ISSN: 0971-1260
Vol-22-Issue-3-July-2019

Image Identification Algorithm for Detecting Text Contained Regions

Navjot Kaur

AP, School of Computer Science & Engineering

Lovely Professional University

Phagwara, Punjab

navjot.20506@lpu.co.in

Someet Singh
someet.17380@lpu.co.in
AP, School of Electronics & Electrical Engineering
Lovely Professional University
Phagwara, Punjab

Abstract- In this paper, a method for detecting texts and scenes in unstructured and structured images is proposed. A text contained image in content recognition techniques dependent on profound learning and identification of the same has accomplished by implementing an efficient algorithm to meet expected outcomes. An algorithm is proposed using which edges of the images are detected. This leads to identification of candidate text. An efficient text detection algorithm is proposed in this paper which aims to distinguish an enormous number of content region candidates and continuously expels those less inclined to contain content.

Keyword- image detection, feature extraction, overlapping regions

I. Introduction

To identify any unstructured scene, detection of image contained regions is evident. Amorphous scenes contain any arbitrary or uncertain scenarios. Such scenarios can be used to identify random text automatically captured from some video and can be used to alert regarding a situation. These are different from well structured scenes where the actual position of the text is known beforehand. To recognize characters in the text string, an image objects that consists of text and uniformly distributed symbols in the background are segmented [11]. Various techniques to extract text or characters from overlapping text or images are available. To identify

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

an image and filter its edges, an appropriate structuring element is used. Throughout the process of identifying and transforming an image structuring element plays a vital role. Operations that are performed on a binary image yield an image in which pixel value is non-zero. A structuring element is a matrix of pixels that has 0 or 1 value. This pattern value of 0's and 1's form a structuring element, which has its origin on one of its pixels.

Consider a Universal Set *U*, Group *G* and two sets *P* and *I* in Group *G* then,

$$P + I = \{Iz \cap P \neq \phi\} \qquad (1)$$

A structuring element is transforming element and is defined as,

$$S\{f[p, s]\} = \{f[p - p`, s - s`] : [p`, s`]\} \, \varepsilon \, \Pi ps \qquad (2)$$

Where *Πps* is structuring element and *f [p,s]* is an image. [9]

This paper depicts the improvement and usage of morphological way to deal with character string extraction from an image that contain content or text and limits the shape bending and formation of characters.

II. Methodology

Identification of text from unstructured images includes various steps. Initial step is to detect all candidate text regions. To achieve this MSER feature detector is used. It functions admirably for content in light of the fact that the reliable shading and high complexity of content prompts stable power profiles.

Main focus is to define computationally fast and invariant algorithm for unstructured images to indentify text in an image. The idea is to detect text by defining region properties - Aspect ratio, Eccentricity, Euler number, Extent, Solidity which will also be used to identify target regions.

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

A. Basic Steps

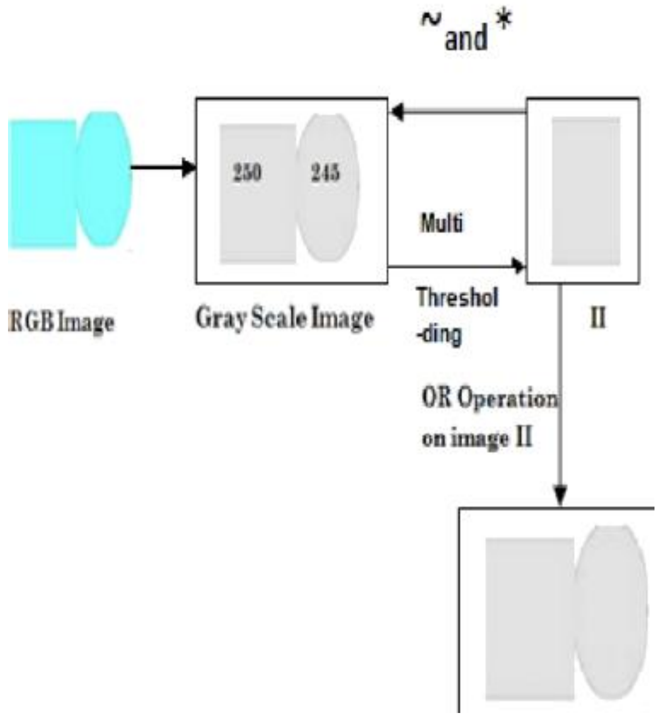

Figure 1: Basic steps of converting an RGB image [12]

