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Text Recognition By Using Character Descriptor And SVM Classifier

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ABSTRACT:Generally, the images captured by Camera has many different shapes, sizes, colours, text, non-text etc regions which very complex the Camera-based scene images usually have background which is very complex. The existing system is very sensitive to font scale changes and background interference with low accuracy. The most important aim of this system is based on character recognition method. Separating text or characters from captured scene images or videos is a very difficult task because of different text styles, fonts, patterns and variable background image interferences. We are proposing in this paper that a process of natural scene text recognition from selected text regions from a natural image. In text detection, we detect text from any natural image by using MSER (Maximally Stable Extremal Region) algorithm. MSER contains the text region from an image; for text recognition and the proposed system uses character descriptor which is very effective in extracting image. The local features descriptor HOG is suitable and compatible with all main points' detectors from interested region. Our method of text recognition from detected text regions is very compatible with an application of mobile devices. The demo system which developed is completely based on Android operating system. The Proposed system exactly extracts text from any natural scene image with background interference. The demo system gives us details of algorithm design and performance improvements of scene text extraction.

KEYWORDS: Text understanding, Text Detection, Character Features, Feature Extraction

I.INTRODUCTION

Now-a-days with the rapid growth of technology there are many camera based applications are available in different devices like tabs, cell phones, etc. Everyone is able to capture the images easily, but whenever we need to read the text presented in those images are very difficult. This is the main Problem for us. Since so many years, the text detection plays very important role in human life it can be helpful in the language translation and navigation. Text extraction plays a very important role for blind people when they want to read the text presented in the scene images. By these ways the text reorganization and detection can play vital role in humans every day and in future it can be part of so many computer applications. In this paper, our aim to solve text detection problem. Now, we describe the overview of text detection and recognition. In scene text detection process, we apply the methods presented in our proposed work MSER based is adopted to extract text regions and segment text characters in image. In text recognition, for Feature extracted by method of character descriptor that involve some key point detector. To recognize text, this system has designed a scheme to scene text recognition. Training a binary character classifier for each character class to predict the existence of this category in an image patch.

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II.SYSTEM MODEL AND ASSUMPTIONS

Bellow diagram shows Flow Chart of proposed system:

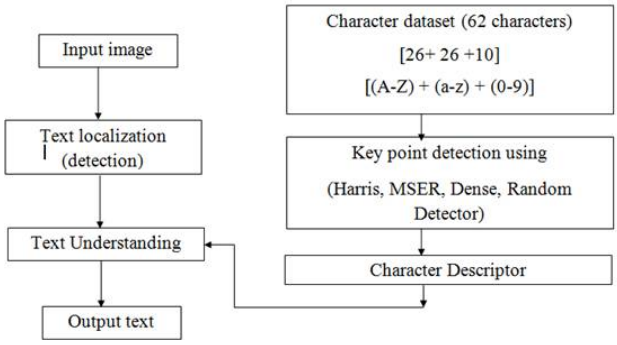

Fig1. Flow Chart of scene text recognition

The above figure shows the flow of Scene text recognition method. It includes scene text detection (Section III.A) and scene text recognition schemes (Section III.B). In recognition, character descriptor are compute character features. The proposed method combines scene text detection and scene text recognition algorithms. Fig. 1 presents a flowchart of scene text recognition method. Initially, a character descriptor is proposed to extract representative and discriminative feature from character patches. It combines several feature detectors (Harris-Corner, Maximal Stable Extremal Regions (MSER), and dense sampling) and Histogram of Oriented Gradients (HOG) descriptors for feature extraction in testing and training database images. Secondly, to generate a SVM classifier for each character class in text understanding by the character descriptor we are extracting feature of that character text understanding is able to help search for expect objects from environment. Similar to other methods, our method combines the low-level features descriptors. Also, we present the respective concepts of text understanding and evaluate our proposed character feature representation based on the schemes in our experiments.

a. Text Detection:

This method is to detect image regions containing text characters and strings. It focuses to remove most non-text background noises. And to detect the text from image. we have algorithm for text detection.
MSER: MSER is a method for blob detection in the images; it is a stable connected component of some gray level sets of the image. MSER depends on the threshold of the image, if we give them some threshold value the pixels below that threshold value are ‘white’ and all those above or equal are black

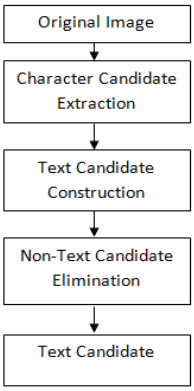

Fig2. Flow of MSER Algorithm

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Character candidates extraction: in this section character candidates are differentiated with the help of MSER algorithm, here most of the non-characters are reducing by our MSERs algorithm using MSER feature.
Text candidates construction: In this section, text candidate constructed by applying some criteria average width and average height of text region. The distance weight and height are learned using the proposed MSER algorithm.
Text candidates elimination: In this step, non-text region are eliminated by comparison of average width and average height with their values criteria in previous section and here we finally get an text candidate image where only text region image obtained.

