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Smart Eye: A Handheld Device Based Application for Text Detection and Speech Conversion

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Abstract: ***Natural scene text is broadly observed in our everyday life and has countless imperative multimedia applications. Natural scene text typically show signs of outsized discrepancy in font and languages but endures from low resolution, occlusions and intricate background. An android based application Smart Eye which works in offline mode is proposed here for text detection which robustly perceives the text in natural images in real time and translates the text present in image to speech which can assist people with vision disability. The spoken is also converted to text which can aid people with hearing disability.***

Keywords: Android, Optical Character Recognition, Text to Speech, Android Graphics.

I. INTRODUCTION

Machine imitation of human functions like reading, speaking is a primeval trance. Over the last few decades, research is being done to craft this dream into veracity. However a hundred percent accurate system is not developed for text identification. India being a developing nation has literacy rate of 74.04% .Uneducated people and person suffering from dyslexia have to face lot of problems in their day to day activities. The majority of the time they are baffled in a new environment or surrounding due to issues related to accessibility. In this paper an Android based application Smart Eye is proposed for text detection which helps the user to determine the text present in images converts it into speech. The recognized speech is stored and converted into text. The Android platform is chosen for the Smart Eye Application development as it is one of the cost effective device and can be used by user with more ease. Should be included in the final paper/camera ready submission. It is be sure that contents of the paper are fine and satisfactory. Author (s) can make rectification in the final

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II. LITERATURE SURVEY

A. Shaik, G.et al. 2010 [1] proposed OCR based text detection technique which employed tesseract engine in android device platform. V. Fragoso et al. 2011[2] suggested OCR based text detection method which used tesseract engine for text detection in Maemo5 Nokia N900 which entailed internet connection for text processing but it did not support text to speech functionality. Coughlan et al. 2013 [3] This paper tells about how a visually impaired person can get around independently with the help of technologies. These systems were based on carrying heavy equipment or a computer. Sathiapriya Ramiah et al. 2015[4] tells about text detection from images using OCR and also translation of the detected text to speech using the tesseract engine. Cuixia Ni et al. 2016 [5] proposed implementation of graphics for textual data in Android devices. Li Ye et al. 2016 [6] presented the design and implementation of android based speech storage system. Nana Ramadijanti et al.[7] proposed a method about how text can be detected in images by selecting the area of interest in image for text detection.

III. SYSTEM DESIGN

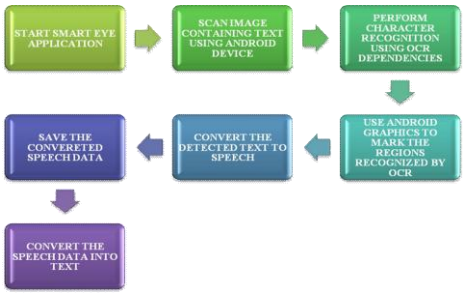

Figure 1: System Design of the proposed system Smart Eye.

The design of the Smart Eye Application is shown in the Figure 1: The Application does not require internet facility for text detection and it does not ask the user the permission to capture the image to detect the text of interest. The OCR dependencies are included in grade build of the android to support the character recognition.

A. Environment

The development environment is supported on the 64-bit Windows 7 system. The development language and the tool are JAVA and Android Studio 2.3 respectively.

The testing environment is the Android and the testing tool is Android Device (version lollipop and above).

B. Optical Character Recognition

Optical character recognition is desirable when the information should be decipherable both to humans and to a machine and substitute inputs cannot be pre identified.

In contrast among the other methods for automatic detection, optical character recognition is exceptional in that it does not necessitate control of the process that produces the information.

C. Android Camera

The Android device supports usage of inbuilt device camera. The camera permissions are added in the manifest of the source code. The frame buffers are made use for working with the camera

1. Initialization of four frame buffers.
2. Set the first frame buffer for detecting text.
3. Set the next frame buffer for processing the next action (usage of graphics).
4. Set the next two consecutive frames for populating next preview of images.

