Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

An Efficient Method for Text Detection and Recognition in Still Images

Dr.M.Meenakumari [1],Dr. T. Mohanasundaram [2], R.Suresh Kumar [3], A.Maria Sindhuja [4],S.Gowdhamkumar[5]

[1]Professor, Department of ECE, Sri Ranganathar Institute of Engineering and Technology, Coimbatore, Tamilnadu.
[2]Associate Professor, Department of Management studies, Ramaiah Institute of Technology,Bengaluru.
[3]Assistant Professor (Sr.G), Department of Computer Science and Engineering, Kongu Engineering College, Perundurai.
[4] Assistant Professor,Department of Electrical and Electronics Engineering, M.Kumarasamy College of Engineering,Karur.
[5] Training officer, PSG Industrial Institute (PSGCT), Peelamedu,Coimbatore-641001, Tamilnadu.

ABSTRACT

Text Detection and recognition in general have quite a lot of relevant application milestones in various fields such as unmanned drone, defence vehicle, sign board detection, security surveillance, and even for unmanned driving. Text detection from blurred images due to environment weather is very challenging. The main aim of this paper is to identify and recognize the text in still images. Results demonstrated that the new adaptive algorithm could efficiently recognize the text even if the image is corrupted by high noise density. Also implementation of the proposed method is easy and less complex when compared to other methods. This paper shows how to split regions containing text in an image and how to detect the text. The automated text detection algorithm in this paper uses MSER regions and optical character recognition (OCR) is used to recognize the text. Here system detects the text and finds the connected regions, chain them together in their relative position. The result of multiple segmentation hypotheses are post-processed by a connected component analysis algorithm. This algorithm is applied to several sample images and proved that this method is more efficient.

Keywords- Recognition, OCR, segmentation, MSER, Detection

I INTRODUCTION

The main aim of this work is to identify and classify the text in natural pictures Text line detection and recognition has crossed lots of applications for example information retrieval such as content-based image retrieval and recognition. It is also seeking further developments in future. Therefore, there was a lot of researches and efforts on the account of creating a successful platform for text detection and recognition. There are several information sources for text information extraction in images (e.g., color, texture, motion, shape, geometry, etc). It is advantageous to merge various information sources to enhance the performance of a text information extraction.

A variety of approaches to text information extraction from images and video have been proposed for specific applications. This is because there are so many possible sources of variation when extracting text from a shaded or textured background, from low-contrast or complex images, or from images having variations in font size, style, color, orientation, and alignment. Text detection in natural images has vital role in the field of artificial intelligence, augmented reality and other innovations. It helps

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

to remove noise in images and identify text. Nonetheless, it is additionally a difficult issue because of the variability in imaging conditions, for example, lighting, reflections, commotion, obscure and in the changeability of the content itself, for example, its scale, introduction, textual style, and style. Great text discovery calculations should accordingly be vigorous against such fluctuations. The text detection plays an important role in life as it is used for vision type applications. Currently it faces difficulties like different direction of the text, complexity in backgrounds, diversity of scene text and interference factors etc.

.

II.Literature survey

Text detection and Recognition survey is discussed in[1].Scene Text Detection via Connected Component Clustering and Non-text Filtering method is discussed in [3]. A Laplacian Approach to Multi-Oriented Text Detection in Video is explained in [4]. Text Detection in Natural Scene method is dicussed in[5].Priyanka N Guttedar, Pushpalata S in 2015 mentioned, text character is very important to provide valuable information [8]. For problem of character segmentation need to detect text. Therefore in this paper scene text detection and text recognition both are playing very important roles. Text detection deals with colour conversion and k-means clustering algorithm used for the same. Cunzhao Shi, Chunheng Wang, Baihua Xiao, Yang Zhang, Song Gao in 2013 has mentioned about part based tree structure to represent all type of character which can detect and recognize at the same time [9]. A framework prepared to recognize words, which has detection score and linguistic knowledge incorporated with the help of Conditional random field (CRF) model.

