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Fast Text localization and Retrieval in Image

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Abstract: ***With the increasing use of digital media, video and images in daily day to day life. Caption in digital media images, capture images or natural images as important for text retrieval in images. In this paper we proposed a fast text localization method in which sobel edge detection and clustering method is used to localize all the possible edges in the image. Optical character recognition method to recognize is the localized edges are text or not. Experimental results show the improvance in the proposed algorithm.***

Keywords: Caption, edge detection, text localization, text detection, clustering.

I. INTRODUCTION

With wide use of internet, digital media, digital media capturing devices e.g. mobile phones, cameras people are capturing images, video and upload it to the internet websites like instagram, mypics, youtube etc. Text retrieval in this medium has become research area now a day's [2]. As it may contain logo, superimposed text, cricket score, information about players, breaking news, Temperature etc. These texts is relevant to the video or image it has many applications like content based web search, logo detection in CCTV video feeds, sign detection, licence plate reading. As visually impaired person can't see it will useful for them to access text and clustered with text to speech algorithm and make them to read cover of book, labels on door, medicine labels etc. hence caption localization and detection become important research now a days. Our main moto of the proposed system is to detect text in internet video, low quality images downloaded from internet or capturing devices [8].

A lot of research work has been done on text localization and recognition in which method used is grouped in three classes as texture based, connected component based and edge based. Texture based method assumes that text in image have some unique property. Connected component based method assumes that character in image has uniform color while Edge based method assumes that character are made up of edge strokes hence retrieval of edges is important constraint in edge based method e.g. edge detection algorithm[1].

In this paper we proposed a fast text localization method to localize all the possible edges and text in images. Optical character recognition is used to recognize the clustered get from the output of sobel edge detection algorithm [6].

II. PROPOSED METHOD

On observation of literature survey and work done on edge detection maps it is observed that text regions contains strong density of edges. As characters are made up of edge strokes they show some inhibit property of finding in pairs and opposite gradient direction.

The block diagram of proposed method is as shown in figure. Input to the system is image containing text or .avi uncompressed video file.

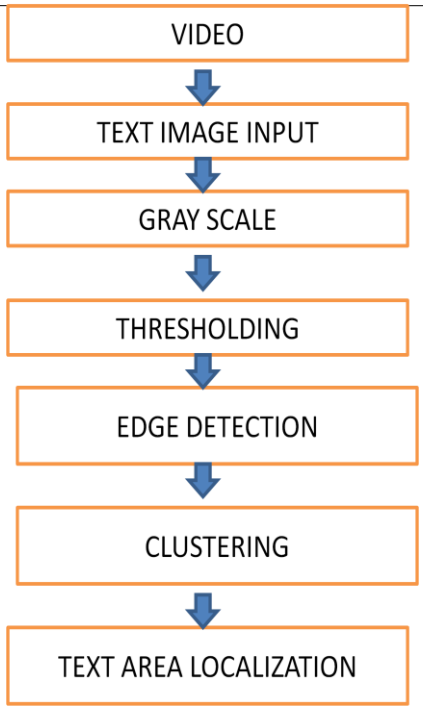

Fig.1: Text Localization

A. Pre-processing: As image file containing text or .avi uncompressed video file is input to the system. Java media framework which optional package of java platform takes the frames of playing video. Frames can be taken from 10 to 50 in numbers. After taking frames or snapshot next is to convert to gray scale if the frames are color in nature for easy processing and saving tie for finding text in after processes. Color image is to convert into grayscale by retrieving each R,G and B contents from color image it can be retrieved by some formulae's like B=(RGB) AND 0XFF,G=(RGB>>8) AND 0XFF,R=(RGB>>16) AND 0XFF.Once value of R,G and B is retrieved we can take average of these three constraint as R+G+B/3 and assign it to new pixel in image like these way we can convert color image to grayscale pixel by pixel value[9].

Gray scale image is now can be used for binary thresholding as it is next step in proposed system.Thresholding can be achieved by taking thresholding value user can set value in between range of pixels 0 to 255 and comparing it with the gray scale image. If we get less value of pixel than threshold value then assign it as "BLACK". and if get more value than threshold assign it as "WHITE" or vice versa. In this way we can get complete black and white image than gray scale image because it contains variable value of pixels [2].

