International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169
Volume: 3 Issue: 11 6403 - 6407

Text Extraction System From High As Well As Low Resolution Natural Scene Images

Ms. Soniya A. Gite
Department of Computer Engineering
JSPM, Hadapsar
PUNE, INDIA
E-mail-gitesonia17@gmail.com

Prof.H.A.Hingoliwala
Department of Computer Engineering
JSPM, Hadapsar
PUNE, INDIA
E-mail-ali_hyderi@yahoo.com

Abstract:-In this paper, we propose efficient and sturdy technique for investigating texts in natural scene footage. A fast and effective pruning formula is designed to extract Maximally Stable External Regions (MSERs) as character candidate's victimization the strategy of minimizing regularized variations. Character candidates form into text candidates by the single-link clump formula, wherever distance weights and clump threshold unit of measurement learned by a completely distinctive self-training distance metric learning formula. The probabilities of text candidates like non-text unit of measurement estimable with a temperament classifier. Text candidates with high non-text probabilities unit of density eliminated and texts unit of measurement acknowledged with a document classifier. Text find in natural scene footage is also an important for several content-based image resolve. Experiments on polyglot, street browse; multi-direction and even born-digital databases conjointly demonstrate the effectiveness of the reposed technique.

*****

1. INTRODUCTION

Existing strategies for scene text detection will roughly be categorized into 3 groups: window based [6] [7], connected element based [9][10] and hybrid strategies[12]. Text in pictures contains valuable data and is exploited in several content-based image and video applications, like content-based net image search, video data retrieval, and mobile based mostly text analysis and recognition attributable to complicated background, and variations of font, size, color and direction, text in natural scene pictures needs to be robustly detected before being recognized and retrieved. Window based mostly strategies, also referred to as region-based strategies, use a window to search for doable texts within the image and so use machine learning techniques to spot text. These methods square measure slow because the image needs to be processed in multiple scales. Connected element based mostly strategies extract character candidates from pictures by connected element resolve followed by grouping character candidates into text; extra checks is also performed to get rid of false positives. The hybrid technique discovered by Pan et al. [12] exploits a locality detector to detect text candidates and extracts connected elements as character candidates by local finalization; non-characters square part eliminated with a Conditional Random Fields model [13] and characters will finally be classified into text. Additional, Stable External Regions (MSERs) [14] primarily based ways, which can be categorized as connected part primarily based ways but mistreatment MSERs as character candidates, became the focus of many recent works.

MSER-based ways have according promising conduct on the wide used ICDAR 2011 Strong Reading Competition info [15]. However, many issues remain to be self-addressed. First, the MSERs algorithmic program detects a large range of continuance elements and this continuance components square measure ambiguous for the latter character grouping algorithmic program. Most of the continuance elements, apart from the elements that almost all doubtless correspond to characters, ought to be removed before any process. The existing ways for MSERs pruning [19] still have space for enhancements in terms of accuracy and speed. Second, current approaches [14], [19], [20] for document candidates construction, which may be categorized as rule based and clustering-based ways, work well however square measure still not sufficient: rule-based ways typically need calibration parameters by hand, that is long and error prune; the clustering-based technique [14] shows smart performance but is sophisticated by incorporating post-processing stage once minimum spanning tree clump.

In this paper, we have a tendency to propose a sturdy and correct MSER based scene text detection technique. First, by exploring the data structure of MSERs and adopting easy features, we have a bias to style a quick and correct MSERs pruning algorithm; the amount of character candidates to be processed is considerably reduced with a high accuracy. Second, we have a tendency to propose a unique self-training distance metric learning formula that may learn distance weights and clustering threshold naturally; character candidates are gather into text candidates by the single-link cluster algorithm victimization the learned parameters. Third, we propose to use a personality classifier to estimate the back probabilities of text candidate's equivalent to non-text and remove text candidates with high non-text possibilities. Such elimination helps to coach a lot of powerful text classifier for distinguishing text. Finally, by integration the above concepts, we have a tendency to build correct and strong scene text find system. The system is evaluated on the benchmark ICDAR 2011 strong Reading Competition information (Challenge 2) Associate in Nursing has achieved an f -measure of seventy six, which is far above the present best performance of 71%. Moreover, experiments on trilingual, street read, multi-orientation and even born-digital (web and email) databases conjointly demonstrate that our methodology achieves hefty improvements over existing ways. An online demo of our planned scene text detection system.

2. LITERATURE SURVEY

In the literature survey we are going to discuss Robust Text Detection in Natural Scene Images: Below in literature we are discussing some of them.

