Analysis of Various Character Detection Techniques

Bhupinder Kaur[1], Prabhjot Kaur[2]
[1]Research Scholar, [2]Assistant Professor
[12]Universal Group of Institutions, Lalru, Punjab, India

Abstract- Digital image processing is another name of image processing. It however provides both optical and analog image processing in it. Several techniques are applied in this technology, which are studied here. Imaging is defined as the image acquisition. It is feasible to perform optical and analog image processing. The natural scene images are the images which we saw in our daily life. The natural scene images have much constrains for the character detection. The technique which are already designed for the character detection are reviewed in this paper in terms of certain parameters

Keywords- Natural scene, SIFT, Classification

I.   INTRODUCTION

The technology through which raw images that are collected from cameras available on various sources can be improved such that the information that is important can be extracted from them is known as image processing. Several techniques have been developed over the time within this technology to provide enhancements such that the complex data can be extracted [1]. Several applications have been using this technology over the time. The military, medical and research fields have been using it most widely. Personally also, several organizations have been using it to ease the human workload and perform certain activities. For enhancing the visual appearance of images, image processing is widely applied within several applications [2]. Several computations are also performed in order to prepare the images. Digital image processing is another name of image processing. It however provides both optical and analog image processing in it. Several techniques are applied in this technology, which are studied here. Imaging is defined as the image acquisition. It is feasible to perform optical and analog image processing. Several fields such as computer graphics are available in this approach through which it is possible to generate images [3]. This approach also helps in manipulating and modifying images. Computer vision is used to analyze the image. An image consists of certain numbers of sub-images which are also known as regions-of-interest. Within an image, the objects are gathered that provides a base for certain area. Through the selection of appropriate area, the application of particular image processing operations is possible within image processing system [4]. Through the processing of certain part of an image, it is possible to enhance the color rendition of an image. The motion blur can be suppressed using the other part of image. Within various applications, the major issue is to extract text from images or videos. Within

surrounding sign boards and objects, there are various text characters and strings found which are categorized into natural scene images and videos [5]. The information related to the region and the objects can easily be known by studying this data. The resolution and quality of the natural scene images is very less and the background is complex as well. Therefore, it is very difficult to recognize, extract or identify the scene text since it is possible that the text is either slant, tilt or occluded partially. Recently, several text detection techniques have been proposed by researcher for natural scene images [6]. It is important to include scene text detection and recognition algorithms that are automatic and efficient such that the text information can be extracted from natural scenes with the help of mobile devices. The recognition and processing can be performed automatically on text information available within indoor or outdoor scene images. Within complex scene images, automatic detection, segmentation and recognition of visual text entities is performed in the new emerging techniques. Any part of the scene images can include text within it in various forms. since there is proliferation of digital cameras and large number of potential applications are involved, there is huge attention given to the research of scene text recognition [7]. For providing assistance to the visual impaired persons, several image retrieval, navigation systems and applications are involved within various applications. Low resolution and quality, perspective distortion and complex background are the major issues of indoor or outdoor scene images. Since it is possible to view the scene text at any slant, tilt and any lighting, at any surface, the detection of this text is very difficult [8]. Lately, several approaches have been proposed to detect text from natural scene images. The text within natural scene images is identified, localized and recognized with the help of this approach. A text region detector is used such that the text regions present within each layer of image can be detected using histogram of oriented gradients (HOG) within the pre-processing stage. For the segmentation of candidate connected components, local binarization known as segmentation is applied [9]. For the filtering of text and non-text components, it is important to consider parameters such as normalized height width ration and compactness within text extraction stage. Further, the zone centroid and image centroid based distance metric feature extraction system is utilized at final stage for performing text recognition. Achieving a digitized raster image of the document with the help of appropriate scanning system is the initial step of document analysis. Further, page

layout analysis and character recognition are performed after this [10]. In order to identify whether the document is skewed or not, a test is performed previous to the structuring of achieved text. In order to correct the skewed document images, several methods have been proposed lately. The skew estimation techniques have five different classes.