B. Edge Detection: Next step in pre-processing is edge detection by sobel operator. Input to the sobel edge detection algorithm id threshold image. Sobel operator takes threshold image treates each pixel as constraint of edge sobel operator find out the strength and direction of each pixel. Stregth of pixel is calculated on x and y axis.Magnitude of X axis can be calculate as Gx and Gy for y axis. Total magnitude can be calculated as G=√Gx+√Gy. Direction of edge pixel has to be calculating because character strokes lies in pairs and opposite pair as shown in fig.

Θ=tan(Gy/Gx) Magnitue and direction are important in getting strong density of edge pixel[1].

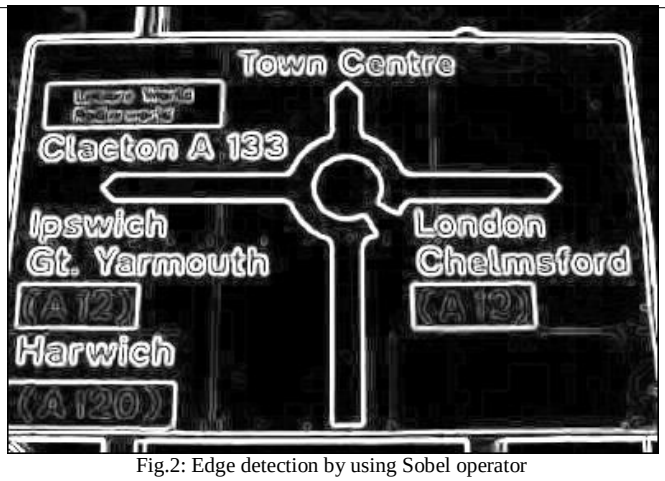

Fig.2: Edge detection by using Sobel operator

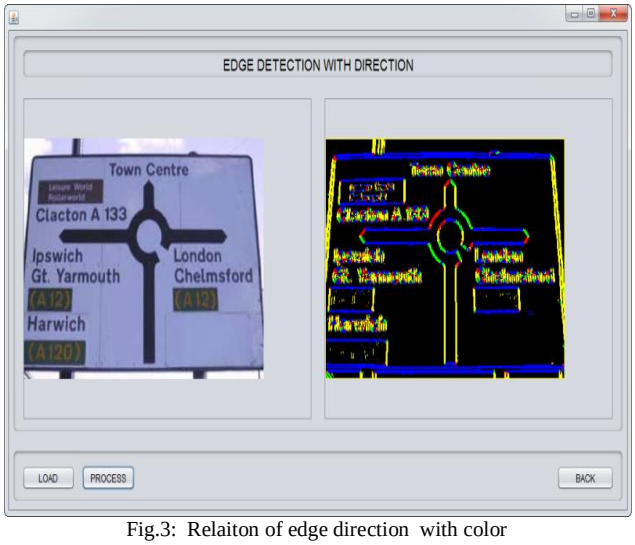

Fig.3: Relaiton of edge direction with color

C. Clustering: In this step detected edges from sobel operator is used as we get all the possible edges in the images from sobel edge detection algorithm likewise if there is some noise remain in the image before going it to the clustering then blurring can be done on getting clear edge pixels or some inclear images.Blurring can be on each pixel as matrices took of 3*3 or 5*5 is treated and average of R,G and b is assign to center pixel[1,4].

Frequency counting part of k-means clustering is used to localize the text in the output image of sobel edge detection algorithm. K-meas clustering approach.

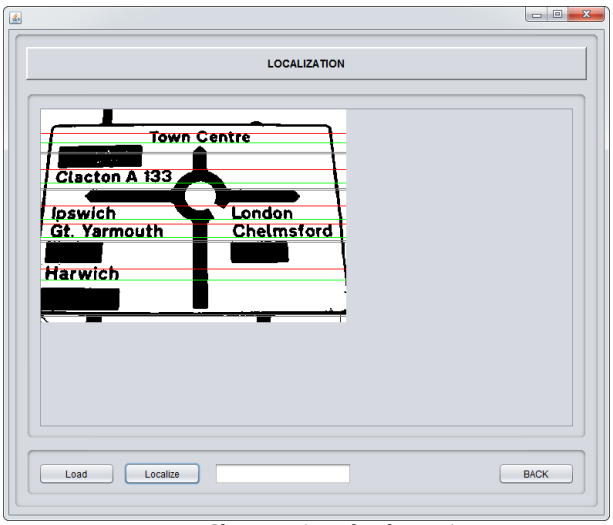

Fig.4: Clustering (Text localization)

