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Review on Accessible Shopping System for Blind and Visually Impaired Individuals

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ABSTRACT: Self-Dependency of blind people is very important in their day-to-day lives. In this paper Camera is used to capture the image of the product.Then captured image is processed internally using different algorithms such as text localization and text recognition algorithm to extract text the label from image by using MATLAB.The extracted text label is converted to audio output using text to speech converter and it is pronounced as audio to the blind person. As we know printed text is everywhere like product names, instructions on medicine bottles, restaurant menus, signed boards etc. To read these text blind and visually impaired people need some help, So in this paper accessible shopping system for blind and visually impaired individuals system proposed.

KEYWORDS: camera-based label reader, text localization and text recognition algorithm, MATLAB, text to speech converter

I. INTRODUCTION

Reading is obviously essential in today's society. Printed text is everywhere in the form of reports, 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 they can provide good access to common hand-held objects such as product packages, and objects printed with text such as prescription medication bottles. The ability of people who are blind or have significant visual impairments to read printed labels and product packages will enhance independent living and foster economic and social self-sufficiency.

Today, there are already a few systems that have some promise for portable use, but they cannot handle product labeling. For example, portable bar code readers designed to help blind people identify different products, to access information about these products through speech and Braille. But a big limitations 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. Some reading-assistive systems such as pen scanners, K-mobile reader might be employed in these and similar situations. Such systems integrate OCR software to offer the function of scanning and recognition of text and some have integrated voice output. However, these systems are generally designed for and perform best with document images with simple backgrounds, standard fonts, a small range of font sizes, and well-organized characters rather than commercial product boxes with multiple decorative patterns. Most state of the art OCR software cannot directly handle scene images with complex backgrounds.

A number of portable reading assistants have been designed specifically for the visually impaired. K-Reader Mobile runs on a cell phone and allows the user to read mail, receipts and many other documents. However, the

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documents to be read must be nearly flat, dark surface and contain mostly text. Furthermore, KReader Mobile accurately reads black print on a white background, but has problems in recognizing colored text or text on a colored background. It cannot read text with complex backgrounds, text printed on cylinders with warped. Although a number of reading assistants have been designed specifically for the visually impaired, to our knowledge, no existing reading assistant can read text from the kinds of challenging patterns and backgrounds found on many everyday commercial products.

As shown in Fig. 1.1 such text information can appear multiple scales, fonts, colors, and orientations. To assist blind persons to read text from these kinds of hand-held objects, we have conceived of a camera-based assistive text reading framework to track the object of interest within the camera view and extract print text information from the object. The proposed algorithm can effectively handle complex background and multiple patterns, and extract text information from both hand-held objects and nearby signage.

Fig. 1.1 Printed Text with Multiple Colours Complex Backgrounds or Non-Flat Surfaces

As shown in Fig. 1.2 in assistive reading systems for blind persons, it is very challenging for users to position the object of interest within the center of the camera's view. In Fig 1.2 (a)is Camera captured images, (b) is localized text regions (marked in blue),(c) text regions cropped from image and (d) Text codes recognized by OCR. Text at the top right corner of bottom image is shown in a magnified callout.

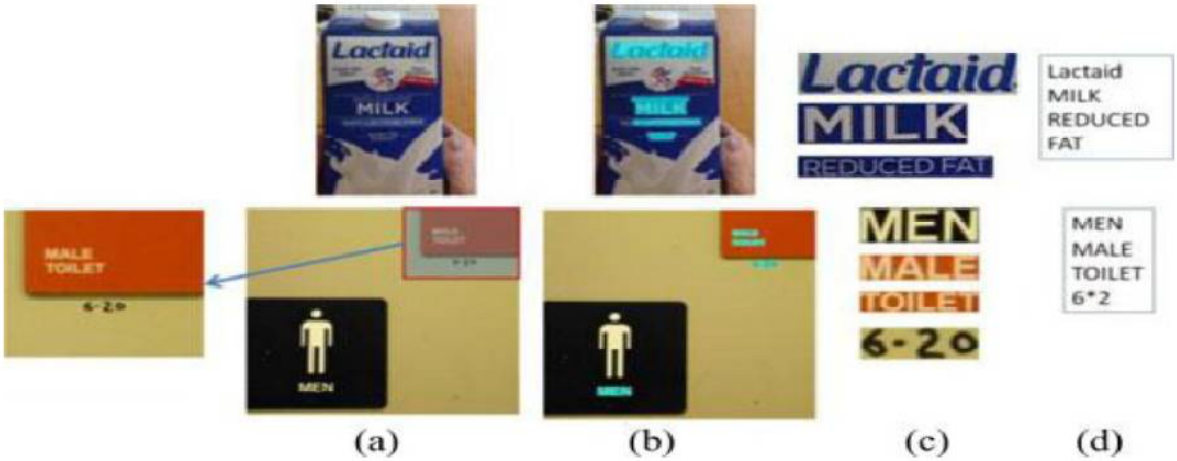

Fig.1.2 Examples of Text Localization and Recognition from Camera Captured Images. (Top) Milk Box. (Bottom) Men Bathroom Signage.