II.   LITERATURE REVIEW

Veena Rajan, et.al (2017) proposed an enhanced model or new hybrid method in this paper for the detection of text from natural scene images. This method is based on the fractional poisson and also used Laplacian operation that helps in increasing the image quality. In order to obtain the better contrast between the targets and their backgrounds, it is required to have the actual values of pixels that help sin the operation of the image enhancement [11]. Therefore, it is required to introduce new methods in order to obtain the accurate images and error free. Thus, to detect the all characters or text of an image even the low quality as well they utilized the Maximally Stable External Region algorithm in this paper. It is also interconnected with the gray level sets of the image. In order to enclose the letters or characters of the words, they adopted a new method for segmenting the word in which bounding box regions is used. Thereby, to combine the character bounding boxes and to obtain the word bounding boxes, there resulting letter spaces are continuously filled.

Rituraj Soni, et.al (2017) proposed a hybrid approach in this paper for the extraction of above mentioned issues on the basis of text confidence score in which three different attributes are used such as dissimilarity, color dissimilarity and occupy rate. With the help of this method text and non-text constituents are distinguished from each other [12]. Therefore, achieving the fast detection and text regions localization in low resolution and blurred images is the main objective of this paper. They used the edge smoothing to extract the possible candidate regions in which fast guided filter followed by MSER. They used the Bayesian framework for the calculation of the text confidence score on these constituents in which mentioned three attributes are used. Therefore, they performed experiments for the evaluation of the proposed method.

Wenjun Ding, et.al (2017) presented there is useful information is present in the natural scene images in the form of text about the scene which is helpful for content-based image applications. Therefore, detection of text from natural images is the major challenge due to presence of different texts and scene complexity [13]. They proposed a robust text detection method in this paper using which textual components are localized at different levels such as pixel, intra-character and inter-character. They adopted a seed growing mechanism at each level in which well-conditioned seed textual components are detected. After which to localize the degraded components they grow all the seeds. In order to

aggregate character candidates into text lines, they proposed a random walk in this paper to restart the algorithm. They performed experiments on the proposed method and concluded the effectiveness of the proposed method as compared to others.

Zhandong Liu, et.al (2017) proposed a simple and effective text detection method in this paper. They utilized the V-MSER algorithm for the extraction of MSERs using different channels such as G, H, S, O1, and O2, as component candidates [14]. They also designed an MRF model in order to develop the relationship between the characters as there are character candidates in the text. They also designed a set of two-layers filtering scheme using which non-text components are filtered out. Therefore, to generate the component pairs they adopted the four simple features. They utilized the two public dataset such as ICDAR 2011 and MSRA-TD500 in this paper for the evaluation of the proposed method that achieves the higher accuracy of 82.94 and 75% F-measure. The obtained results show the effectiveness of the proposed method.

Shuping Liu, et.al (2017) presented a novel method in this paper for the detection of scene images from the text. They utilized the morphological component analysis (MCA) in this paper for the decomposition of the scene images [15]. This helps in reducing the adverse effects of complex backgrounds on the detection results. Hence, there is improvement in the discrimination of dictionary with the help of the proposed method in which Laplacian sparse regularization is introduced. They constructed the text component on the basis of text dictionary and the sparse-representation coefficients of text. They implemented certain heuristic rules for the detection of the query image in the text. On the basis of performed experiments, they concluded the effectiveness of the proposed method as compared to others.

Juili P. Bhirud, et.al (2016) utilized the stroke-width transform method in this paper using which text is extracted from natural images and textual images [16]. In order to find the stroke-width of every pixel, the image operator (SWT) has been utilized. On the basis of performed experiments, shows the better performance of the SWT method which is reliable and powerful in detecting the text independent of scale, direction, background and font. On the basis of the detection of possible texts, the connected component based approaches are categorized by this method.

Chingakham Neeta Devi, et.al (2015) proposed a Text Detection System in this paper has been utilized for the Manipuri Meetei Mayek Optical Character Recognition (OCR). They presented the requirement in this paper of the Manipuri Meetei Mayek script in order to detect the text part from natural scene images [17]. Therefore, they developed a complete OCR system in this paper for this process. They also utilized other algorithms such as Edge Enhanced Maximally Stable Extremal Regions (MSER) and a new Stroke Width

Transform (SWT) algorithm for the development of new method called Text Detection algorithm. Experiments were performed for the evaluation of the proposed method and identified that in detecting the text proposed method shows effective results. In order to extract the feature in the natural scene images the segmented text is feed directly after the skew correction.