A. Using framework to find text strings [1].
This paper proposed framework of text string detection consists of two steps: 1) Image partition to detect text character candidates depend on local gradient characteristics and color uniformity of character components. 2) Character candidate classification to find text strings based on joint structural characteristics of text characters in each text string such as character size differences, distances between adjacent characters, and character alignment. By assuming that a text string has at least three characters, proposed two algorithms of text string detection: 1) adjacent character grouping method, and 2) text line grouping method. The adjacent character grouping method finding the connection groups of each character candidate as string partitions and then blends the intersecting sibling groups into text string. The text line grouping method executes Hough transform to fit text line between the centroids of text candidates. Each fitted text line interprets the location of a potential text string. The identified text string is presented by a rectangle region covering all characters whose centroids are cascaded in its text line. Text information in natural incident images serves as significant hint for many image-based applications such as scene understanding, content-based image retrieval, assistive navigation, and automatic geocoding. However, locating text from complicated background with various colors is a competitive task. In this paper, I examine a new framework to find text strings with arbitrary orientations in composite natural scene images. To enhance efficiency and correctness, our algorithms are bringing out in multi-scales. The proposed methods outperform the state-of-the-art output on the public power full Reading Dataset which present text only in horizontal orientation. Furthermore, the effectiveness of our methods to detect text strings with arbitrary orientations is evaluated on the Oriented Scene Text Dataset collected by ourselves containing text strings in non-horizontal orientations.

B. Using a novel hybrid method [26].
This paper proposed a novel hybrid method to actively localize texts in natural scene images. A text region finder is designed to create a text confidence map, based on which text components can be partitions by local linearization approach. A Conditional Random Field (CRF) model, considering the unary component property as well as binary neighboring component relationship, is then presented to label components as "text" or "non-text". Last, text components are arranged into text lines with a power minimization approach. Experimental results show that the proposed method gives hopeful performance balancing with the existing methods on ICDAR 2003 competition dataset.

C. A text line segmentation algorithm [27].
In this paper, they proposed a text line segmentation algorithm based on minimal spanning tree clustering with distance metric learning for differentiating text lines in handwritten documents. Mentioned a distance metric, the connected components (CCs) of document image are grouped into a tree format, from which text lines are obtained. By understanding the distance metric in supervised learning on a dataset of pairs of CCs, the proposed algorithm is made robust to handle various documents with un-uniformly skewed and curved text lines.

D. Pattern clustering methods [29].
This paper introduced an overview of pattern clustering methods from a statistical pattern identification perspective, with an aim of providing useful advice and references to basic concepts accessible to the broad community of clustering practitioners. The present classification of clustering techniques, and distinguish cross-cutting themes and recent advances, and also illustrate some essential applications of clustering algorithms such as image segmentation, object recognition, and information retrieval. Clustering is the unsupervised arrangement of patterns (observations, data items, or feature vectors) into groups (clusters). The clustering problem has been addressed in many contexts and by researchers in many disciplines; this reflects its broad appeal and usefulness as one of the steps in exploratory data analysis. However, clustering is a hard problem combinatorial, and distinguishes in assumptions and contexts in different communities have made the transfer of useful generic concepts and methodologies slow to occur.

3. PROPOSED APPROACH AND FRAMEWORK AND DESIGN

The robust method is introduced for scene text detection using the Maximally Stable Extremely Regions (MSERs) on ICDAR 2011 dataset. But this method is having many limitations to address. In this project, the important limitation of this method is how to detect highly blurred texts in low resolution natural scene images, is considered as our research problem. To address this research problem, we are presenting new modified system which can able to handle both low as well as high resolution images for robust scene text detection. For low resolution images, the recent efficient algorithm introduced to enhance the quality of low resolution image to high resolution.

4 .ALGORITHM

Algorithm 1: Robust Text detection for low resolution images.
I/p-Image i
O/p-Text t
1: //normalize preprocess
i_norm=normalize (i);
i_edg_map=preprocess (i_norm);

2: set i_new= ø
i_new=create new image
height = i_heigtht
and width = i_width

3: i_new =resize (i_new, i_edg_map)
4: fragment [] = candidate_construction (i_new)
5: For each f from fragments follow steps 6 to 8
6: [E] = classify_candidte (f);
7: r = set result (c);
8: t = character Extraction (r);
end for
9: set outputResult= ø

 ISSN: 2321-8169
6403 - 6407

10: For each class_c from c
Follow step 11
11: outputResult = outputResult+extract (class_c)
12: return outputResult

Algorithm 2: Algorithm for preprocessing image

I/p-Image i
O/p-preprocessed image p
1: set p= ø
2: For each pixel x from i //Grayscale
3: follow step 4
4: p=p.add (x.R+x.G+x.B/3)
5: E=detect edges (p); //E
6: For each e € from E
Follow step 7-8
7: e=setstrok (z)
8: e=setcolor (e, red);
End for
9: p=detect Text. Area (p);
10: return p;

5. RESULT ANALYSIS

Using modified Robust Text Detection with Low Resolution system, required time for extraction of text from images having different resolution and there accuracy is shown below.

