International Journal For Technological Research In Engineering
Volume 7, Issue 11, July-2020 *ISSN (Online): 2347 - 4718*

TRANSLATION OF RECOGNIZED TEXT FROM IMAGES

Dr.Vasudev T[1], Chaithanya K N[2], Madhushree R[3], Apoorva B P[4], Arpitha N[5]
[1]Profeesor at Department of Information Science and Engineering
[2,3,4,5]Engineering student, Department of Information Science and Engineering
Maharaja Institute of Technology-Mysore, Mysuru, India

Abstract: This paper focuseson development of a mobile application on Android platform. Text in scene images as well as document images can provide valuable information for variety of applications. Text recognition in images is a challenging task because of its inherent varying patterns and complex background. The proposed work consists of two stages. The first stage attempts to recognize the text from images through tesseract algorithm and the second stage performs translation using Google API. In present situation, people keep travelling to different geographical places for one are the other reasons and are facing problems to understand/communicate in different languages. For example, in India, if a person from a state movesto other state, he/she does not understand the other language. During such times the proposed application will be of very much use. The state of art workson separate applications for each module viacapture image through camera, Optical Character Reader (OCR) for recognition and translator. But normally, users expect anintegrated application that integrates all the three modules on an essential device such as mobile.Such requirement motivated us to proposethe idea of developing an application with an idea to translate the recognized text in a language to the required language. The performance of the proposed system shows encouraging results to improve the model for better results.

Index Terms: image, *text recognition,translation, Tesseract algorithm****, Google API***

I. INTRODUCTION

Generally, the possibility of text in captured image is quite high. Text recognition is the process of detection, extraction and identification of text in images. In the process of text recognition digital image processing principles and techniques are employed.This paper proposes atwo-stage model to recognize and translate the recognized text from captured image by providing the user with multi-time cropping option for successful recognition of text in the first stage.Translation of the recognized text is performed in the second stage. Text recognitionin images is a complicated task in digital image processing. It is very complex and difficult task due to large variations in fonts,styles, sizes, text orientations, presence of complex background inferences and different lighting conditions. Images can be classified into two types: [i] scene text image and [ii] document text image.There are good numbers of OCR algorithms available to deal with the document text images.OCR is the technology used to transform different types of document images into machine readable/editable documents.In this work, an open source OCR software called Tesseract( )is employed as a tool to perform the text recognition from the image. Tesseract is a free OCR with relatively more efficient in recognition.The translation stage uses Google API( ) and appropriately translates the recognized text based on the OCR recognition efficiency. The flow of various steps in the process starting from image capture through recognition and translation ispresented in section III. The work proposed in this paper aims to detect and translate the text present in images in real time mode. The recognition and translation integrated system is implemented using C++ libraries on android studio( ) with the NDK benefits.

II. LITERATURE REVIEW

Good numbers of proposals have been published on text recognition from images and as well as on translation of the text from one language to other. This section takes through a brief walk through on few methodologies published on the related work. Extracting text from real-world photos is a challenging problem due to variations in different environments.Even the best open source OCR engine available (Tesseract) is easily thwarted by uneven illumination, off-angle rotation and perspective, and misaligned text, among others. They have shown that by correcting these factors it is possible to improve an OCR technology's accuracy. A simple adaptive thresholding technique was used to reduce the effect of illumination gradients in [1]. The tool used in this work is Tesseract. The system has the capability to recognize characters with accuracy exceeding 90%. The advantage of the system is easy portability and scalability which can recognize various languages and also help in translating the text in different languages. In another work[2], it is possible to extract text from low contrast or complex images by using contrast algorithm. In this work it can even extract text from colourimages by using grayscale technique. This makes possible to extract text from wide range of colour images. The work[3] proposes a method of scene text recognition from detected text regions, which is compatible with mobile applications. The detection of text regions from natural scene image/video and recognizes text information from the text regions. In scene text detection, layout analysis of colour decomposition and horizontal alignment is performed to search for image regions of text strings. A detailed discussion about offline image to text recognition through an Android app presented[4]. The image is loaded into the Android app and the users are provided to select a region of image to be converted, Then the image is processed by OCR technique to produce the converted text on screen. Based on

