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Voice Based Product Label Detection for Assisting Blind People

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Abstract— This work presents a camera-based label reader to assist blind persons to read a product name. Camera serves as main vision in detecting the label image of the product or board then image is processed internally and separates label from image and finally recognizes the product and identified product name is pronounced through voice. Now it recognizes received label image is transformed to text. Once the identified label name is transformed to text and converted text is displayed on display unit connected to controller. Now converted text should be transformed to voice to hear label name as voice over ear phones connected to audio jack port.

Keywords— Assistive devices, blindness, stroke orientation, hand-held objects, optical character recognition (OCR), distribution of edge pixels, text reading, and text region localization.

1. Introduction

Blind people feel very difficult to read the text in the newspapers, labels, reports, receipts, bank statements, restaurant menus, product packages, instructions on medicine bottles etc. There are no proper systems to assist the blind people to recognize the text, especially product labels. Blind people find it very difficult to locate the bar code area in order to find out the product name [1]

Today, there are already a few systems that have some potential for portable use, but they cannot manage product labelling. For example, portable bar code readers developed to help blind people identify different products in an extensive product database can enable users who are blind to access information about these products through speech and braille. But a big restriction is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code. Certain reading-assistive systems such as pen scanners might be worked in these and similar situations. Such systems integrate OCR software to provide the function of scanning and recognition of text and some have integrated voice output. However, these systems are generally developed for and perform best with document images with simple backgrounds, standard fonts and well organized characters rather than commercial product boxes with multiple decorative patterns. Generally OCR software cannot directly handle scene images with complex background [2].

Reading is clearly essential in today's society. Printed text is anywhere in the form of receipts, bank statements, restaurant menus, classroom handouts, product packages, instructions on medicine bottles, etc. And while optical aids, video magnifiers, and screen readers can help blind users and those with low vision to access documents, there are few devices that can offer good access to common hand-held objects such as product packages, and objects written with text such as prescription medication bottles. The capability of people who are blind or have significant visual impairments to read printed labels and product packages will improve independent living and foster economic and social self-sufficiency so here we are going to propose a system that it useful to blind people[3].

2. Image Capturing And Pre-Processing

The video is captured by using web-cam and the frames from the video is segregated and undergone to the pre-processing. First, get the objects constantly from the camera and adapted to process. Once the object of interest is extracted from the camera image and it transformed into gray image. Use classifier for identify the character from the object.

The work with a classifier consists of two major stages: training and detection. For training a set of samples is needed. There are two types of samples which are positive and negative. To mine the hand-held object of interest from other objects in the camera view, inquire users to shake the handheld objects containing the text they desire to identify and then employ a motion-based method to localize objects from messy background.

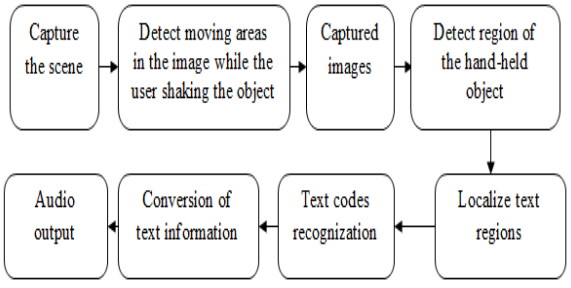

Fig. 1: Architecture

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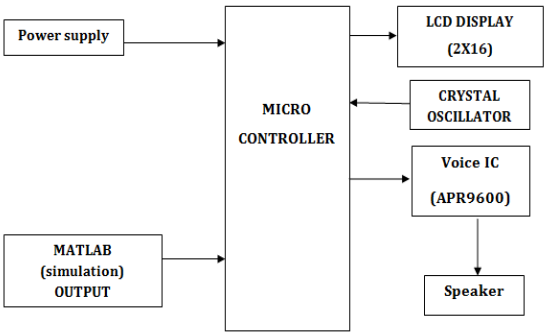

