Product Label Reading from the Real Time Camera Captured Image using Text Extraction Algorithm

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Abstract- *Text recognition from an image receives more attention due to increasing use in more applications in image retrieval. Image contains the information, which describes about its existence. Blind person can't easily identify any product of same size and shape by just touching it. So we have designed a system which can read the characters printed on the product. This will be best way for blind person to identify any product. Previously designed systems can only recognize any product by its shape & it fails if more products have same shape. This system has some limitations such as if image captured has less resolution and if the background subtraction is not done properly.*

We present a system here for visually impaired person, to identify the product by reading the title/product label one can identify the product. This system provides more applications in image retrieval and product label reading for blind person. Visually impaired person can easily identify any product by holding this product in front of the camera which will be attached to this system. This system can also provide a shopping assistance to blind person in malls and shopping centers.

Keywords- Color Quantization; Edge Detection; Stroke width Detection

I. INTRODUCTION

Text region localization and extraction is one of the first and most important steps in the analysis of documents or natural scenes. The processing of image text is a specific application that used to recognize text appearing as part of or embedded in visual content [1]. There are many phenomena that affect, the separation of text from camera captured images. The Images usually have non-uniform illumination due to the Lighting conditions and shadows appearing on image. Hence, the primary property of scene text such as, high contrast against background, uniform colors is difficult to maintain in real application. When the algorithm scans the whole image for texts, text pixels with low contrast and non-uniform lighting could be confused as background due to similar colors [3]. Most of the techniques simply use the general segmentation rules or the prior knowledge about the text size.

The text has the strokes of different sizes and orientations, so the concept of stroke filter is more effective particularly where the text segmentation considered. The problem with traditional stroke filter lies in its fixed width and is capable of segmenting strokes of already defined width.

Texture based approach view text as a special texture that is differentiable from the background. Typically the features are extracted over a certain region and a classifier is used to identify the existence of text. The CC-based approach extracts regions from the image and uses the geometric constraints to identify non text candidates. We proposed the novel CC-based with bonding box text detection algorithm, which employs Maximally Stable Extremal Regions (MSER) as our basic letter candidate.

II. ALGORITHM DESIGN

A. MSER Algorithm

First, for recognition of text region from an image, we need to locate text regions from an image. MSER algorithm can locate the stable region in image which includes non-text region as well. By applying the correct threshold value to the image it will be easy way to minimize the non-text regions. Though MSER has been used in the text detection task, such as [3], most of those approaches use bare MSER algorithm, ignoring the fact that MSER is sensitive to blur images.

B. Color Quantization

Color quantization can be used to minimize the color combinations in image. Peculiarities, For example, the head margin in this template measures proportionately more than is conventional. To identify the text regions from an image, we have taken the image as input for further algorithm processing. For reading the text we have used small & low resolution camera. This camera is attached to the PC through USB

interfacing, which will read the image pixel by pixel and store that image.

Figure 1. Original Image

Figure 2. MSER Regions

C. Text Detection Algorithm

Every input image, we first resize it into 640 x 480 or (480 x 640) resolution, and then MSERs are detected and considered as text region candidates [5]. Next step is to remove these MSERs from an image which are not text regions. We have combined stroke width detection and CC grouping algorithm to achieve maximum results.

D. The Edge-Enhanced MSER

As intensity & contrast of text to its background is typically significant and uniform. Using this method the text regions are clearly subtracted from the background, so that the only text region are obtained and further processing is done on that text regions. MESR algorithm is best edge enhanced edge detection algorithm is more as compared to other text detection methods [2]. To deal with the blurred images we have designed a combined algorithm with canny edge detection and MSER algorithm which easily identifies the edge enhanced text. The outline of extremal regions can be enhanced by applying the precisely located but not necessarily connected canny edges.

E. Geometric Filtering

With edge-enhanced text detection MSER, we obtain a binary image where the foreground CCs are considered as text/letter candidates. We have performed flexible geometric checks on each connected components to filter out non-text regions.

F. Stroke Width Detection by Distance Transform

By taking the inspiration from previously designed works, we have developed an image operator to transform the binary image into its stroke width image. The stroke width image is same resolution as of image, with the stroke width labeled for every pixel. We determine the stroke width using a novel approach based on the distance transform, which differs drastically from the SWT proposed in [6].

III. SIMULATION RESULTS

All the simulation is done in MATLAB R2013, and the results are compared with the available methods to detect texts from an image. Camera captures the image of the product and it is analyzed in the MATLAB. Designed Algorithm performs the operations on the captured image and user gets the desired output from the algorithm. This algorithm can provide maximum about 80 – 85% of accuracy, because the recognized characters are not accurate with the letter z & number 2. Sometimes it is unable to identify the exact difference in between letter o & number 0.

Following images will illustrate the results obtained from processing the image using the designed algorithm. Step by step processing on image is shown below where we get a desired text region with maximum efficiency of text to be identified. From first image we can easily identify the text contained original image which can be used for further processing under same algorithm will lead appropriate and desired results with the text extracted from an image.

Figure 3. Input Image for simulation

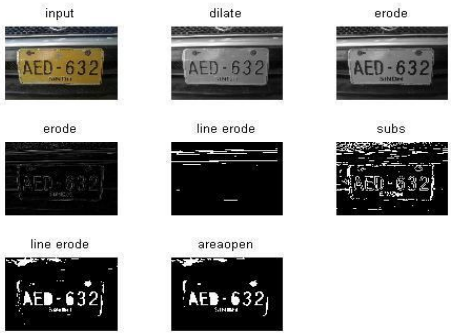

Figure 4. Different operations performed on image to remove non text regions from an image.

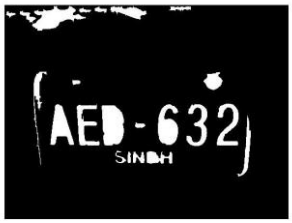

Figure 5. Image with the only text highlighted from input image.

Figure 6. Extracted text from an image and obtained in the .txt file format.

IV. CONCLUSION

The text recognition from an image is a challenging task which has too many complexities, while designing an algorithm for identification of text region from an image. The main challenge was to eliminate the non-text region and it has to highlight only text region. After that some operations like color quantization and MSER text region identification had performed so that it can identify only text with minimum color combination.

The deigned algorithm is mainly applicable for reading the product label, so that visually impaired person can easily identify the product by just listening audio. This algorithm has high efficiency on regular text.

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