D. Recognition: All the possible edges are localized by using sobel edge detection algorithm and k-means clustering algorithm. Whatever the edged we have localized is that text,number or special character we have to recognized to get the proper output. For that reason we are applying the output of clustering to the optical character recognition (OCR). OCR contains some constraints as follows

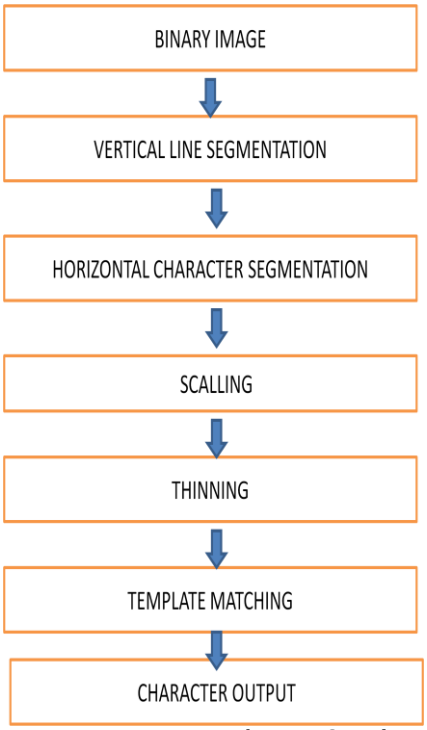

Fig.5: Text Recognition by using Optical

III. CHARACTER RECOGNITION (OCR)

1. Binary input image: Input to the optical character recognition is binary input which we get from ouput of hreshold image as in the total black and white form or we can use output image of clustering or sobel edge detection algorithm to recognize text in the caption.

2. Thinning: Thinning can be applied to binary input image for easy process and time saving process in the optical character recognition.As thick characters can be complex in process and cannot easily process due to color contrast and background hence we need to thin it.Thinning can be done in three stages first stage is to check whether it satisfies the pixel range like 001,100,011,110.If the text or character provided by user contains the above column and row matix simultaneously then can move to second condition that pixel we are deleting or erasing should not be end point or it should not be connected to more than two pixel.If it satisfies above two condition we mark the pixel as erasable and after checking n point connectivity the pixel is deleted[5].

3. Scalling: As all characters should be in random in size,shape and position.All has to be in one size it an be achieved by scalling it.Dirty function is use to scale the characters.

4. Template matching: By using technique of template matching we can find small part of template image.Template match process can be used to navigate mobile robot and to detect edges.

Template match works in two fashion like template based matching and feature based matching.Feature based matching technique used some of the features of image to match like edges and template match.If the source has the features then only it is used for feature based template otherwise template based matching is used.

The basic method of template matching works in fashion that it uses gray scale or binary threshold image.All the black pixel which has value 1is consider for template matching. All the 1's compared to the templates in the stored database if the stored

database contains same template value of 1's and 1's cane be assign as count+ and then can get same or approximate value which can be consider.

5. Training: Training is important constraint in the optical character recognition. As we get same behavioural pattern by template match technique we have to train the system what is the character generated by user to the character present in database. We can create same behavioral pastern and save it database or automatically we can give image containing text to retrieve and save text in database [7].

