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Text Extraction From Image Using GAMMA Correction Method.

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Abstract - *Text extraction is the task of automatically extracting structured information from instructed or semi-structured machine readable documents. When one scans a paper page into a computer produces just an image file, a photo of the page. The computer cannot understand the letter on the page so we need to extract text from image file. Text extraction from image is one of the complicated areas in digital image processing. Text data present in images contain useful information. We can extract text and layout information from image file. It is a complex process to detect and recognize the text from images due to their various sizes, gray scale and complex background. Various researchers used the method such as morphological filters, comic text extraction method, connect component labeling algorithm and mathematical morphology which gives less accuracy. In proposed system gamma method is used which may give more accuracy as compared to the existing methods. In gamma method it suppressed non-text background details from the image by applying appropriate gamma value and to remove non text region and makes the image accurate and extract the text from image.*

Key Words: Text Extraction, Text Recognition , Gamma method, Image Processing .

1. Introduction

Images can be broadly classified into Document images, Caption text images and Scene text images. A document image (Figure 1a) usually contains text. Document images are acquired by scanning journal, printed document, degraded document images, handwritten historical document, and book cover etc. The text may appear in a virtually unlimited number of fonts, style, alignment, size, shapes, colors, etc. Extraction of text in documents with text on complex color background is difficult due to complexity of the background and mix up of color of fore-ground text with colors of background.

Caption text is also known as Overlay text or Cut line text. Caption text (Figure 1b) is artificially superimposed on the video/image at the time of editing and it usually describes or identifies the subject of the image/video content. These types of caption text include moving text, rotating text, growing text, shrinking text, text of arbitrary orientation, and text of arbitrary size.

Scene text (Figure 1c) appears within the scene which is then captured by the recording device i.e. text which is present in the scene when the image or video is shot. Scene texts occur naturally as a part of the scene and contain important semantic information. It is difficult to detect and extract since it may appear in a virtually unlimited number of poses, size, shapes and colors, low resolution, complex background, non-uniform lightning or blurring effects of varying lighting, complex movement and transformation, unknown layout, uneven lighting, shadowing and variation in font style, size, orientation, alignment & complexity of background.

Due to very fast growth of available multimedia documents and growing requirement, studies in the field of pattern recognition shows a great amount of interest in efficient extraction of text, indexing and retrieval from digital video/document images. The text characters are difficult to be detected and recognized due to their deviation of size, font, style, orientation, alignment, contrast, complex colored, textured background. Intensive research projects are performed for text extraction in images by many scholars. Several techniques have been developed for extracting the text from an image. The proposed methods were based on morphological operators, wavelet transform, artificial neural network, skeletonization operation, edge detection algorithm, histogram technique etc .

Fig1. (a)

Document_image

Fig1. (b)

Caption_image

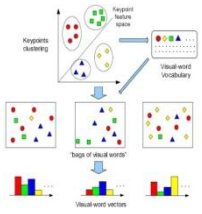


Fig1. (c)

Scenec_image

1.1 Literature overview

According to Siddhartha Brahma, the text extraction from image is done by using the shape context matching [1].

According to Ruini Cao, Chew Lim Tan – the separation of overlapping text from graphics is a challenging problem in document image analysis. So they used a specific method for detecting and extracting characters that are touching graphics. It is based on the observation that the constituent strokes of characters are usually short segment in comparison with those of graphics. It combines line continuation with the feature line width to decompose and reconstruct segments and improved the percentage of correctly detected text as well as the accuracy of character recognition significantly [2].

Q. Yuan, C. L. Tan presented a well designed method that makes use of edge information to extract textual blocks from the gray scale document images. It aims at detecting textual regions on heavy noise infected newspaper images and separate them from graphical regions. The algorithm traces the feature points in different entities and then groups those edge points of textual regions. By using the line approximation and layout categorization, it can successfully retrieve directional placed text blocks. Finally they used a connected component merging to gather homogeneous textual regions together within the scope of its bounding rectangles. They tested this method on a large group of newspaper images with multiple page layouts, promising results approved the effectiveness of their Method [3].