Jerod J. Weinman, Member in 2009, IEEE, Erik Learned-Miller, Member, IEEE proposed, Gabor model method is used to recognize the text from a natural scene image. Gabor-based model is an appearance model or a linguistic model [10]. This is related to frequency and letter case, similarity model, and lexicon model to perform scene character recognition. Chukai Y. in July 2014 proposed, scene text detection and scene text recognition are two important phases' .For scene text detection layout based and horizontal alignment scheme used to detect image region or text region [11].[12]Amritha S Nadarajan&; Thamizharasi A (2018), proposes an innovative algorithm to find value of stroke width in natural images. This algorithm helps to detect many font and languages. This includes preprocessing, extraction or text localization, classification and character detection.[13]Chandio, A. A., Pickering, M., and Shafi, K. (2018), using the technique hybrid technique for enhancement of the image, robust technique for background subtraction, supervised machine learning algorithm for maps an input to an output based on example input output pair. [14]Tridib Chakraborty et al (2017), here check the noise and skew of the image. This is the first step. This is called pre-processing. [15]Karaoglu, S., Tao, R., van Gemert, J. C., Gevers, T. (2017), they applying those methods like connected component approach, visual saliency, multi model fusion, fine grained classification and content for object categorization. [16]Guan, L., Chu, J. (2017, character candidate extraction for finding the specific area in the image, preliminary filtering based on heuristic rules for solving the difficult problems, related text training, and text line aggregation methods used.[17] Zhu, Q. H., Zhu, R., Li, N., Yang, Y. B. (2017, here using meiric learning method, using triplet selection strategyand neural network structure equipped with triplet loss.

[18]Zhong, Z., Jin, L., Huang, S. (2017), to find text region proposal generation, text detection: ATC inter cooperation, and learning optimization for deep learning. [19]Karaoglu, S., Tao, R., Gevers, T., Smeulders, A. W. (2017), Here to check word level textual cue encoding, multimodal classification for compared through the experiments.[20]Jeong, M., Jo, K. H. (2015), here we can use edge detection for finding the objects in a specific boundary, edge component labeling, tree of edge component generating [21]. Jacob, J., Thomas, A. (2015), here they using the methods image pre- processing, edge detection for finding the edges, stroke width transforms for finding stroke width.[22]Rong, L., Suyu, W., Shi, Z. (2014), connected component extracting, finding connected components group, using SVM classifier for learning the machine algorithms, classification of CCs, and CRF based post processing. [23]Yao, C., Bai, X., Liu, W. (2014)., here they use the methods like classification scheme for text detection and character recognition, component linking and work partition, error correlation in character recognition.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

[24]A.,Ruikar, S. D. (2014), text region detection method(HOG) is used to detect the text, image segmentation image centroid and zone (ICZ) based distance metric feature extraction system for extracting the features.[25]Meng, Q., Song, Y., Zhang, Y., Liu, Y. (2013), in this paper to implement the methodologies like, edge segmentation stroke width transforms for segmenting the edges using stroke width transform

III. Proposed system

Proposed methodology consists pre-processing, segmentation, MSER, stroke width calculation, feature extraction, text detection and text recognition .It combines the techniques of OCR and other robust algorithm such as extraction and maximally stable extremal region (MSER).The conventional binarization algorithm was replaced by MSER technique because this binarization algorithm was designed only for dark text on white background it also has complexity in processing in multiple scales.

In Optical Character Recognition scanned document such as printed text, images which of typed format and that of sign board, billboard in photo or even text imposed on an image It is also now widely used as a form of information from computerized receipts, printed paper data records, printouts of static-data, passport documents, invoices, bank statements, business cards, mail, or any suitable documentation. It is a method of digitizing printed texts so that they can be electronically edited, searched, stored more compactly. The Connected Components extraction is implemented by using, the MSER algorithm has been commonly used in recent scene text detection methods The MSER algorithm enables to have text component candidates by extracting both small segment and large structures at the same time.

The Algorithm is given below.

*Pre-processing to remove the noise from the image.
* Detect MSER regions. Use region properties to measure MSER properties. Compute the aspect ratio using bounding box data.
*Threshold the data to determine which regions to remove. Show the remaining regions
*Get a binary image of the region, and pad it to avoidboundary effects during the stroke width computation.
*Compute the stroke width image andmeasure the stroke width variation metric
*Threshold the stroke width variation metric. Remove regions based on the stroke width variation
*Get bounding boxes for all the regions. Convert from the [x y width height] bounding box format to the [xmin ymin xmax ymax] format for convenience.
* Expand the bounding boxes by a small amount. Find the connected text regions within the graph
*Merge the boxes based on the minimum and maximum dimensions.
*Use OCR
*Remove bounding boxes that only contain one text region.
*Show the final text detection result.
*The procedure shown above must be applied separately to each detected MSER region.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