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As of now, there are still no acceptable solutions. We approach the problem in stages. To make sure the hand-held object appears in the camera view, we use a camera with sufficiently wide angle to accommodate users with only approximate aim. This may often result in other text objects appearing in the camera's view (for example, while shopping at a supermarket). To extract the hand-held object from the camera image, we develop a motion-based method to obtain a region of interest (ROI) of the object. Then, we perform text recognition only in this ROI.

II. LITERATURE REVIEW

Sr. No.	Author	Description / Techniques Used	Advantages/ Disadvantages
1	Anhar Risnumawan et al.[21] ,2014	For edge detection use canny and Sobel operators and work on symmetrical features. The extract candidate character uses local descriptors	Don't depend upon an orientation, script, font, font size, contrast and resolution. Accuracy is not good.
2.	Xu-Cheng Yin et al. [22],2014	Connected component with MSER method, single-link clustering method and use character classifier.	It detects the text when image is in low quality. But it can't work when the text is highly blurred and low resolution image.
3.	Xu-Cheng Yin et al. [23] 2013	Adaptive hierarchical clustering method makes a single cluster. Morphological, orientation and projection clustering methods	The search area reduces by using structural information. This method provides improve result than previous method.
4.	Cong Yao et al. [24] 2014	Obtain a characters using SWT and clustering techniques. Dictionary based correction method to correct the errors. Random Forest classifier is work for recognition purpose	This method improves the accuracy of character recognition method. It extracts the false positive character because they are very similar to true text.
5.	Yi-Feng Pan et al. [25] 2013	Hybrid approach i.e. combination of region based and connected component method, CRF work as a classifier.	It combines the advantages of both region and CC based method. This method fails to detect some complex background images and need to some improvements.
6.	Jack Greenhalgh and Majid Mirmehdi [26] ,2014	Use a combination of MSER and HSV (Hue, Saturation and Value) color thresholding method for character component.	The search area reduces by using structural information. This method provides improve result than previous method.
7.	Wahyono *et al.* [27]	Canny edge detector and k-nearest neighbor method.	It can extract the discontinuous LED text, but not continuous or titled text.

(Jung K et.al., 2004) provided a survey of text information extraction in images and videos. A classification of the different algorithms for text detection and localization is mentioned. They surveyed several localization methods such as region-based methods, Connected Component-based methods, Edge-based methods, Texture-based methods

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and Text Extraction in Compressed Domain. As single method implementation did not provide satisfactory performance hence integration of methods is done [1].

(Xu Zhaoet.al., 2011) Proposed a corner based approach to detect text and caption from videos, because in each character there exist dense and orderly presences of corner points. Several discriminative features were used to describe the text regions formed by the corner points whose usage can be extended different applications. An algorithm is implemented to detect moving captions in videos where motion features extracted by optical flow are combined with text features to detect the moving caption patterns. This proposed system detects video text with high precision and efficiency. Language independent is overcome by this proposed system [2].

(Wonjun Kim,et.al.,2009) proposed a novel framework to detect and extract the overlay text from the video scene. Observations were made based on existence of transient colors between inserted text and its adjacent background. First, the transition map is generated based on logarithmical change of intensity and modified saturation. Linked maps are generated to make connected components for each candidate region and then each connected component is reshaped to have smooth boundaries. The transition pixels density and the consistency of texture around each transition pixels are computed to distinguish the overlay text regions from other candidate regions. This proposed method uses local binary pattern for the intensity variation around the transition pixel in the proposed. This method is very useful for the real-time application [3].

Jing Zhang et.al., presented a new unsupervised method to detect scene text objects by modeling each text object as a pictorial structure. For each character in text object the edges of a stroke are considered as a combination of two edge sets that have high similarities in length, orientation, and curvature. Link energy is computed which describes the spatial relationship and property similarity between two neighboring characters. Unit energy (Combination of character energy and link energy) is used to measure the probability that a candidate text model is a text object and generate final detection result [4].

III. ADVANTAGES

- User Friendly
- Required Less Time
- Easy to Used

IV. CONCLUSION

A robust technique for Text detection is presented here. It exploits the fact that the region of area contains rich edge and texture information. First, the vertical edges are extracted and the edge map is adaptively binarized. Then, the candidate region is detected. The proposed way is tested on various images. It produced fairly and stable results. Consistent acceptable outputs over the various kinds of real life images have proved robustness of the proposed scheme. Thus, the proposed method could be handy for any computer vision task where extraction of edge maps is necessary to produce a large set of images for feature extraction.

A new and fast algorithm for vertical edge detection is proposed, in which its performance is faster than the performance of Sobel by five to nine times depending on image resolution. The VEDA contributes to make the whole proposed text detection method faster. Text detection method is proposed in which data set was captured by using a web camera. Different images are employed taken from various scenes and under different conditions. In the experiment, the rate of correctly detected text is 81.4%. In addition, the computation time of the Text detection method is 47.7 ms, which meets the real-time requirements. Finally, the VEDA-based and Sobel-based text detection is compared, and the findings show that VEDA-based text detection is better in terms of the computation time and the detection rate.

5. Future Scope

The system will also extend algorithm to handle non-horizontal text strings. Furthermore, the system will address the significant human interface issues associated with reading text by blind users. This will be done by eliminating the below disadvantages.

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- It is difficult to recognize the text from images which are not flat using this process.
- It cannot handle non-horizontal text strings.

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