Houssem Turki, et.al (2016) utilized the two masks filtering method in this paper using which complex background in an image is filtered out by using the proposed method contribution in two in which first step is based on the text confidence and multi-channel maximally stable external regions (MSERs) is the basis of second step [18]. On the basis of Support Vector Machines (SVM) using HOG features the non-text components are filtered by the classification of character candidate. They used the geometrical properties of text blocks in order to eliminate the false positives. After the grouping process, they implemented the boundary box localization. They utilized the ICDAR 2013 scene text detection competition dataset for the evaluation of the proposed method and an obtained result shows the effectiveness of the proposed method.

Table 1: Table of Comparison

Authors Names	Year	Description	Outcomes
Veena Rajan, Shani Raj	2017	An enhanced model or new hybrid method was proposed in this paper for the detection of text from natural scene images. This method is based on the fractional poisson and also used Laplacian operation that helps in increasing the image quality.	To combine the character bounding boxes and to obtain the word bounding boxes, there resulting letter spaces are continuously filled.
Rituraj Soni, Bijendra Kumar, Satish Chand	2017	A hybrid approach was proposed for the extraction of above mentioned issues on the basis of text confidence score in which three different attributes are used such as dissimilarity, color dissimilarity and occupy rate.	They used the Bayesian framework for the calculation of the text confidence score on these constituents in which mentioned three attributes are used.
Wenjun Ding, Susu Shan and Feng Su	2017	They proposed a robust text detection method in this paper using which textual components are localized at different levels such as pixel, intra-character and inter-character.	They performed experiments on the proposed method and concluded the effectiveness of the proposed method as compared to others.
Zhandong Liu, Yong Li, Xiangwei Qi, Yong Yang, Mei Nian, Haijun Zhang, Reziwanguli Xiamixiding	2017	A simple and effective text detection method was proposed in this paper. They utilized the V-MSER algorithm for the extraction of MSERs using different channels such as G, H, S, O1, and O2, as component candidates.	They utilized the two public dataset such as ICDAR 2011 and MSRA-TD500 for the evaluation of the proposed method that achieves the higher accuracy of 82.94 and 75% F-measure. The obtained results show the effectiveness of the proposed method.
Shuping Liu, Yantuan Xian, Huafeng Li, and Zhengtao Yu	2017	A novel method was proposed for the detection of scene images from the text. They utilized the morphological component analysis (MCA) in this paper for the decomposition of the scene images.	On the basis of performed experiments, they concluded the effectiveness of the proposed method as compared to others.
Juili P. Bhirud, Priti P. Rege	2016	In order to find the stroke-width of every pixel, the image operator (SWT) has been utilized.	On the basis of the detection of possible texts, the connected component based approaches are categorized by this method.
Chingakham Neeta Devi, Haobam Mamata Devi	2015	A Text Detection System in this paper has been utilized for the Manipuri Meetei Mayek Optical Character Recognition (OCR).	In order to extract the feature in the natural scene images the segmented text is feed directly after the skew correction.
Houssem Turki, Mohamed Ben Halima, Adel M. Alimi	2016	Two masks filtering method in this paper using which complex background in an image is filtered out by using the proposed method contribution in two in which first step is based on the text confidence and multi-channel maximally stable	They utilized the ICDAR 2013 scene text detection competition dataset for the evaluation of the proposed method and an obtained result shows the effectiveness of the proposed method.

		external regions (MSERs) is the basis of second step.	

III.   CONCLUSION

In this paper, it is concluded that natural scene image are very complex and also it is difficult to detect characters from those type of images. The character detection from natural scene images are done with the feature extraction and classification technique. In the previous year authors have proposed techniques for the character detection. In this paper, various techniques for the character detection are reviewed in terms of certain parameters.