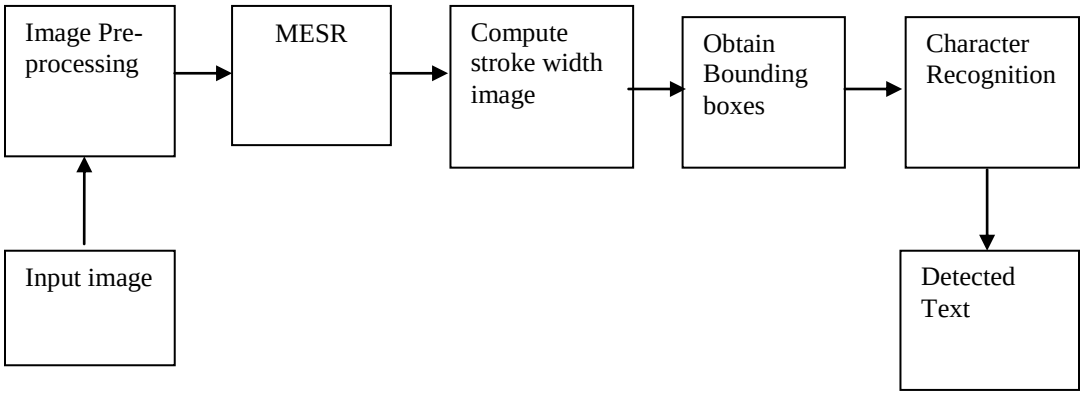

Fig. 1 Block diagram of Text detection

IV.RESULTS AND DISCUSSIONS

This project is implemented using Matlab 9.1.The Simulation results are given.

Figure 4.1: Sample test image

Figure.4.2:MSER region images

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

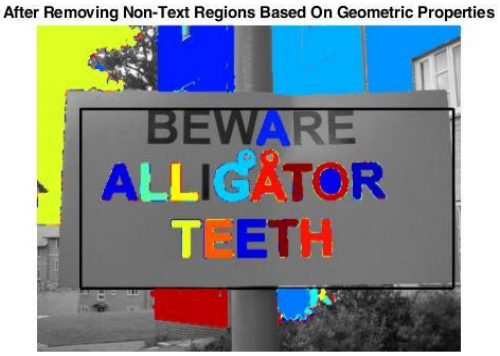

Fig 4.3:Removing the non-text region based Geometric properties

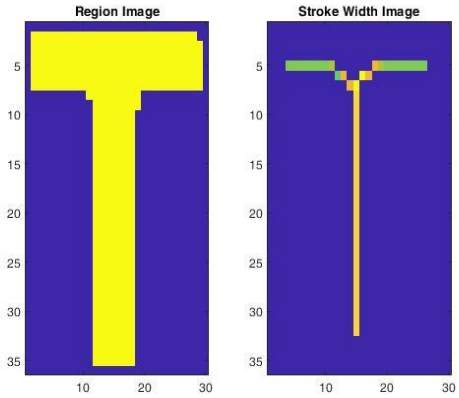

Figure4.4:Stroke width Image

Fig 4.5: Non-text region based on stroke width variation

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

Figure 4.6: Bounding box text images

Figure 4.7: Detected text image

Detected text:BEWAREALLIGATORTEETH

V.CONCLUSION

In this paper, a new efficient text detection and recognition technique is presented and Extensive computer simulations indicate that it outperformssignificantly many other well-known algorithms. Due to its high performance and low complexity it can be applied to noisy images.

REFERENCES

[1] Qixiang Ye, David Doermann, “Text Detection and Recognition in Imagery: A Survey” IEEE Transactions on Pattern Analysis and Machine Intelligence, 2014.

[2] L. Neumann, J. Matas,” On Combining Multiple Segmentations in Scene Text Recognition,” in Proc. IEEE Int’l Conf. Document Analysis and Recognition, pp. 523-527, 2013.

[3] H. Koo, D.H. Kim,” Scene Text Detection via Connected Component Clustering and Non-text Filtering,” IEEE Trans. Image Processing, vol. 22, no. 6, pp. 2296-2305, 2013.

[4] P. Shivakumara, T.Q. Phan and C.L. Tan,” A Laplacian Approach to Multi-Oriented Text Detection in Video,” IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 33, no. 2, pp. 412-419, 2011.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 7408 - 7415
Received 16 February 2021; Accepted 08 March 2021.

[5] J. Lee, P. Lee, S. Lee, A. Yuille and C. Koch," AdaBoost for Text Detection in Natural Scene," in Proc. IEEE Int'l Conf. Document Analysis and Recognition, pp. 429-434, 2011.