Table 1: Time for extraction and accuracy for color images.

Image Resolution (pixel/inch)	Time For Extraction (milli)	Accuracy (%)
150	275	72
300	480	86
500	658	91
750	970	92
1000	1250	95
1500	1800	96
2000	2486	99

For Gray Scale Images required time for extraction of text and there accuracy is shown below.

Table2: Time for extraction and accuracy for gray scale Images

Time For Extraction (milli)	Accuracy (%)
198	61
310	69
540	74
762	79
1020	81
1305	86
1970	92

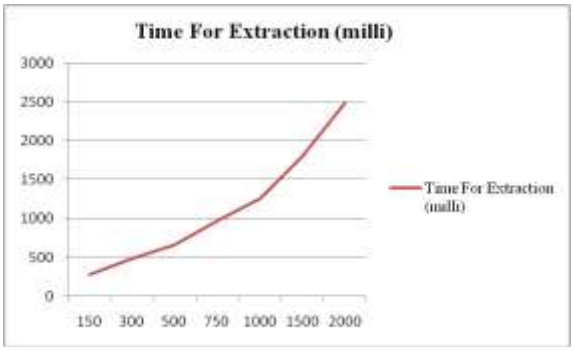

Figure 1: Time for extraction for color images

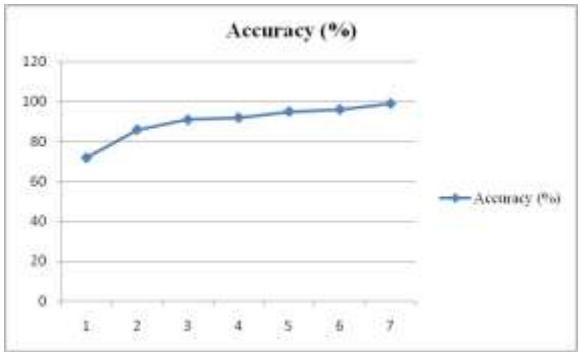

Figure 2: Accuracy for color images.

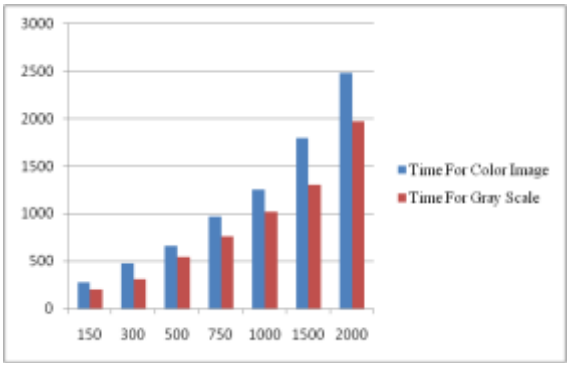

Figure 3: Time for color and gray scale images

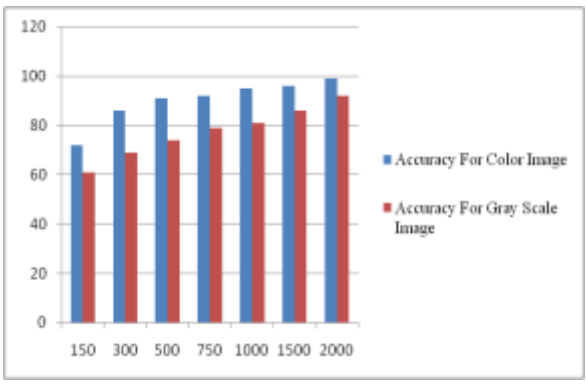

Figure 4: Accuracy for color and gray scale images.

Table 3 shows the performance of our modified system with respect to OCR and previous Robust Text Detection system. Precision records for modified Robust Text Detection with Low Resolution system shows excellent result with respect to the OCR and previous Robust Text Detection system for all high resolution and low resolution images.

