Product Label Reading using Text Extraction Algorithm from an Image for Blind Person

SachinMohite

M.E. (VLSI & Embedded Systems)

Department of E&TC, PCCOE, Nigdi,Pune
SavitribaiPhule Pune University, Pune,India

Prof. A. R.Suryawanshi

Associate Professor

Department of E&TC, PCCOE, Nigdi,Savitribai
Phule Pune University Pune, Pune,

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;EdgeDetection; Stroke widthDetection

1   INTRODUCTION

Text localization and extraction is one of the first andmostimportant steps in the analysis of structured documentsornatural scenes. The processing of image text is aspecificapplication that seeks to recognize text appearing as part oforembeddedinvisualcontent[1].Therearemanyphenomenathat affect, the separation of text from camera c a p t u r e d images. The Images usually have non-uniformilluminationdue to the Lighting conditions and shadows. Hence,theprimary property of scene text such as, high c o n t r a s t against background, uniform colors is difficult to preserveinreal application.

When the system scans the whole imagefortexts, text pixels with low contrast and non-uniformlightingcould be confused as background due to similar colors[3].Most of the techniques simply exploit the generalsegmentation rules or the prior knowledge about thetextsize.The text has the strokes of different sizesandorientations,sotheconceptofstrokefilterismoreeffectiveparticularly where the text segmentation is takenintoconsideration. The problem with traditional stroke filter liesinits fixed width and is capable of segmenting strokesofpredefinedwidth.

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

2   ALGORITHMS

International Journal of Engineering Technology Science and Research
IJETSR
www.ijetsr.com
ISSN 2394 – 3386
Volume 4, Issue 5
May 2017

2.2   *MSERAlgorithm*

2.3   First, for recognition of text region from an image, weneedto locate text regions from an image. MSER algorithmcanlocate the stable region in image which includesnon-textregion as well. By applying the correct   threshold   value   totheimageitwillbeeasywaytominimizethenon-textregions.ThoughMSERhasbeenusedinthetextdetectiontask,suchas[3], most of those approaches use bare MSERalgorithm,ignoringthefactthatMSERissensitivetoblurimages

2.4   *Color Quantization*

Every   input   image,   we   first   resize   it   into   640   x   480 or(480x640)resolution,andthenMSERsaredetectedandconsideredas text region candidates [5]. Next step is to removetheseMSERsfromanimagewhicharenottextregions.WehavecombinedstrokewidthdetectionandCCgroupi ngalgorithmtoachieve maximumresults.

2.5   *Text DetectionAlgorithm*

Color quantization can be used to minimize the colorcombinations in image. Peculiarities, For example, theheadmargin in this template measures proportionately more thanisconventional. To identify the text regions from an image,wehave taken the image as input for further algorithmprocessing.For reading the text we have used small &lowresolutioncamera. This camera is attached to the PC throughUSBinterfacing, which will read the image pixel by pixel andstorethatimage.

Fig. 1.a. OriginalImage   b. MSERRegions

2.6   *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.

2.7   *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.

2.8   *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].

3   SIMULATION RESULTS

All the simulation is done in MATLAB R2013, andtheresults are compared with the available methods to detecttextsfromanimage. 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.

Step by step processing on image is shown below where we get a desired text region with maximum efficiency of text to be identified.

Fig.2a.InputImageforsimulation   Fig. 2 b. Different operations performed on imagetoremovenontextregionsfromanimage.

Fig2c.Imagewiththeonly t e x t Fig2d.Extractedtextfromanimageandobtainedinthe .txt fileformat.

4   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.

5   ACKNOWLEDGMENT

REFERENCES

[1] ApurvaSrivastav, Jayant Kumar, "Text detection in scene Imageusing Stroke Width and Nearest-Neighbor Constraints," TENCON2008,2008 IEEE Region 10Conference.

[2] Manoj Kumar, Young Chul Kim, Guee Sang Lee,"TextDetectionusing Multilayer Separation in Real Scene Images," 2010 10thIEEE International Conference on Computer and InformationTechnology(CIT 2010).

[3] HuizhongChen,SamS.Tsai,GeorgeSchroth,DavidM.Chen,RadekGrzeszczuk, Bernd Girod,"Robust Text Detection in NaturalImages with Edge-Enhanced Maximally Stable Extremal Regions," 201118th IEEE International Conference on ImageProcessing.

[4] Yao Li, Huchuan,"Scene Text Detection via StrokeWidth,"21st InternationalConferenceonPatternRecognition(ICPR2012).

[5] Lukas Neumann, Jiri Matas,"Text Localization in real world Imagesusing Efficiently Pruned Exhaustive Search ," 2011International Conference on Document Analysis andRecognition.

[6] B. Epshtein, E. Ofek, and Y.Wexler, "Detecting text in natural scenes with stroke width transform," CVPR 2010, pp. 2963-2970