Mobile Net V2 and U-Net, a new text detection method is proposed for naturalnetwork, but also improves the speed of text detection. Experiment result shows that the designed neural network model is suitable for the devices with limited computing resource, which make the text detector for the mobile devices possible. The work[6] presents an approach for Kannada text detection from scene images.Scene text detection and recognition have received increasing attention in computer vision due to its potential applications in numerous fields. This paper mainly reviews detection and recognition methods. The work reports the results of more than 40 representative methods and compare their performance. The results are unsatisfactory. It means that they need to tackle the problem of incidental and diversified text detection. The paper[7]proposes an implementation of a new text region recognition algorithm that can accurately localize image text regions in natural image with complex background. The proposed functionality is based on the anchor mechanism of the faster R-CNN. They use very deep VGG 16 network to perform convolution calculation in the image to extract the deep features of the image, making the prediction results more accurate and reliable. Thework[8] proposes a novel algorithm to detect and locate text in natural scene images. After carefully analysing the results of all the test images, the algorithm achieves better performance than others due to the following factors: as many external regions as possible are extracted even when the image is of low quality. Two classifiers are trained to identify character components. Some non-character components are correctly identified by classifiers. An application system for Text Detection and Recognition on images captured with an Android Smartphone is presented[9]. This system is very handy and useful for many categories of people. Compared to a PC platform, the mobile platform is portable and more convenient to usewith Tesseract engine for text recognition. This system can offer users a greater flexibility as they can reduce time and effort. The main limitation is that it is difficult to detect and recognize a text in a very complex and multi-orientation background.

III. PROPOSED METHODOLOGY

The proposed work consists of two stages, first stagefocuses on text recognition using image processing techniques and the second part stage takes care of translating the recognized text into another language. The block diagram of the work is presented in fig 1. The proposed work considers an image as input through image acquisition device and goes through various phases of image processing to prepare the image for recognition task. The different sequence of activities involved in the recognition stage is explained in brief.

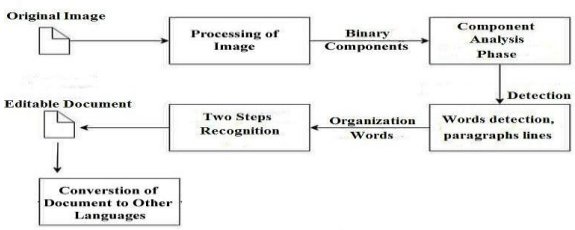

Fig 1: Block Diagram of the Methodology

Image acquisition: It is the process of creating the representation for characteristics of the objects present in the image. In this work, it is done by capturing the image from a mobile phone camera or uploading it from the phone's memory. Further, the image is binarized. Binarization is the process of converting the image into binary values as 0's and 1's. the region where text is present is considered as binary value 1 and left behind region is considered as binary value 0. It is mainly used as one of the preprocessing steps in image processing. Another technique used is gray scaling, it is mainly used to convert the binarized image into black and white. When we convert it to black and white, it exhibits useful information.

Image enhancement: This stage is mainly used for preparing the input images more suitable for analysis. The various enhancement techniques are cropping, rotating, deskewing, linearization etc. Deskewing is used to remove the slant/orientationin image or the text into horizontal axis. This is done with the help of Hough transform. It is a feature extraction technique. Linearization is provided in the system to adjust the image from blurs and fuzzy edges.

Segmentation and recognition: In this stage, image is divided into multiple segments which provides useful information and easier to analyze. After segmentation, recognition of text from images is done with the help of tesseract engine. The Tesseract library will act as an API to the project in the front end.

Text recognition in images

This application uses Tesseract engine for image processing. The targetoperating system used for developing an android application is Ubuntu. Android studio is installed within it. Main feature is chopping the image character by character. Various preprocessing steps were applied.

Translation

The translation is done for the text which is obtained after the recognition from image. It can be translated to desired language. Google API used for the translation. User will be provided to download the desired language for obtaining the character recognition from the image.

The architecture of the proposed system, system flow diagram and use case diagram are shown in fig 2 ,fig 2 and fig 4 respectively.