Table3: Precision for color images

Image Resolution (pixel/inch)	OCR (Precision)	Robust Text Detection (Precision)	Robust Text Detection With Low Resolution (Precision)
150	0.12	0.58	0.82
300	0.18	0.61	0.87
500	0.21	0.68	0.91
750	0.23	0.75	0.95
1000	0.24	0.85	0.96
1500	0.29	0.89	0.97
2000	0.31	0.91	0.98

Table 4 shows precision records for gray scale images. For gray scale images also new modified system shows the excellent performance with respect to OCR and previous Robust Text Detection system.

Table 4: Precision for gray scale images.

OCR	Robust Text Detection	Robust Text Detection With Low Resolution (Precision)
0.023	0.28	0.75
0.097	0.31	0.79
0.19	0.35	0.81
0.23	0.39	0.87
0.27	0.42	0.91
0.32	0.48	0.93
0.35	0.59	0.96

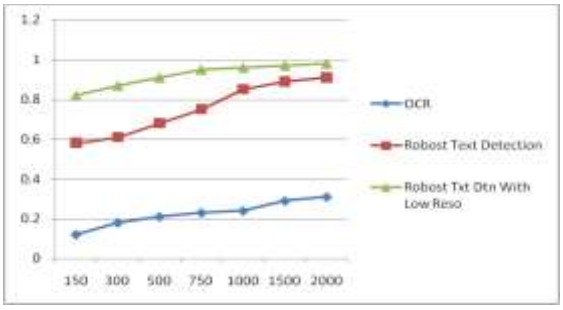

Figure5: Precision for color images

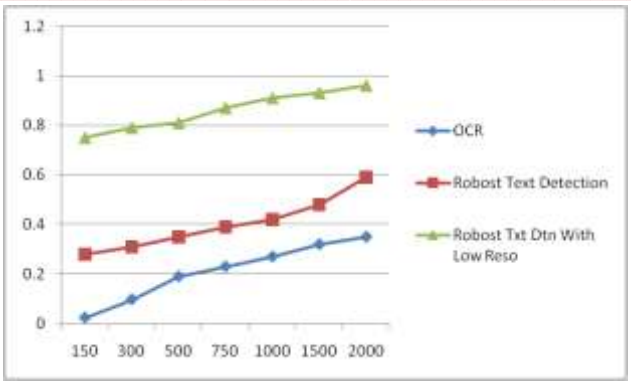

Figure6: Precision for gray scale images

6. CONCLUSION

Proposed new modified system able to handle both low as well as high resolution images for scene text detection. For low resolution images, the recent efficient algorithm introduced to enhance the quality of low resolution image to high resolution. Finally, by above new techniques we build a robust scene text find system that exhibits superior act over state-of-the-art methods on a variety of public databases.

7. ACKNOWLEDGEMENT

I would like thanks to Prof. H. A. Hingoliwala professor of Computer Engineering at J.S.P.M .Hadapsar, Pune who guided through this paper.

8. REFERENCES

[1] Y. Zhong, H. Zhang, and A. Jain, “Automatic caption localization in compressed video,” IEEE Trans. Pattern Anal. Mach. Intell. vol. 22, no. 4, pp. 385–392, Apr. 2000.
[2] h. Lee, d. Doermann and o KIA, "automatic text detection and tracking in digital video," IEEE Trans image process. vol. 9, no.1, pp 147-156, January 2000.
[3] j. Weidman learned-Miller, e. and a. Hanson, "view text recognition with sparse belief propagation, equality and using a dictionary" IEEE Trans’ pattern anal. Mach. Intell., vol. 31, no. 10, pp. 1733-1746, October 2009.
[4] X-c. Yin, h. Get Sun Hao, j. w. and s. fast, "based on the documents, the vanishing point detection strong mobile cam to Proc. ICDAR, Beijing, people's Republic of China, in 2011, pp. 136-140.
[5] p. Shivakumara, q. p. Trung, & c. L. Tan, "a Laplacian approach multi-oriented text to video," IEEE Trans pattern anal. Mach. Intell., vol. 33, no. 2, pp. 412-419, February 2011.
[6] X. Chen and A. Yuille, “Detecting and reading text in natural scenes,” in Proceedings of IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) , vol. 2, 2004, pp.366–373
[7] j.-j. Lee, p. H. Lee, s.-w. Lee, a. Yule & c. Coach, "AdaBoost scenery, to explore the text" Proc. ICDAR, Beijing, People’s Republic of China, in 2011, pp. 429-434.
[8] k. k. Kim, Jung, and j. Kim, "support vector machines and texture-base approach sustained Adaptive mean shift algorithm, using images to locate text in" IEEE Trans pattern anal. Mach. Intell., vol 25, no. 12, pp. 1631-1639, December 2003.
[9] B. Epshtein, E. Ofek, and Y. Wexler, “Detecting text in natural scenes with stroke width transform,” in Proceedings of IEEE Con- ference on Computer Vision and Pattern Recognition (CVPR) , 2010, pp. 2963–2970

