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Review on Text Detection Methodology from Images

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Abstract: Texts in an image directly carry high-level semantic information about a scene, which can be used to assist a wide variety of applications, such as image understanding, image search and indexing, navigation, and human computer interaction. However, lot of existing text detection and recognition systems are considered for horizontal or near-horizontal texts. With the increasingly popular computing on the go devices, detecting texts of random orientations from images taken by such devices under less controlled conditions has become an increasingly important and yet challenging task. Different techniques have been proposed to address this problem, and to classify and review these related algorithms. This paper gives detail explanation of work done for automatically detection of text from images, localize and extract text in images having complex backgrounds.

Keyword: text extraction, text detection, segmentation.

I. INTRODUCTION

A text information in images serves as an important clue in different applications. It provides instructions for assistive reading and content-based image retrieval and so many applications. It is a challenging task to detect and segment text from captured images due to two main issues: 1) Different variety of text patterns like sizes, fonts, orientations, colors, and 2) presence of background outliers similar to text characters, such as windows, bricks, and character-like texture. After text detection an optical character recognition (OCR) systems are designed to convert text images to readable text codes, but perform poorly when text is embedded into complex background.

The rapid change in digital technologies and gadgets prepared with megapixel cameras and discovery of latest touch screen method in digital devices like PDA, mobile, etc., are responsible to increase the demand for information retrieval and it leads lots of new research challenges. Text detection and segmentation from natural scene images are important in many applications. The key property of scene text such as, uniform colors, high contrast against background are difficult to preserve in real application. When the system scans whole image for texts, text pixels with non uniform lighting and low contras could be mystified background due to similar colors.

Textual information appears in an images divided into two type:1)Scene text: this type of text appears into image accidently which is not so much important, and 2)Artificial text: this act as key to understand the image. Text localization and simplification of the background in images is the main purpose of automatic text detection approaches. Text-based search has been successfully applied in many applications, while the robustness and computation cost of feature matching algorithms depend on other high-level features is not efficient enough to be applied to large databases. Several text detection methods have been proposed based on binarization, edge detection,

spatial-frequency image analysis and mathematical morphology [1]. Normally text detection methods can be classified as either connected-component based, edge-based and texture-based methods [2].

According to [3] the best results were achieved using combination of color based and adjacent character grouping for text detection from images. Color uniformity acts as stronger property to differentiate to connected component of text character from complex background.

II. LITERATURE REVIEW

Number of approaches for text detection in images has been proposed into the past. Automatic detection and translation of text in images done using different techniques proposed. These methods aim to detect the characters based on general properties of character pixels. The distribution of edges, color is used in many text detection methods also for low resolution document are processed by perticuler method[2,4,6].

Text detection and recognition in images and video frames, process is combination of advanced optical character recognition (OCR) and text-based searching technologies. Unfortunately, text characters contained in images can be any gray-scale value (not always white), variable size, low-resolution and embedded in complex backgrounds.

Texture is commonly used feature for text segmentation. Many researchers working on text detection and thresholding algorithm with various approaches achieved good performance depends on some constraints.

Therefore, proficient detection and segmentation of text characters from the background is necessary to fill the gap between image documents and the input of a standard OCR system.

Previously, proposed methods divided into bottom-up methods and top-down methods .Bottom-up methods segment images into regions and then group “character” regions into words. The performance of recognition therefore relies on the segmentation algorithm and the complexity of the image content. Top-down algorithms first detect text regions in images and then segment each

of them into text and background. They are able to process more complex images than bottom-up approaches but difficulties are still encountered at both the detection and segmentation recognition stages.

An early Otsu's method is histogram based global thresholding used in many applications [1]. Text detection and binarization method is planned for Korean sign board images using k means clustering [5]. But finding a best value for 'k' to achieve a good binary image is difficult in images with complex background and lighting. The linear Niblack method was proposed to extract connected components and texts were localized using a classifier algorithm [9].Different methods were suggested to extract text, depending on character size.

Cai *et a1.*[12] text detection approach presented which is based on character features like edge density, edge strength and horizontal distribution. First, color edge detection algorithm in YUV color space and filter out non-text edges using a weak threshold value. Then, a local thresholding technique is employed in order to keep low-contrast text and simplify the background. Finally, projection profiles are analyzed to localize text regions. Some approach which operates directly on color images using the RGB color space.

Kim [6] approach in which LCQ (Local Color Quantization) is performed for each color separately. Each color is assumed as a text color without knowing whether it is real text color or not. To decrease processing time, an input image is converted to a 256-color image before color quantization takes place. To find candidate text lines, the connected components that are extracted for each color are merged when they show text region features. The drawback of this method is the high processing time since LCQ is executed for each color.

Unless characters are expected to appear at pre-defined page locations, as in forms processing, the text must somehow be located. Text detection in document processing is often treated as a very straightforward process. Typically, this involves a search for lines of text in a binarized image. Other approaches include processing and classifying connected components. A survey of the document image analysis field as represented by publications in the Transactions on Pattern Analysis and Machine Intelligence is given by Nagy. Detecting text in scenes or low resolution video is more difficult, yet these problems have experienced increased prominence recently with contests sponsored by the International Conference on Document Analysis and Recognition in 2003 and 2005. There have been a different methods dealing with text detection and recognition in images. Comprehensive surveys can be found in .Some approaches to text detection classified into three categories: texture-based methods, region based methods and hybrid methods. Texture-based methods involves texture properties of text such as style, orientation and the construction of gray-level co-occurrence matrix. These methods are computation demanding as all locations and scales are exhaustively scanned. Moreover, these algorithms mostly concentrate to detect horizontal texts. Region based methods use the properties of the color or gray scale or alignment in a text region or their differences in properties of the background. First extract candidate text regions through segmentation or clustering and then remove non-text regions. The third category,hybrid methods is a fusion of region-based and texture-based methods. Different document or web,e-mail images,in which text characters are normalized and proper resolutions, natural scene images,embed text can be in size,shapes and orientations into complex background.It is impossible to recognize text in images directly through OCR software because of complex background.This is all about different text detection methodologies which detect text accurately and help for better recognition.

III. CONCLUSION

As we discussed above different methods of text detection from an images like document, digital camera based and web, email is challenging due to the random text appearances and complex backgrounds.

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