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Review on Development of Assistive Text & Product Label Recognition System for Blind Person

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ABSTRACT

This paper presents camera based system which will help blind person for reading. This is the framework to assist visually impaired persons to read text patterns and convert it into the audio output. To obtain the object from the background and extract the text pattern from that object, the system first proposes the method that will capture the image from the camera and object region is detected. The texts which are maximally stable are detected using Maximally Stable External Regions (MSER) feature. The detected text is compared with the template and converted into the speech output. The text patterns are localized and binarized using Optical Character Recognition (OCR).The recognized text is then converted to an audio output. Experimental results show the analysis of MSER and OCR for different text patterns. MSER shows that it is robust algorithm for the text detection. Therefore, this paper deals with analysis of detection and recognition of different text patterns on different objects.

Keywords : Assistive Devices, Distribution Of Edge Pixels, Hand-Held Objects, Optical Character Recognition (OCR), Stroke Orientation, Text Region Localization, Image Processing.

I. INTRODUCTION

In order to solve the task that to extract text information from complex backgrounds with variable text patterns, this system proposes a text detection and localization algorithm that combines detection and conversion of text patterns. This actually differentiates text characters and discriminative text features from background outliers. The problem is challenging that to automatically localize and detect the text from ROI in the captured images with different backgrounds. The text captured images are mostly contain noise .The text characters are always present with different fonts, variable scales and colours. The text containing images are varying in orientation and alignment. Many algorithms are present for localization of text regions in image captured scene images. In assistive reading systems, it is very difficult for blind person to find the position of object of interest from the centre of the camera. In order to assist the blind person, this system will work to track the object of interest within the camera view.

This proposed algorithm will effectively handle the different text patterns and different backgrounds, to extract the text information from the camera captured image. In order to solve the problems regarding this we are defining a novel feature for extraction of text from the image. In order to detect the text from natural scene images, it is very difficult to find it. The natural scenes contain different shapes, sizes, orientations and complex backgrounds. Hence to detect the text patterns, this system will help blind user to easily locate the object and get the information on the hand held objects. As OCR is used it will recognized the text into separate letters. However, this paper is more focused on the text detection algorithms. This system will detect the text with different shapes, sizes and orientation of text objects.

II. LITERATURE SURVEY

The literature survey of the mentioned work is as given below.

World Health Organization (2009) [1] Studied that of the 314 million visually impaired people worldwide, 45 million are blind. Advance Data Reports from the National Health Interview Survey (2008)[2] says Even in a developed country like the U.S., the 2008 National Health Interview Survey reported that an estimated 25.2 million adult Americans (over 8%) are blind or visually impaired. Today, there are already a few systems that have some promise for portable use, but they cannot handle product labelling. For example, portable bar code readers designed to help blind people identify different products in an extensive product database can enable users who are blind to access information

According to National Census of India and K Reader Mobile User Guide [16], in worldwide there are 314 million visually impaired people and blind, out of which 45 million are visual impairment which was released by "World Health Organization" in 10 facts regarding blindness. The valuation of The National Health Interview Survey 25.2 million adult Americans are blind or visually impaired. The valuation of The National Census of India there is 21.9 Million disabled people in the country, out of which more than 15 million people are blind.

Scan Talker [3] says a number of portable reading systems have been designed specifically for the visually impaired "K-Reader Mobile" runs on a cell phone which allows the visually impaired person to read mail, receipts, fliers, and many other documents.

By X. Chen and A. L. Yuille [5],R. Lienhart and A. Wernicke [7] given methods based on sliding windows are discussed which are more robust to noise, but they have high computational complexity as in this input whole image is scanned with windows of multiple sizes.

In K. Jung, K.I. Kim, A.K. Jain, "Text information extraction in images and video: a survey" [17], a survey was done on several ongoing researches on camera based document analysis such as text detection, extraction, enhancement, recognition and its applications.

C. Yi and Y. Tian proposed a method of adjacent character grouping to calculate the image patches that contain fragments of text strings [7]. Rule based and learning based methods are also proposed for text extraction. Learning based methods model text structure and extract representative text features to build text classifiers.

L. Ma [12] performed classification of text edges by using histograms of oriented gradients and local binary patterns as local features on the support vector machine model. In [9] a finger worn device containing a button camera and microcontroller is implemented. This device assists the visually impaired by reading paper printed text.

In [13] a mixture-of- Gaussians-based background subtraction technique is used to determine the region of interest in video and moving object region is extracted. Then, text localization and recognition algorithms are used to acquire text details. In [14] a camera based assistive text reading framework is proposed that helps blind persons to read text labels from hand-held objects in their daily lives.

III. PROPOSED WORK

The proposed system is shown in figure.

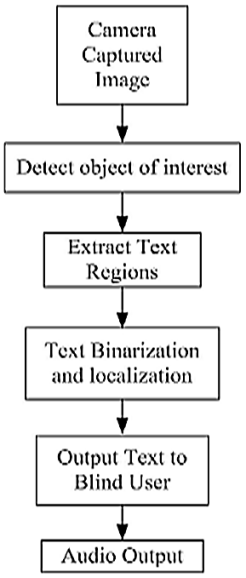

Figure 1. Basic Proposed System

This prototype system presents text reading from the camera captured image. Framework consists of three functional section scene capture, data processing and audio output. The scene capture component collects the images of different objects and finds the object of interest from the image. In this system camera is used for scene capture purpose. The data processing component is used for the detection of text patterns to extract the text information from image. The data processing includes

1) Object of interest detection to get the text patterns from Image.
2) Text localization to obtain text regions and to recognize them.

The proposed system is able to detect the text strings properly. The laptop is used as processing device for the audio output. The audio output is used to assist the blind user. Easiest way to inform blind user is the audio output. The main contribution of the system is to solve the problem for blind people by using

1) Simply by detecting the text pattern from captured scene.
2) A novel method for localizing and recognising the detected text.
3) Audio output of the recognized text to the blind user.

The flowchart explains the system very well. Firstly, we are taking images using the camera. Then the proposed system will detect the object of interest from the image using Maximally Stable External Regions (MSER) features. After that text patterns are detected from the image. These text patterns are binarized and localized.

The localized texts are recognized using Optical Character Recognition (OCR) software tool. The recognized text patterns are given as audio output to blind people. The external regions are detected using the anchor points. Local extremes are detected at multiple scales.

IV. CONCLUSION

In this paper, we have described a system to read printed text on hand-held objects for assisting blind persons. In order to solve the problems of blind users, we have proposed a method to detect the object of interest, while the blind user simply shakes the object for a couple of seconds. This method recognises the object of interest from background or other objects in the camera view. We have interfaced the USB webcam for image capturing of the object, the pre-processing takes place and the image is directly sent to the OCR engine, it carries the further processes such as segmentation, character prediction and post-processing. It results the recognised character and by using TTS engine it gives the output.

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