Fig. 2: Block diagram

2.1 Product Image

. Fig. 3: Input image

.2.2 Grayscale Conversion

Fig. 4: Gray scale

2.3 Smoothing and Filtering

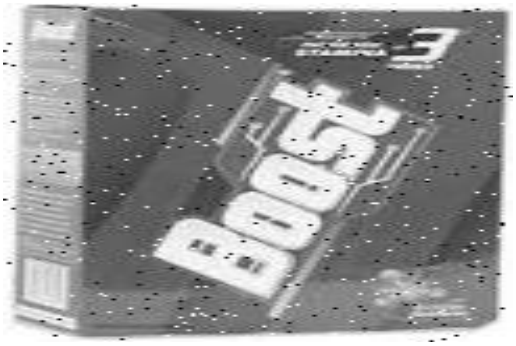

Fig. 5: Smoothing

Fig. 6: Filtering

2.4 Text Extraction

In order to manage complex backgrounds, two novel feature maps to mines text features based on stroke orientations and edge distributions, correspondingly. Here, stroke is defined as a uniform region with enclosed width and significant amount. These feature maps are combined to form an Adaboost based text classifier.

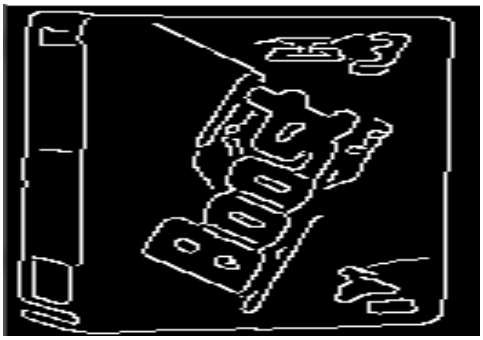

Fig. 7: Text extraction

2.5 Localization of Text Region

Text localization is then performed on the camera based image. The classifier verifies the existence of text information in an image patch but it cannot the whole images, so heuristic layout analysis is done to take out candidate image patches prepared for text classification. Text information in the image typically appears in the form of horizontal text strings comprising no less than three character members.

Fig. 8: Localization of Text Region

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2.6 Recognition of Text And Audio Output

Text recognition is performed by off-the-shelf OCR preceding to output of informative words from the localized text regions. A text region tags the minimum rectangular area for the accommodation of characters inside it, so the border of the text region associates the edge boundary of the text characters. However, this experiment illustrate that OCR generates better performance text regions are first assigned proper margin areas and binarized to segments text characters from background. The predictable text codes are recorded in script files. Then, employ the Development Kit to load these files and display the voice output of text information. Blind users can regulate speech rate, volume and tone according to their preferences.

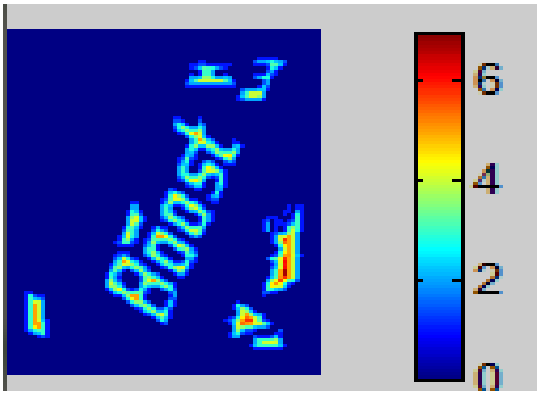

Fig. 9: Recognition of Text and audio output

3. Conclusion

In this work, we have defined a prototype system to read printed text on hand-held objects for assisting blind persons. In order to resolve the common aiming problem for blind users, we have proposed a method to detect the object of interest, while the blind user merely shakes the object for a couple of seconds. This method can effectually distinguish the Object of interest from background or other objects in the camera view. To mine text regions from complex backgrounds, we have implemented a novel text localization algorithm based on Models of stroke orientation and edge distributions. An Adaboost learning model is employed to localize text in camera-based images. Off-the-shelfOCR is utilized to do word recognition on the localized textregions and transform into audio output for blind users.

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