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Text Extraction and Localization From Captured Images

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Abstract: Extraction of text contents from image is tedious task because of variance in the font size, style, Orientation, Alignment and heterogeneous nature of text. The contents of text information in the scene images hold valuable data. The framework uses 2-d Wavelet transform using HAAR is applied to the grayscale image followed by edge detection for each sub-band filtering. Then region clustering technique is applied using centroids to each region. Further bounding box is fit to each region thus identifying the text components. Proposed framework is removing non-text content and separated text-content, then each text contents are converted into editable text using OCR engine. Here, we use Teserract recognition engine.

Key Words: *heterogeneous background, DWT, Sub-band filtering, clusters.*

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I. Introduction

Natural images are acquired by using hand held devices and scanners. Many images and videos are being capture by using digital cameras and phone cameras. Text in image will have important information. It is helpful if we could recognize the text meaningfully, that makes a design for an automatic text detecting and recognition system.

Text extraction from camera captured images, introducing a system that reads the text present in natural scenes in order to help the blind [1]. To find the stroke width value for each pixel of image, and how to use on the text detection task in images methods are given [2]. Identification of content in shading pictures of heterogeneous complex hued foundation is done through a productive programmed content location technique melding multi-feature. Heterogeneous complex colored [3]. Intensity information method comprises of gray value expanding and binarizing the image by an average intensity of the image [4]. An efficient method for text localization and identification in images is given in which detection method, color, texture, and OCR statistic features are clubbed in a frame to differentiate texts from non-text objects. Color is used to segregate text pixels to form candidate text. Texture as a feature which can be used to capture the ‘‘dense intensity variance’’ feature of text arrangement. Features by OCR results are utilized to identify the text[5]. Content recognition is done utilizing multiscale surface division and spatial union requirements, then cleaned up and picked up utilizing histogram-oriented binarisation algorithm [6]. A framework is proposed to detect content using shape features content intensity, and segregate parts into districts with normally utilized geometry highlights. In intensity filtering of non-text regions the cover between the color histogram of a component and color histogram of joining area is large,

and components with large values it can be taken out. To deletes regions shape filter is used, whose constituent parts arrive from the same object, as most of the words made up of various characters [7].

II. Proposed Method

To extract text from images using Haar discrete wavelet transform (Haar DWT). which provides a powerful tool for modeling the characteristics of textured images. It can decompose signal into different components in the frequency domain. We are using 2-d DWT in which it decomposes input image into four components or sub-bands, one average component(LL) and three detail components(LL, HL, HH) as shown in Fig.2.1 .The detail component sub-bands are used to detect candidate text edges in the original image. Using Haar wavelet, the illumination components are transformed to the wavelet domain. This stage results in the four LL, HL,LH and HH sub image coefficients. The traditional edge detection filters can provide the similar result as well but it cannot detect three kinds of edges at a time. Therefore, processing time of the traditional edge detection filters is slower than 2-d DWT. The reason we choose Haar DWT because it is simpler than that of any other wavelets.

Figure: 2.1 Haar Sub-bands

2-Dimensional DWT can find 3 kinds of edges at once while the other edge detection filters cannot.

Three sorts of edges are there in the exact part sub-bands however are unobvious. DWT channels with Haar DWT, the discovered edges turn out to be more conspicuous and the preparing time lessens. The Haar DWT is less demanding contrasted with whatever other wavelets change.

Employing Haar DWT on given image, we can get several characteristics about the input image such as:

1. LL sub-band provides approximation components.

2. HL sub-band provides Vertical accurate edges.

3. LH sub-band provides Horizontal accurate edges.

4. HH sub-band provides Diagonal accurate edges.

A. Edge Detection

Operation of Morphological capacity and the legitimate and administrators are utilized to kill the non text part of the image. In content region, vertical, flat and inclining edges are associated together and they are scattered in non text content locales. Text regions are in the horizontal, vertical and diagonal edges, hence such areas can be considered as text. The three sub-band are for edge detection and then apply AND operation applied to horizontal, vertical and diagonal edge map because text edges are usually small and joined with one another in different orientation and is set to obtain the region of interest (ROI). Text area, Horizontal pixels, vertical pixels and diagonal pixels after applying AND operations to the sub-bands are shown in the figure 2.1.2

Threshold value is used for eliminating weak edges of non-text components.