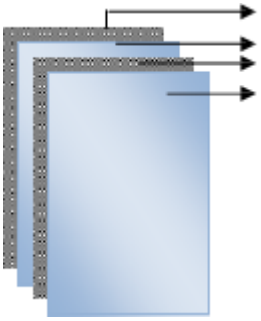

Figure 2: Representation of frame buffers.

D. Android Graphics

The Android Graphics can be used to display the detected text on the camera preview screen. The recognized text block by OCR is passed as an input to sparse array. The Sparse array is used for mapping of integer to object. The detected text blocks are stored in sparse array which is later given as input to canvas of the graphics. The draw () and paint() methods are used to define the content in text block.

E. Text to Speech

The Text to Speech Engine is used to convert the detected text to speech .The detected text is stored in queue and the Text to Speech engine is started to convert the detected text object to speech.

F. Speech to Text

The Speech to text conversion is made by storing the detected speech data in singleton class util. The stored speech data is next converted into text and displayed on the screen.

IV. RESULTS

The below screenshots gives a picture of how Smart Eye Application can be used in different scenario

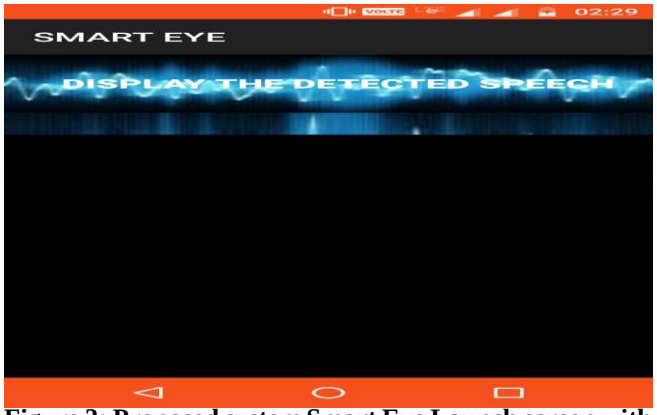

Figure 3: Proposed system Smart Eye Launch screen with camera preview

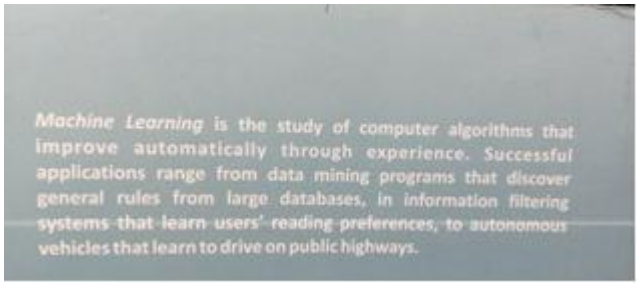

Figure 4: Input Image

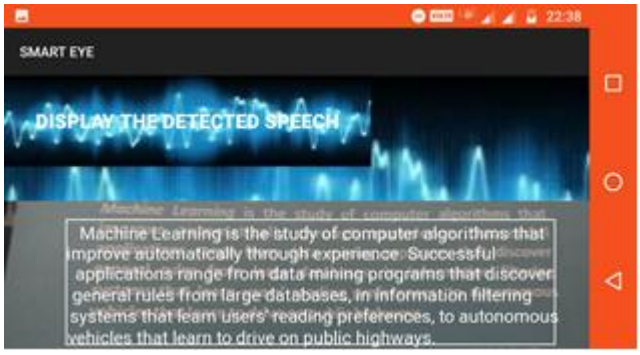

Figure 5: Text detected in input image.

Figure 6: Text detection made in real time

Figure 7: Text detection in handwritten text

V. CONCLUSION

Obtaining best image to text detection and conversion of it into speech is the main goal of Smart Eye application. The Proposed system detects the text using Android System and converts it into speech without internet facility.

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