Level 1:

1. Read an RGB image
2. Convert RGB image to gray level image
3. Detect candidate regions
4. Define region properties for target regions

Level 2:

5. Compute aspect ratio and define threshold values to identify text regions for further identification.
6. Identify neighboring text areas to form a bounding box.
7. Merge overlapping bounding boxes and connected text regions

Level 3:

8. Remove bounding boxes that contain single text region.
9. Show detected text.

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

B. Algorithm

The detailed algorithm is described as,

1. Acquire an RGB image.
   col_Img:= Read an image usng imread<img_name>
   $I= r(x_1,y_1)$, $g(x_1,y_1)$, *and* $b(x_1,y_1)$, a collection of image functions.
2. Convert to gray scale image.
   J := rgb2gray<I>
   Where J is resultant grey scale image and I is an rgb image
3. Detect candidate regions
   [MSER_Reg, MSER_Conn_Comp]:= detect_MSER_feature <image, region_area_range, threshold_value>
4. Define region properties for target regions
   MSER_status:= Reg_Prop[status: regionproperty<mserConnComp, 'BoundingBox', 'Eccentricity', 'Solidity', 'Extent', 'Euler', 'Image to be considered'>]
5. Compute aspect ratio
   boubox:= vertcat<mserStats.BoundingBox>
   wi := boubox<:,3>
   ht := boubox<:,4>
   aspectRatio := <wi/ht>
6. Find neighboring text regions
   bboxes:=vertcat<MSER_Statsus of bound_box>
7. Merge overlapping bounding boxes and connected text regions
   comp_indics := conn_comp<overlap_ratio of the overlapping region>
   overlap_ratio:= [<1:n+1:n^2> =0]
   Where n is size of all the expanded bounding boxes.
8. Remove bounding boxes that only contain single text region
   regions_in_Group := histcounts<indexes of the region component>
   text_bboxes[regions_in_Group == 1, :] := []
9. Show detected text
   detect_text_region := insertShape<image, geometric shape, textboxes,LineWidth>
   Display the final detected text using: imshow< detect_text_region>