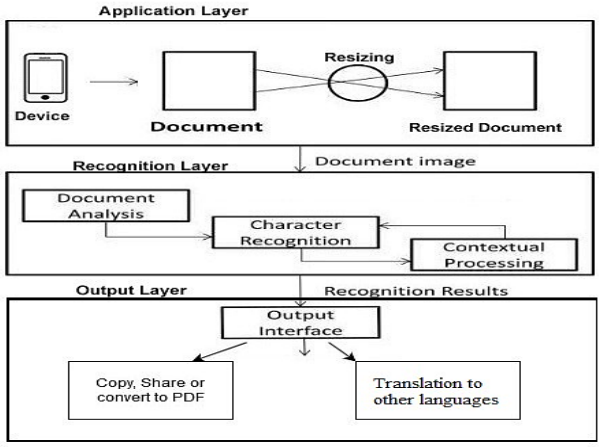

Fig 2: System Architecture

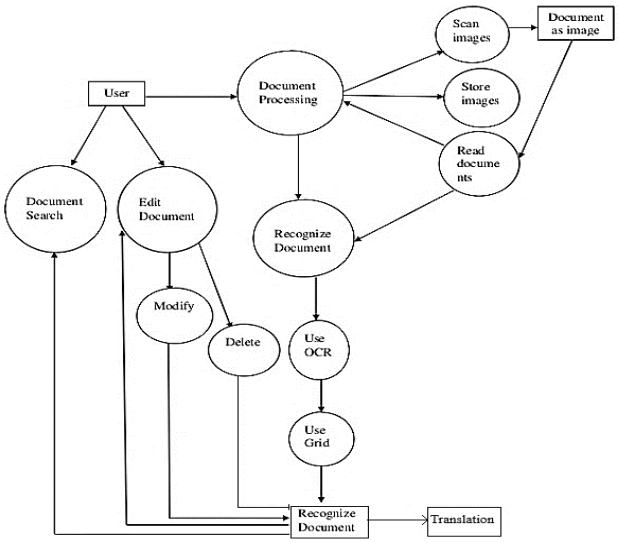

Fig 3: Dataflow Diagram

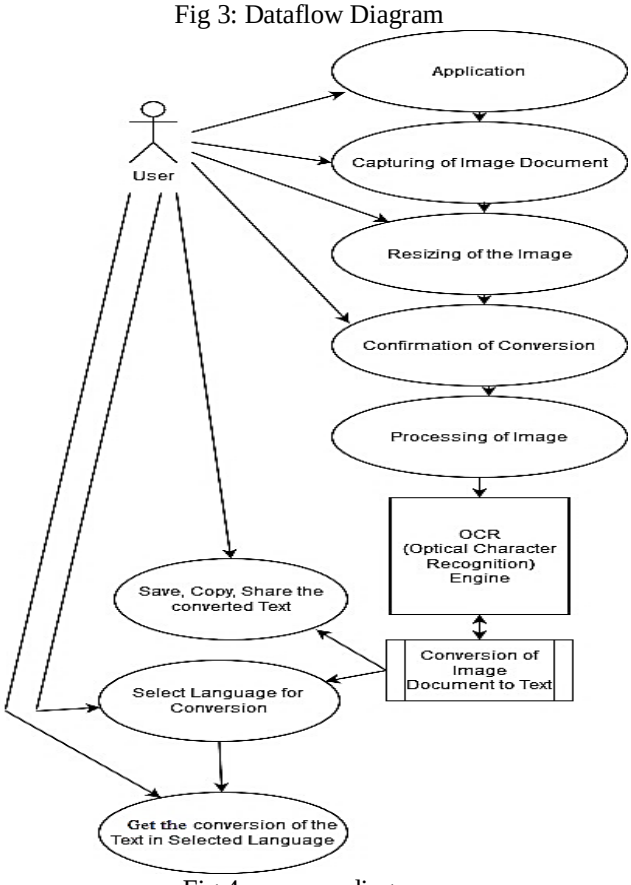

Fig 4: use case diagram

IV. EXPERIMENTAL RESULTS

The system requires the camera having 5 mega pixel or above. The application is built in android studio which is installed in the ubuntu platform. The image uploaded or captured can be cropped or resized according to the user's need as in fig 5. Later the image is sent to the tesseract engine to perform the image processing character recognition process. Here we can see the accuracy of the text which is extracted from the image as in fig 6.