Implementation of MSER

- First of all, sweep threshold of intensity from black to white performing a simple luminance thresholding of the image.
- Then extract the connected components ('Extremal Regions')
- Find a threshold when an extremal region is maximally stable.
- Finally, we get the regions descriptors as features of MSER.

MSER Properties

- MSER performs well on images containing homogeneous regions with distinctive boundaries.
- MSER works well for small regions
- MSER doesn't work well with images with any motion blur
- Good repeatability
- Affine invariant
- A smart implementation makes it one of the fastest region detectors

b. Text Recognition:

It is to transform to readable code from pixel-based text. It focuses to exactly differing different text characters and exactly compose text words. It involves 62 identity categories of text characters for testing dataset or in database, including 10 digits [0-9] and 26 English letters in upper case [A-Z] and smaller case [a-z]. Once we have detected or extracted area of target image, we can recognize the characters or text with the help of training data. The detected image area compared by available training dataset which outputs the exact character written in a image. SVM classifier use for each matching of feature extraction or character descriptor in training and testing dataset

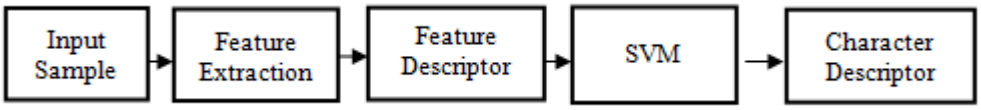

Fig3. Block Diagram of Character Descriptor

Following are the types of character descriptor used to model the character structure

a) Harris:
Harris detector method is a admired corner and edges point detector method due to its different variation and noisy image.

b) MSER:
It helps to separate key points from orientation and width of stroke. MSER regions are connected areas characterized by uniform intensity, surrounded by contrast background. They are constructed through a process is applied on number of different limits. It selects the regions where the shape of area does not change.

c)DENSE:
It uniformly separate key points to a specific distance.

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d)RANDOM:
This detector differentiates feature points by preset number of location in a random pattern. Dense and Random detectors are SIFT detectors

e)HOG:
Histogram of oriented Gradient descriptors is a method of feature extraction and it is performing as descriptor which used in computer vision and image processing for the purpose of object detection. The image of gradient orientation is defined by HOG technique which counts the number of occurrences of gradient orientation over area of interest of an image. The implementation of these descriptors can have achieved with the small connected regions are divided in the image, called as cells. For every cell HOG creates one histogram each of edge orientations or gradient directions for the pixels improved performance, the histograms can be contrast-normalized by calculating a number of larger portion of the image, can be said to be block, and these values are used for normalization of cells and all of those cells comes in the block region.

g) SIFT detector:
This algorithm is one of the most widely used one for image feature extraction. SIFT extracts image features, that are stable over image translation, rotation and scaling and somewhat invariant to changes in the illumination and camera viewpoint. The SIFT algorithm has four major phases.
(i) Extrema Detection: Examines the image under various scales and octaves to isolate points ofthe picture that are different from their surroundings,
(ii) Key point Localization: starts with the extrema and selects some of these points to be key points, that are a whittled down a set of feature candidates
(iii) Orientation Assignment: every key point and its neighbouring point converted into a set of vectors because of computing a magnitude and a direction for them
(iv) Key point Descriptor Generation: It takes a collection of vectors in the neighbourhood of each key point and combine this information into a set of eight vectors defined as descriptor.

f) Support Vector Machine:

SVM are computational algorithms. For hyper plane construction SVM classifier is used, that construct a hyper plane or a combination of hyper planes in a high or infinite dimensional space. SVMs is also used in performing classification and regression, or other tasks. Bi-liner SVM we are using here. SVM is used here for matching the feature extraction values of training image and testing image for recognized character image.

III. RESULT

We will capture an image from camera with resolution more than 2MP and then image will take as input for our implementation. Using Matlab (R2014a) software will process input image to recognized the text embeded into the image and get an output recognized text will be written into text file.

Following figures shows the results:

(a) Input Image

(b)MSER Region

(c) Original MSER Region

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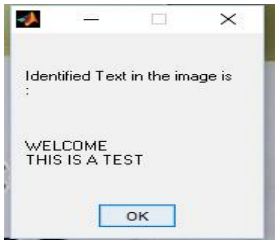
(d) Image Out

(e) Text Detection



(f) Recognized Image

VI.CONCLUSION

In this paper, we proposed new methodology to recognize the text presented in scene images. Initially we are detecting text region by using MSER algorithm. The algorithm identifies the MSER regions and that regions will be shown with the different colors, we compare the original MSER region and segmented MSER regions, by using the mask we join individual characters in the image will give the text region image we will get without any noisy objects in the image. In this our proposed work ,we recognize text with high accuracy

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