Kohei Arai and Herman Toll stated that Reading digital comic on mobile phone is demanding now. Instead of creating new mobile comic contents, adaptation of the existing digital comic web portal is valuable. In this paper, they proposed an automatic e-comic mobile content adaptation method for automatically creating mobile comic content from digital comic website portal. Automatic e-comic content adaptation is based on the comic frame extraction method combined with additional process to extract comic balloon and text from digital comic page. Their proposed method is an effective and efficient method for real time implementation of reading e-comic comparing to other methods. From their Experimental results they showed a 100% accuracy of flat comic frame extraction, 91.48% accuracy of non-flat comic frame extraction, and about 90% processing time faster than previous method [4].

Pan et al. [5] projected a text region detector to estimate the text existing confidence and scale information in image pyramid, which helped to segment candidate text components by local Binarization. A conditional random field (CRF) model considering unary component properties and binary contextual component relationships with supervised parameter learning to remove non text was proposed. Finally, text components were grouped into text lines/words with a learning-based energy minimization method.

Chucai et.al [6] proposed an algorithm that was able to model both character appearance and structure to generate representative and discriminative text descriptors. The article Gayathri et.al

[7] discussed in detail about the various existing schemes on extracting the text from an image

1.2 Text Extraction(Gamma Method Rules)

Rule 1: If the value of Energy > =0.05, find an instance wherethreshold value is 0.5 from the table. If more than one instances are found, select an instance which has maximum value of Contrast and Energy>=0.05. If there is no instance found, find an instance where threshold value is next nearer to 0.5. The corresponding gamma value of this selected instance is the estimated gamma value.

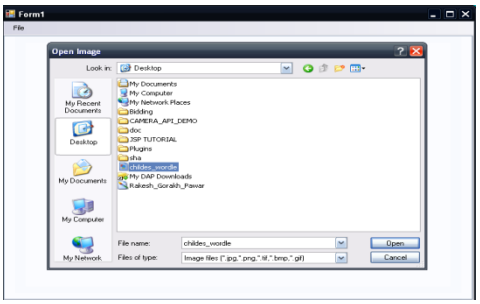
Rule 2: If the value of Energy < 0.05 and the value of Contrast>=1000, find an instance which has the value of Energy>=0.1, the value of Contrast>=1000 and threshold value of 0.5 from the table for the Gamma values 1 to 10. If more than one instance is found, select an instance which has the value of Energy maximum and the value of Contrast > 1000. If there is no such instance found, find an instance in between gamma value of 0.1 and 0.9 such that

value of the threshold should be nearer or next nearer value of 0.5. The corresponding gamma value of this selected instance if the estimated gamma value.

Rule 3: If the value of Energy < 0.05 and the value of Contrast<1000, find an instance which has the value of Energy>=0.1, the value of Contrast is maximum and the maximum contrast value should be greater than 100 for the Gamma values 1 to 10.If no such instance found, find an instance in between gamma value of 0.1 and 1 such that value of the threshold should be nearer or next nearer value of 0.5. The corresponding gamma value of this selected instance is the estimated gamma value. Text Extraction from Image using Gamma Correction Method Use a zero before decimal points: "0.25," not ".25." Use "cm3," not "cc." (*bullet list*)

2. Experiment Result

1. Original image



2. Open image

3. Gray Scale of image

4. Binarization of image

3. CONCLUSIONS

There are many applications of a text extraction such as Keyword based image search, text based image indexing and retrieval , document analysis, vehicle license detection and recognition, page segmentation , technical paper analysis, street signs, name plates, document coding, object identification, text based video indexing, video content analysis etc. The Gamma Correction approach got the average precision rate of 78% and recall rate of 96%. Gamma Correction method outperforms the existing methods. So, we can retrieved text from any image, improve the quality, accuracy & maintain the database of image.

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