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

C. Flow Chart

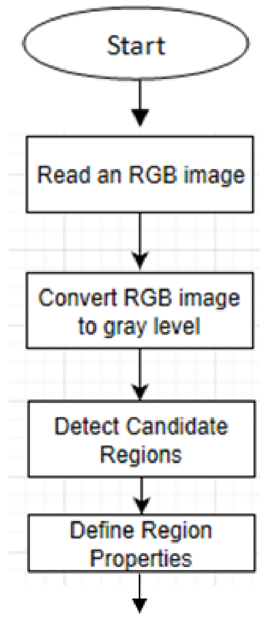

Figure 2: Operational Stages of Level 1

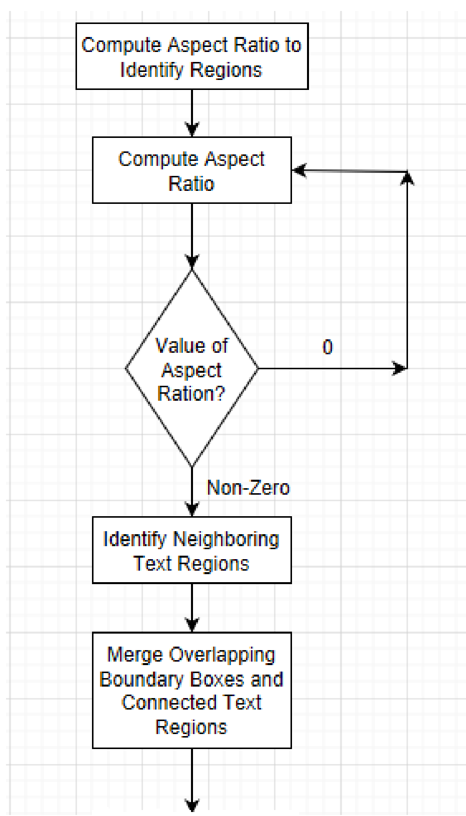

Figure 3: Operational Stages of Level 2

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

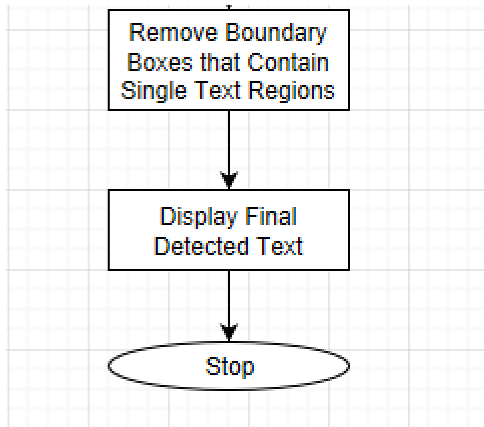

Figure 4: Operational Stages of Level 3

III. Results

1. RGB Image converted to grey scale

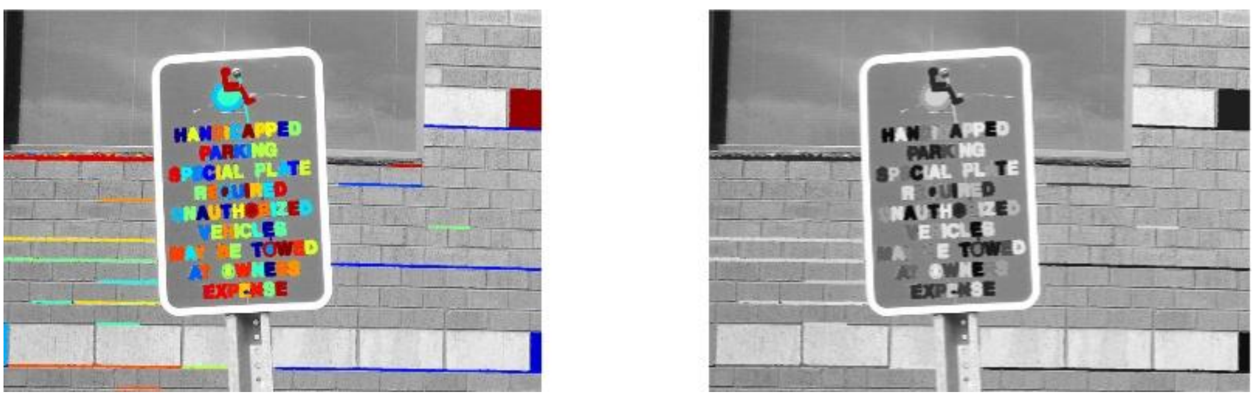

Figure 5: Conversion of RGB image to gray scale

2. After removing non-text regions.

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

Figure 6: After removing non-text regions by considering geometric properties

3. Apply boundary boxes to identify text regions

Figure 7: Expanded Boundary Boxes

4. Resultant image with detected text

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

Figure 8: Resultant image

As structured or unstructured images consists of objects. Objects in an image may be overlapping. Defining various geometry properties also help to identify various objects that an image consists of [12].

Table 1: No. of objects and their identification time

Objects/Image	Time to identify objects per image/s			
	Circle	Triangle	Rectangle	Eclipse
10	5.78	5.23	5.29	5.44
13	9.60	8.85	8.36	8.54
15	9.13	8.60	8.62	8.75
22	13.94	29.49	23.20	13.24