IV.   REFERENCES

[1]. A. Krizhevsky, I. Sutskever, and G. E. Hinton, "Imagenet classification with deep convolutional neural networks," 2012, in Neural InformationProcessing Systems (NIPS).

[2]. Tong He, Weilin Huang, Yu Qiao, and Jian Yao, "Text Attentional Copnvolutional Neural Network for Scene Text Detection"

[3]. K. Kim, K. Jung, and J. Kim, "Texture-based approach for text detection in images using support vector machines and continuously adaptive mean shift algorithm," IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI), vol. 25, pp. 1631–1639, 2003.

[4]. S. Hanif and L. Prevost, "Text detection and localization in complex scene images using constrained Adaboost algorithm," 2009, in International Conference on Document Analysis and Recognition (ICDAR).

[5]. D. B. Barber, J. D. Redding, T. W. McLain, R. W. Beard, and C. N.Taylor. Vision-based target geo-location using a fixedwing miniature air vehicle. Journal of Intelligent and Robotic Systems, 47(4):361–382,2006.

[6]. Y. K. Ham, M. S. Kang, H. K. Chung, R. H. Park, and G. T. Park. Recognition of raised characters for automatic classification of rubber tires. Optical Engineering, 34(1):102–109, 2005.

[7]. X. C. Yin, X. Yin, K. Huang, and H. W. Hao, "Robust text detection in natural scene images," IEEE Trans. Pattern Analysisand Machine Intelligence (TPAMI), vol. 36, pp. 970–983, 2014.

[8]. Zhang, Z., Shen, W., Yao, C., Bai, X., "Symmetry-based text line detection in natural scenes", 2015, Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition 2558–2567

[9]. W. Huang, Y. Qiao, and X. Tang, "Robust scene text detection with convolutional neural networks induced mser trees," 2014, in European Conference on Computer Vision (ECCV).

[10]. Tong He, Weilin Huang, Yu Qiao and Jian Yao, "Text Attentional Convolutional Neural Network for Scene Text Detection", 2016, IEEE TRANS. ON IMAGE PROCESSING.

[11]. Veena Rajan, Shani Raj, "TEXT DETECTION AND CHARACTER EXTRACTION IN NATURAL SCENE IMAGES USING FRACTIONAL POISSON MODEL", IEEE 2017 International Conference on Computing Methodologies and Communication (ICCMC)

[12]. Rituraj Soni∗, Bijendra Kumar†, Satish Chand, "Text Detection and Localization in Natural Scene Images Using MSER and Fast Guided Filter", 2017 Fourth International Conference on Image Information Processing

[13]. Wenjun Ding, Susu Shan and Feng Su, "TEXT DETECTION IN NATURAL SCENE IMAGES BY HIERARCHICAL LOCALIZATION AND GROWING OF TEXTUAL COMPONENTS", Proceedings of the IEEE International Conference on Multimedia and Expo (ICME) 2017

[14]. Zhandong Liu1,2, Yong Li1 , Xiangwei Qi1 , Yong Yang1 , Mei Nian1 , Haijun Zhang1,3 , Reziwanguli Xiamixiding, "Method for unconstrained text detection in natural scene image", IET Comput. Vis., 2017, Vol. 11 Iss. 7, pp. 596-604

[15]. Shuping Liu, Yantuan Xian, Huafeng Li, and Zhengtao Yu, "Text Detection in Natural Scene Images Using Morphological Component Analysis and Laplacian Dictionary", 2017

[16]. Juili P. Bhirud, Priti P. Rege, "A Modified SWT based Text-image Separation in Natural Scene Images", 2016 Conference on Advances in Signal Processing (CASP) Cummins College of Engineering for Women, Pune. Jun 9-11, 2016

[17]. Chingakham Neeta Devi, Haobam Mamata Devi, "Text Detection from Natural Scene Images for Manipuri Meetei Mayek Script", 2015 IEEE International Conference on Computer Graphics, Vision and Information Security (CGVIS)

[18]. Houssem Turki, Mohamed Ben Halima, Adel M. Alimi, "Text Detection in Natural Scene Images Using Two Masks Filtering", IEEE, 2016