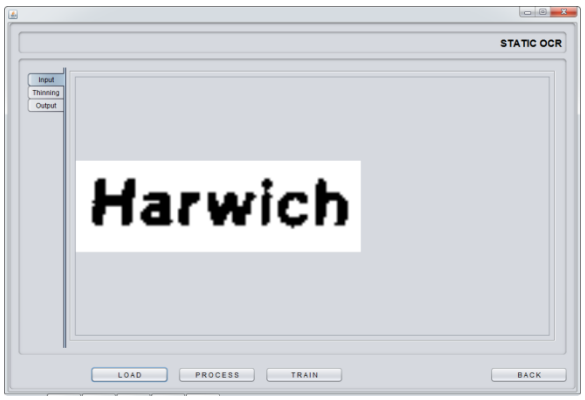

Fig.6.1: Binary input image

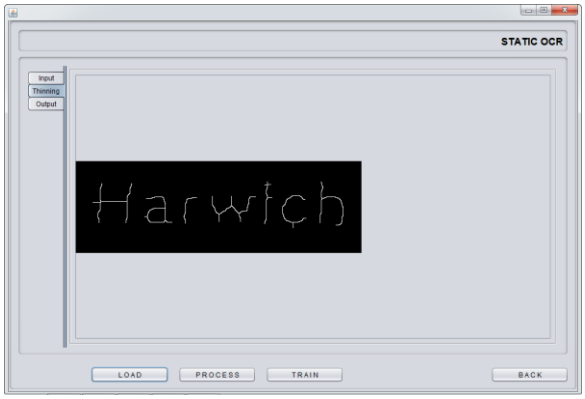

Fig.6.2: Thinning and Process

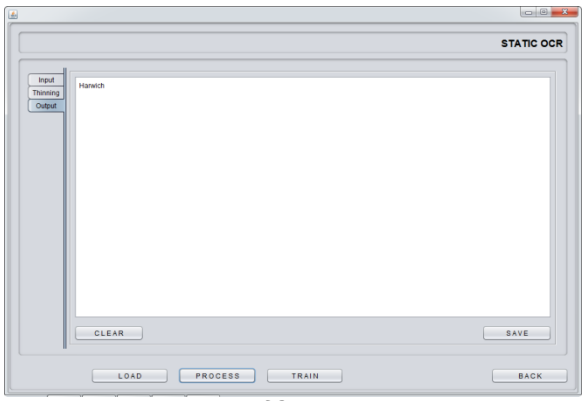

Fig.6.3: output

Experimental results: Experimental results carried out on some random images and one .avi video file is taken for localization of text.

We measure the localization performance on precision rate and recall rate

Precision={relevant document} ∩{retrieved document}/retrieved document

Recall={relevant document} ∩{retrieved document}/relevant document

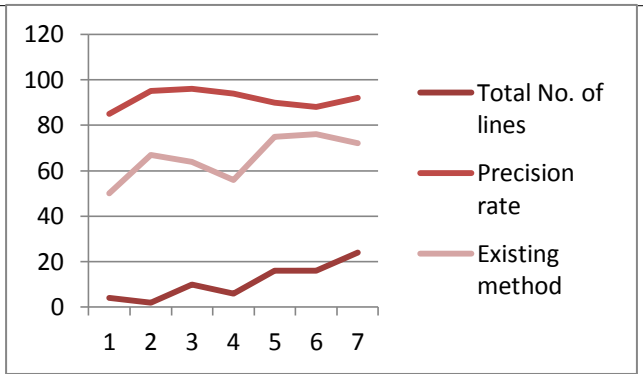

Fig.7: Precision rate

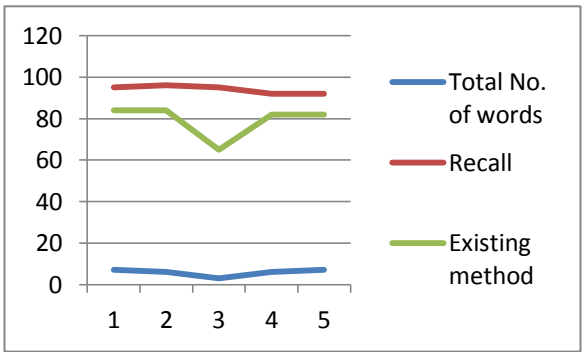

Fig.8: Recall rate

Conclusion: This paper presented a fast text localization method to localized all the text in image and video.Experimental results show efficiency of proposed method to precision rate at 91.2% and recall rate at 94%.In future we will contribute to improve efficiency of our system.

IV. CONCLUSION

This paper presented a fast text localization method to localize all the text in image and video. Experimental results show efficiency of proposed method to precision rate at 91.2% and recall rate at 94%.In future we will contribute to improve efficiency of our system.

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