[10] C. Yi and Y. Tian, “Text string detection from natural scenes by structure-based partition and grouping,” IEEE Trans. Image Processing , vol. 20, no. 9, pp. 2594–2605, 2011.
[11] c. Mancas-Thillou and b. Gosselin "selective metric-based clustering, extract text with color", Compute. Vis. Image Und. vol. 107, no. 1-2, pp. 97-107, 2007.
[12] Y.-F. Pan, X. Hou, and C.-L. Liu, “A hybrid approach to detect and localize texts in natural scene images,” IEEE Trans. Image Processing, vol. 20, no. 3, pp. 800–813, 2011.
[13] J. D. Lafferty, A. McCallum, and F. C. N. Pereira, “Conditional random fields: Probabilistic models for segmenting and labeling sequence data,” in Proceedings of the Eighteenth International Con- ference on Machine Learning (ICML) , 2001, pp. 282–289
[14] J. Matas, O. Chum, M. Urban, and T. Pajdla, “Robust wide base-line stereo from maximally stable extremal regions,” in Proceedings of British Machine Vision Conference (BMVC), vol. 1, 2002, pp. 384– 393
[15] A. Shahab, F. Shafait, and A. Dengel, “ICDAR 2011 robust read-ing competition challenge 2: Reading text in scene images,” in Proceedings of International Conference on Document Analysis and Recognition (ICDAR) , 2011, pp. 1491–1496.
[16] j. Matas, o show, m. Urban, and t. Pajdla, "robust wide baseline stereo from maximally stable extremely regions, in Proc. UK Mach. vis. Conf., vol 1. 2002, pp. 384-393ı
[17] a. Shahab, f Shafait, and a. Dengel, "ICDAR strong competition challenge 2 reading: Visual images, text reading" Proc. ICDAR, 2011, pp. 1491-1496 in.
[18] h. Chen et al., "strong text detection edge enhanced maximally stable extremely regions, as well as natural images" in Proc IEEE Int. Conf. image process.., 2011, pp. 2,609 – is now 2612.
[19] C. Merino-Gracia, K. Lenc, and M. Mirmehdi, “A head-mounted device for recognizing text in natural scenes,” in Proc. Int. Workshop CBDAR, Beijing, China, 2011, pp. 29–41.
[20] L. Neumann and J. Matas, “Real-time scene text localization and recognition,” in Proc. IEEE Conf. CVPR, Providence, RI, USA, 2012, pp. 3538–3545.
[21] l. Neumann and j. Matas, "real-world use of the entire search, meticulously pruned images text localization" Proc. ICDAR, Beijing, People’s Republic of China, in 2011, pp. 687-691.
[22] l. Neumann and j. Matas, "a method for text localization And recognition in real-world images, "Proc. ACCV, vol. 3. Queenstown, New Zealand, 2011, pp. 770-783.
[23] c. Shi, c. Wang, Xiao, y. Zhang and GAO b., "view text detection graph maximally stable extremely regions, using the model created" pattern Recognition. Let. vol. 34, no. 2, pp. 107-116, 2013.
[24] k. k. Kim, Jung, & a. Jain, "text information extraction in images and videos: surveys, a" pattern Recognition. vol 37, no. 5, pp. 977-997, 2004ı
[25] j. Liang, d. Doermann and h. Lee, the text and survey camera-based analysis of documents, an "IJDAR, vol 7, no. 2-3, pp. 84-104, 2005.
[26] j. Zhang and r. Kasturi, ",extraction of text objects in video documents: recent Progress”, in proc.,IAPR workshop DAS,Nara,,2008,pp.1-13
[27] f. Yin c.-l-Leu, "with handwritten Chinese text line and split distance metric learning, clustering by pattern Recognition., vol. 42, no. 12, pp. 3146-3157, 2009.
[28] x. x yin, c. Yin, h. W-Hao, and k. Iqbal, "MSER, geometry-effective with based grouping and localization in text ado scenery images promoting" Proc. Int. Conf. pattern Recognition. In Tsukuba, Japan, 2012, pp. 725-728.
[29] A. Jain, M. Murty, and P. Flynn, “Data clustering: A review,” ACM Comput. Surv., vol. 31, no. 3, pp. 264–323, 1999.