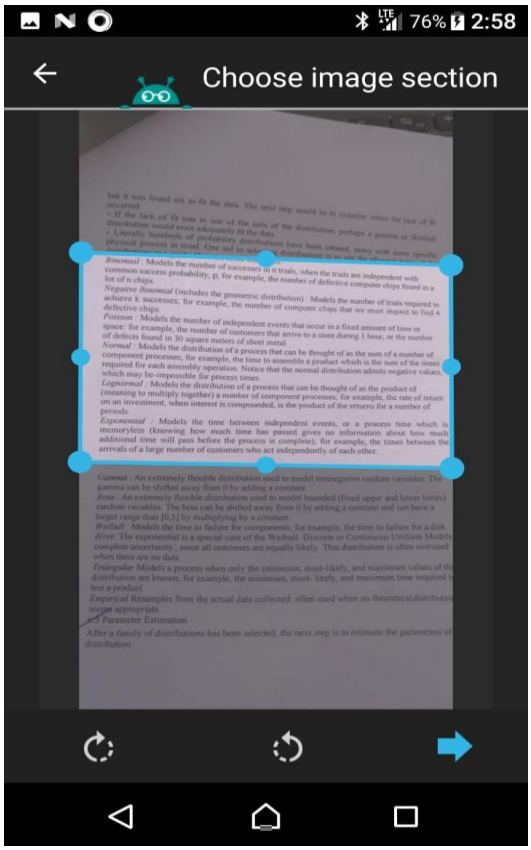

Fig 5: Cropping Image/ Selecting Image Section

After extracting the text from the image, it is available in the editable format for further step as in fig 7. We can save it in the form of PDF or we can also add or delete the information if needed. The text is then translated to any desired language as shown in fig 8.

There are many test cases performed on the system, those test cases are tabulated in table 1.

V. CONCLUSIONS

In this paper we present a feasible solution for text recognition in images and its translation using an android application which employs Tesseract text recognition tool. This provides a higher efficiency compared to the other recognition tools. We propose a satisfactory system for the users who need all the facilities like recognition, translation etc. in a single application. The proposed work gives reasonably good performance in extracting the text and translating the same. The application performs fairly with the recognition efficiency exceeding 90% depending on the quality of input image. It has higher scope towards detection of various languages and also translating the text to different languages.

In future, we are attempting to build an application which can also detect broken characters and digits present in the text with more complex background regions.