B. Filtering Method

After we get text edges there are possibilities that we get some non text edges. Here scanning the image is done to store the rows having white pixel density greater than a threshold. These pixels form the component of text area after filtering

Figure 2.1.1 Haar

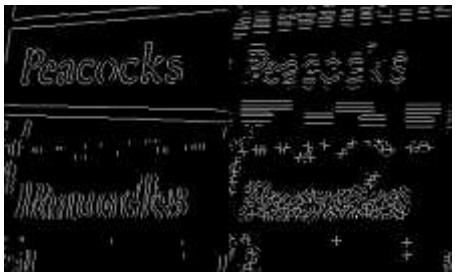

Fig 2.1.2 edge detection

C. Rubber banding technique and Clustering

After the filtering is done the co-ordinates are sent to clustering. Using subtractive clustering to pick out cluster centroids.

The subtractive clustering technique considers each point of data is effective center of cluster and computes a cluster center, on the basis of the density of neighboring points. The algorithm flows as follows:

- The highest potential point of data is chosen to be the 1st cluster centroid.
- Eliminates other all points of data in the neighboring of the first cluster centroid, to get the next data cluster and also its center.
- Iterations are carried out until all of the data is within the neighborhood of cluster centroid.

D. Algorithm for Clustering.

Once the areas (regions) are divided into clusters, the function of rubber band technique will be employed using the cluster centroid of each area, the algorithm as follows:

```
RUBBER_BAND(Center_of_cluster, total_Clusters)
    For every cntr € Center_of_cluster
        draw a 2 * 2 Grid around cntr
        New_val=compute num of
                pixels coming under text
            %Increase=(New_Val-
            Old_Val)*100/ New_Val;
        if  %Increase< 5
            plot a BoundingBox across
            that region;
```

```
                    break;
               else
                    Old_Val=New_Val;
               End if
          End for
Return;
```

Figure: 2.2.1 Bounding Box

III. Character Separation

After the content range is limit , the letters or must be isolated before subjecting to OCR for further acknowledgment, since there will be little hole in the middle of burns on the content region, singes are disengaged utilizing the simple and productive Connected Component (CC) calculation. Segments are thought to be 4-structuring component. CC is executed in order to get the coherence among white pixels. On the off chance that the information picture has white foundation with dark content, it turns into an issue to explain this a technique is created to check the foundation of picture which is as per the following:

1 Draw a 3 * 3 grid at image corner.
2 Background is black, if white pixels' density in that grid is more for black, else white.
3 If the background of the image is white, then it is converted to black and then given to CC algorithm.
4 Now every CC depicts a char which is then sent to OCR for further identification.

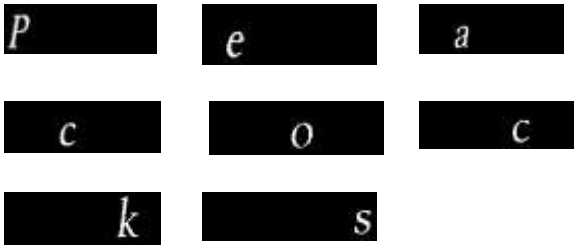

Figure 3.1 Character Separation

CONCLUSION

This paper presents a framework to extract text region in a scene image with heterogeneous background with a rigid font style. This technique uses discrete wavelet transform to obtain the sub-bands. Text region is detected by proposed method, which is based on the collection of texture features by applying morphological operators and logical AND operator. This method is good for images containing objects with less texture properties.

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