[6] J.J. Weinman, Z. Butler, D. Knoll, J. Feild," Toward Integrated Scene Text Reading," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 3, no. 2, pp. 375-387, 2014.

[7]Y. Li, W. Jia, C. Shen, and A. van den Hengel, "Characterness: An indicator of text in the wild," IEEE Trans. Image Processing (TIP), vol. 23, pp. 1666–1677, 2014.

[8] Priyanka N Guttedar, Pushpalata S. Scene Text Recognition in Mobile Application using K-Mean Clustering and Support Vector Machine

[9] C. Shi, C. Wang, B. Xiao, Y. Zhang, S. Gao, and Z.Zhang, "Scene text recognition using part-based tree structured character detection", IEEE Conference inComputer Vision and Pattern Recognition (CVPR), 2013, pp.2961-2968

[10] L. Sun, Q. Huo, W. Jia, and K. Chen, "A robust approach for text detection from natual scene images," Pattern Recognition, vol. 48, pp.2906–2920, 2015

[11] Chucai Yi, "Scene Text Recognition in Mobile Applications by Character Descriptor and Structure Configuration," IEEE Trans. Image Process., vol. 23, no. 7, July2014, pp.2972-2982.

[12].Amritha S Nadarajan, Thamizharasi A, "A Survey on Text Detection in Natural Images", International Journal of Engineering Development and Research (IJEDR), ISSN: 2321-9939, Volume.6, Issue 1, pp.60-66, January 2018.

[13] 2. Chandio, A. A., Pickering, M., &Shafi, K. (2018, March). Character classification and recognition for Urdu texts in natural scene images. In Computing, Mathematics and Engineering Technologies (iCoMET), 2018IEEE International Conference on (pp. 1-6).

[14]. Tridib Chakraborty et al, (2017), Text recognition using image processing, International Journal of Advanced Research in Computer Science, 8 (5), May-June 2017, pp 765-768.

[15]Karaoglu, S., Tao, R., van Gemert, J. C., &Gevers, T. (2017). Con-Text: Text Detection for Fine-Grained Object Classification. IEEE Transactions on Image Processing, 26(8), 3965-3980.

[16]. Guan, L., & Chu, J. (2017). Natural scene text detection based on SWT, MSER and candidate classification. In 2nd IEEE international Conference onImage, Vision and Computing (ICIVC), 2017 (pp. 26-30). [17] Zhu, Q. H., Zhu, R., Li, N., & Yang, Y. B. (2017). Deep metric learning for scene text detection. In Systems, Man, and Cybernetics (SMC), 2017 IEEE International Conference on (pp. 1025-1029).

[18]. Zhong, Z., Jin, L., & Huang, S. (2017). Deeptext: A new approach for text proposal generation and text detection in natural images. In Acoustics, Speech and Signal Processing (ICASSP), 2017 IEEE International Conference on (pp. 1208-1212).

[19]. Karaoglu, S., Tao, R., Gevers, T., &Smeulders, A. W. (2017). Words matter: Scene text for image classification and retrieval. IEEE Transactions on Multimedia, 19(5), 1063-1076.

[20]. Jeong, M., & Jo, K. H. (2015). Multi language text detection using fast stroke width transform. In Frontiers of Computer Vision (FCV), 2015 21st IEEE Korea- Japan Joint Workshop on (pp. 1-4). [21]. Jacob, J., &

Thomas, A. (2015). Detection of multioriented texts in natural scene images. In Control, Instrumentation, Communication and Computational Technologies (ICCICCT), 2015 International Conference on (pp. 625-628).

[22].Rong, L., Suyu, W., & Shi, Z. (2014). A two level algorithm for text detection in natural scene images. In Document Analysis Systems (DAS), 2014 11thIEEEIAPR International Workshop on (pp. 329-333). [23]. Yao, C., Bai, X., & Liu, W. (2014). A unified framework for multioriented text detection and recognition. IEEE Transactions on Image Processing, 23(11), 4737-4749.

[24]. Pise, A., &Ruikar, S. D. (2014). Text detection and recognition in natural scene images. In Communications and Signal Processing (ICCSP), 2014 International Conference on (pp. 1068-1072). IEEE.

[25]. Meng, Q., Song, Y., Zhang, Y., & Liu, Y. (2013). Text detection in natural scene with edge analysis. In Image Processing (ICIP), 2013 20th IEEE International Conference on (pp. 4151-4155).