates and information, which you can store and alter on your PCs and cell phones[3].There are many existing tools to store information by scanning the specified text, but it will be stored as a picture that will not help for further processing. For example, if user store scanned text images, he will not read the text word by word, or line; the text in these scanned images cannot be reused unless we rewrite the whole content by ourselves. For this reason, a mobile Application is formed which recognize the text from an image capture from mobile using OCR(Optical Character Recognition) and NLP(Natural Language Processing)[6]. -Also implemented Text to Speech for a blind. Expelling content from the ordinary scene and demonstrating information related to it will help with knowing the general condition. As we will embed this application on the smartphone, there will be more mobility.

II. Literature Review

In 2009, Jian Yuan[1] presented the idea of development of a human machine interactive software application which is named as 'Textract', for extracting the text and recognition in natural scene images which are captured via mobiles and other digital devices. The texts which are extracted from images are then translated into some other language (They have mentioned Chinese in this project) so that a device such as a cell phone serves as a portablr language translator. Considering the resource constraint nature of the mobile devices, the proposed solution makes the best possible choices to balance between the accuracy of recognition and the processing speed.

In 2015, Sathiapriya Ramiah[2] presented this paper which explains about the idea of creating an Android application using integrating Tesseract OCR engine, Bing translator and mobile phones built-in speech out the technology. With the help of this Android Application, travelers who visiting a foreign country is able tounderstand messages, notices or signs drawn in various different languages. Visually impaired users can also access the important messages from a printed text through the speech out feature .As the technology is rising day by day, now it has become possible to apply some techniques to perform the detection of text and translation. Therefore, here the author presents an application that allows the mobile phones to capture the images and extract the needed text from it to translate it into speech. The final outputs are tested by the various end users belonging from different language backgrounds and concluded that this application has satisfied many

users. By using this app, the users who travel to any foreign country and are unable to understand the domestic language of that country are now easily able to understand the messages and notices portrayed in different languages.

In 2018, Nilesh Jondhale[3] focused more on OCR which is used for recognition of characters with high accuracy. Using a handheld mobile device camera, user can capture an image of a printed or handwritten document to generate text from the same. On a global scale, there are millions and billions of Android Mobile Phones running. With the help of a Mobile Phone and an android text to speech technology, user can convert the text into an effective & accurate speech optimally. Machine learning has also become one of the peak of technology. Previously it was not possible to compute the data at higher or faster rate, but with the help of leading technology it is now possible to process data at higher rate to get optimized hence better result.

In 2018, Yibin Ye[7] proposed a new end-to-end text detection framework called Image Text Extraction (ITE), which incorporates a focal loss and is also trainable. ITE works effectively on words that have extreme aspect ratios with a low computational cost. ITE successfully unifies the text detection and structured data extraction stages in an OCR pipeline into one neural network. It greatly reduces manual labors by transforming the traditionally repetitive template design into a straightforward labeling process. They have validated their proposed method on large-scale realworld Chinese passports and medical receipts datasets, which represents different scenarios.Through accuracies performance, the ITE scheme has proven its effectiveness by its achievement of highest accuracies.

III. Research Methodology

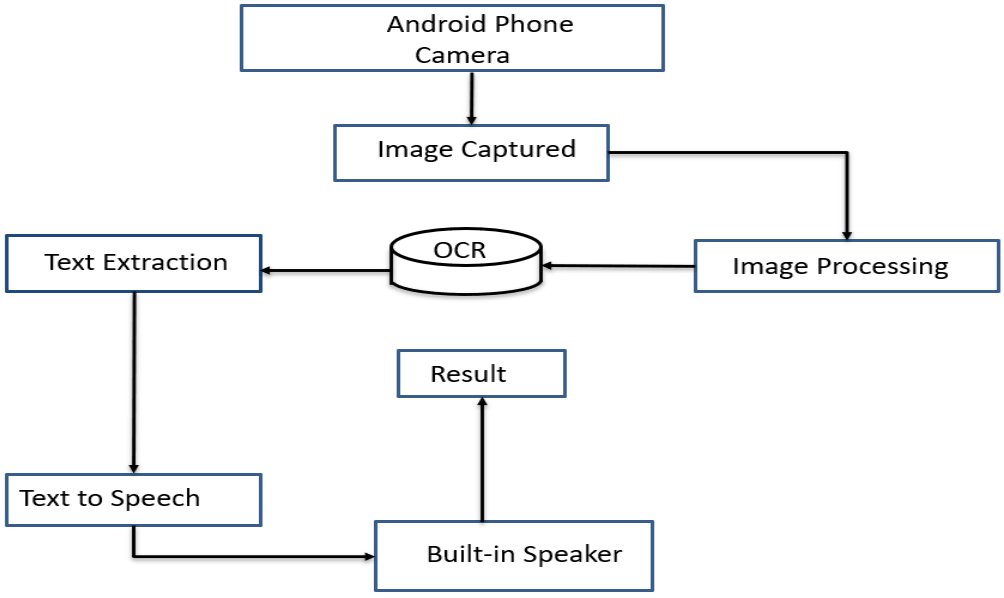

Figure 1: System Architecture

The proposed system contains an Android application. This application uses the camera of a mobile device as a default input device. It gathers data in image format, those images are processed for the Optical Character Recognition. The OCR recognizes the text from an image. System collects outlines and provides text lines. An attempt is made to recognize each word and successfully detected data will be sent to a compatible learner. The recognized data is sent further for converting it into speech using Android mobile phone text to Speech.

The functioning of our proposed system is described in the following steps:

A. User Registration -The user have to provide details such as name, username and password etc. The registration of every new user is required for the first time.

B. UserLogin-Once the registration process is successful, the users can use their username and password to access their account.