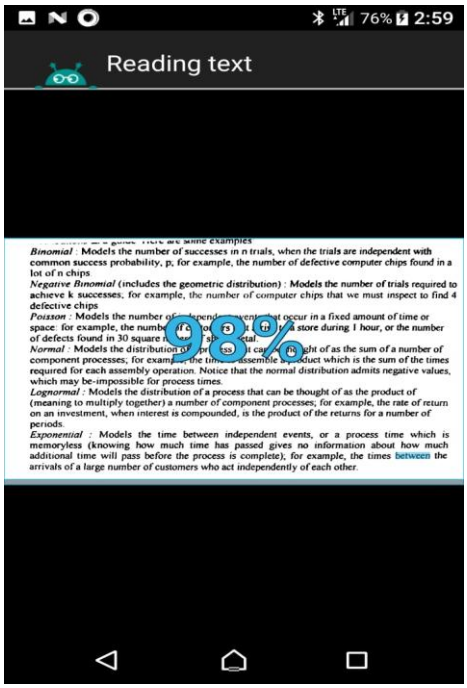

Fig 6: Text Recognition Process

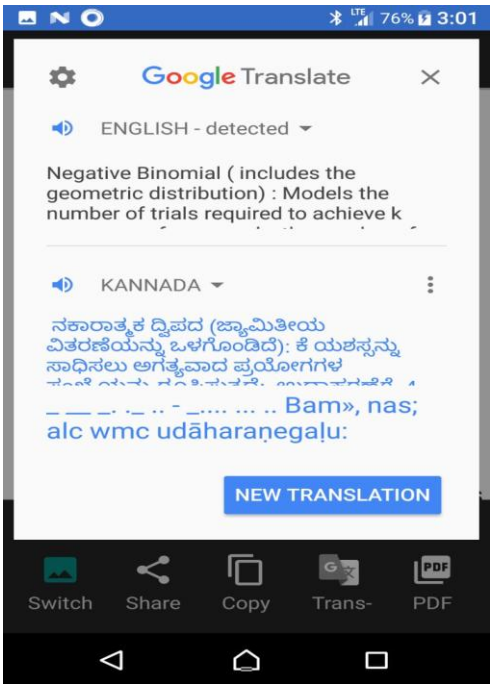

Fig 8: Translated Text from English To Kannada

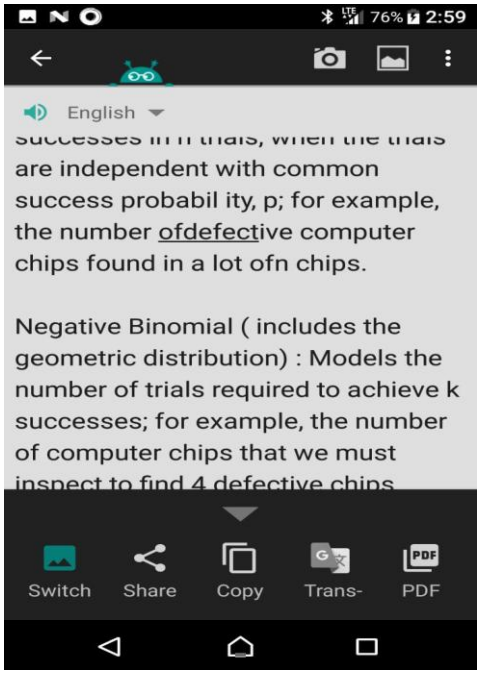

Fig 7: Detected Text From Image

S.No.	Input	Accuracy	Result
1	500 WORDS(English)	100	pass
2	600 WORDS(English)	97	pass
3	20 WORDS (kannada)	90	pass
4	24 WORDS (kannada)	89	pass
5	700 WORDS(English)	95	pass

Table 1: Testcases Displaying The Accuracy Of Recognition Of The Text

VI. PUBLICATION PRINCIPLES

Acknowledgment

We are very much grateful to many groups of people who have helped us with all kind of aspects of this study. We would like to thank Prof Vasudev T and Prof Sharath H A as well as special thanks for our head of the department Dr Sharath Kumar Y H for giving us the opportunity to do this wonderful project on “Translation of Recognized Text from Images”.

REFERENCES

[1] Sonia Bhaskar, Nicholas Lavassar, Scott Green, “Implementing Optical Character Recognition on the Android Operating System for Business Cards” in EE 368 Digital Image Processing, 2019

[2] G.R.Hemalakshmi, “Extraction of Text from an Image and its Language Translation Using OCR”, IJERCSE, 2017.

[3] Dhawal Chheda1, Mihir Mirajkar2, Akshita Dalvi3, Mithil Patil, “An open source Tesseract based Optical Character Recognizer for Mobile Platform”, International Journal of Research in Advent Technology, Vol.4, No.3, March 2016.

[4] B. Smith, “An approach to graphs of linear forms (Unpublished work style),” unpublished.

[5] Ishita Pal1, Mohammadraza Rajani, Anusha Poojary, Priyanka Prasad, “Implementation of Image to Text Conversion using Android App”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation

Engineering, Vol. 6, Issue 4, April 2017

[6] Kangwei Fu and Ling Sun, Xin Kang and Fuji Ren, "Text Detection for Natural Scene based on MobileNet V2 and U-Net", Proceedings of 2019 IEEE.

[7] ShahziaSiddiqua,NaveenaC,Sunil Kumar Manvi, "A Combined Edge and Connected Component Based Approach for Kannada Text Detection in Images",978-1-5090-6701-5/17$31.00 2017 IEEE.

[8] ZihaoLiu,QiweiShen,Chun Wang, "Text Detection in Natural Images with Text Line Construction",978-1-5386-8003-2/18 2018 IEEE.

[9] Yang Zheng, Qing Li ,Jie Liu, "A Cascaded method for text detection in natural scene images" ,0925-2312/2017 Elsevier.