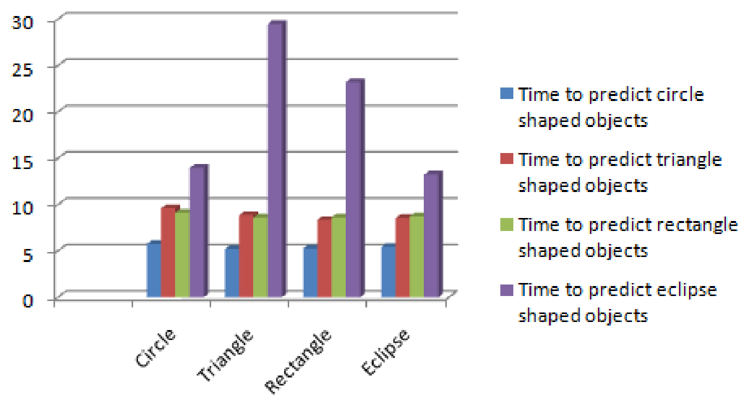

Figure 9: Prediction time to detect objects

Unstructured images may also contain text which may be overlapped with the objects in that image. As the number of objects in an image increases, the time to identify objects and overlapping text also increases [12].

IV. Conclusion

This paper focuses on identification of text from an image. An unstructured image consists of various overlapping objects. Predicting and identifying the same takes different time. Finding target regions and defining how geometric measurements and properties can be used to identify text contained images lead to the development of more vigorous and efficient algorithm.

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

V. Future Scope

Identifying text in images using geometric properties can also be extended to overlapping and blurred images. The proposed method could further be extended in the field of robotics, in which robots or mechanical arms can be used to identify text that could remain unidentified from human.

Reference

[1] Wang, R., Bu, F., Jin H., and Li, L., "Toe shape recognition algorithm based on fuzzy neural networks", IEEE International conference on Natural Computation", vol. 2, pp. 737-741, 2007.

[2] Wang, S., Wang, Y., Gu, X., and Samaras, D., "Conformal Geometry and Its Applications on 3D Shape Matching, Recognition and Stitching", IEEE International conference on control and design, vol. 29, issue 7, pp. 1209-1220, 2007.

[3] Mingqiang, Y., Kidiyo, K., Joseph, R., "Shape Matching and Object Recognition Using Chord Contexts", IEEE conference on Object recognition, vol. 4, pp. 63-69, 2008.

[4] Baloch, S. and Krim, H., "Object Recognition through Topo-Geometric Shape Models Using Error-Tolerant Subgraph Isomorphisms", IEEE Transactions On Image Processing, vol. 19, issue. 5, pp. 1191-1200, 2010.

[5] Salve, G., Jondhale, C., "Shape Matching and Object Recognition Using Shape Contexts", IEEE conference, vol. 9, pp. 471-474, 2010.

[6] Song, R., Zhao, Z., Li,Y., Zhang, Q., Chen,X., "The Method of Shape Recognition Based on V-system", IEEE Conference on Frontier of Computer Science and Technology, fcst, pp. 321-326, 2010.

[7] Yu, D., Jin1, S., Luo1, S., Lai, W., Park, M and Pham, T., "Shape Analysis and Recognition Based on Skeleton and Morphological", International Conference on Computer Graphics, Imaging and Visualization, cgiv, pp. 118-123, 2010.

[8] Almazan, J., Fornes, A., Valveny, E., "A Non-Rigid Feature Extraction Method for Shape Recognition", International Conference on Document Analysis and Recognition, issue 4, pp. 987-991, 2011.

[9] Barbu, T., "Automatic Unsupervised Shape Recognition Technique using Moment Invariants", IEEE conference, pp. 1-4, 2011.

ISSN: 0971-1260
Vol-22-Issue-3-July-2019

[10] Yuan, W., Jing, L., "Hand-Shape Feature Selection and Recognition Performance Analysis", IEEE conference, ichb, pp. 1-6, 2011.

[11] Z. Zhang, W. Shen, C. Yao, and X. Bai, "Symmetry-based text line detection in natural scenes," IEEE Computer Vision and Pattern Recognition (CVPR), 2015.

[12] Kaur,N., Kundra, S.,Kundra,H., "Shape Prediction Linear Algorithm Using Fuzzy", International Journal of Advanced Computer Science and Applications, Vol. 3, No. 10, pp66-70, 2012.