C. Welcome Activity-After the login process , the welcome page appears which can be further used to process the OCR for Text Extraction from Image.

D. OCR-First, you need to capture the text image with the help of the camera. The captured image can be cropped and rotated, after which finally it will start extracting text from an image.

In our proposed system we have two main phases:

PHASE 1 – OPTICAL CHARACTER RECOGNITION (OCR)

OCR is a technology that is used for the translation of different types of forms or document files such as paper documents, PDF's, word document or the images which are captured by any camera which can edit and can even search the data. This technology allows a machine to automatically identify the characters through an optical mechanism similar to a human being using eyes to see any object in the world [2]. At the starting stage of introducing OCR, the technology had to come across several problems including limitations in the quantity and complexity of the hardware. Regardless of how, OCR is now popularly used in many areas such as processing of cheque, digital libraries, recognizing text from natural scenesetc. As years went on, Optical Character Recognition has became more mature with the advancement of technologies and the contributions of some well-known companies such as Hewlett-Packard, Microsoft, International Business Machines, Google, etc with the ongoing researches.

1.1. Line Finding

The line finding algorithm is one of the few parts of Tesseract that was used in earlier system . The line finding algorithm is intended so that a skewed page can be renowned without having to de-skew, so that we can save loss of image quality. The vital parts of the line finding method are blob filtering and constructing of lines.

1.2. Baseline Fitting

Once the text lines are established, the baselines are fixed more accurately by means of a quadratic spline. This was for earlier OCR system, which used to permit Tesseract to handle pages through curved baselines , which are a common artifact in scanning, and not just at book bindings.

1.3. Fixed Pitch Detection and Chopping

Tessaract tests the text lines so that it can decide that the lines are fixed pitch or not, where fixed pitch text,it chops the text into characters using this pitch ,and disables the chopper and associator on these words which can be passed to the next step which is word recognition.

1.4. Word Recognition

For any character recognition the main part in the recognition process is to identify how to segment a word into characters. Firstly we need to classify the initial segmentation output from line finding and the rest of the word recognition is applied only to those words which are non-fixed-pitch text.

PHASE 2 – TEXT TO SPEECH (TTS)

For text to speech, the built-in feature of cell pone would perform the service speech out. Some Android libraries such as android.text and android.speech are mainly used for this objective. Text to speech (TTS) enables an android mobile phone to read the text form an image and convert it into audio via the phone's speaker. Android Text to speech support various different languages. TTS is a simple but very powerful feature. It is more effectively used in mobile Applications committed to people having weak vision or in an educational app of kids or can be used in pronunciation learning app etc.

IV. Experimental Results

First of all, the user registration page appears where the user -fills the details and do the registration. Where the user has to provide the details such as name, username and password. The registration is required only for the new users. After the registration, the users can use their username and password to access their account. After login, the welcome page appears to use the OCR for Text Extraction from Image. First, you need to capture the image with the help of the camera. The captured image can be cropped and rotated, after which finally it starts extracting the text from an image.

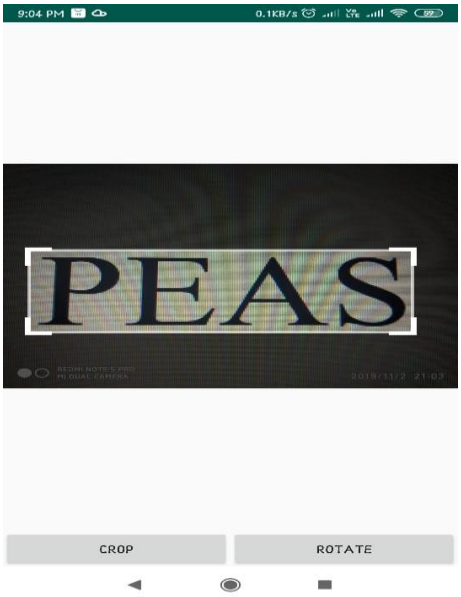

Fig 2 Text Extraction

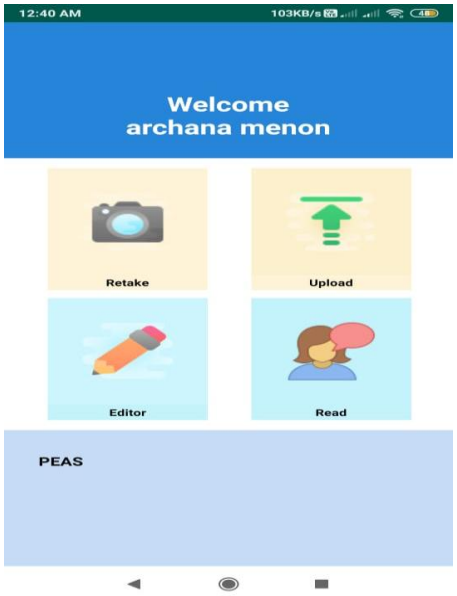

Fig3 Extracted Text

V. Conclusion

By using this technology we can scan text from printed papers as well as handwritten notes with higher accuracy. Further, the system goes on training providing more accurate results and Speed. In addition to that PDF scanning and reading, functionality can also be provided in the future. Users should be able to access the scanned document later in time, hence the same functionality can be provided. The system can be more improved to take the app globally such as it is possible to make such a system for regional languages and improve localization & globalization. The recognized data is sent further for converting it into speech using Android mobile phone text to Speech. The system reduces person efforts along with time. It can be helpful for the person who doesn't know the language/ pronunciation of particular words and also useful for a blind person. The system can also be helpful for visually impaired or persons with weak visual ability. In the upcoming system, it can be advanced with an improved OCR engine, translator facilities or by multi supporting text to speech engine. By doing this, it can remarkably improve the performance of the system for a better quality application.

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