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Document Image Binarization using Image Segmentation Technique

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Abstract: ***Segmentation of text from badly degraded document images is an extremely difficult assignment because of the high inter/Intra variety between the record foundation and the frontal area text of various report pictures. Picture preparing and design acknowledgment algorithms set aside more effort for execution on a solitary centerprocessor. Designs***
Preparing Unit (GPU) is more mainstream these days because of its speed, programmability, minimal expense and more inbuilt execution centers in it. The primary objective of this exploration work is to make binarization quicker for acknowledgment of a huge number of corrupted report pictures on GPU. In this framework, we give another picture division calculation that every pixel in the picture has its own limit proposed. We are accomplishing equal work on a window of m*n size and separate article pixel of text stroke of that window. The archive text is additionally sectioned by a nearby edge that is assessed dependent on the forces of identified content stroke edge pixels inside a nearby window.
Keywords: pixel classification, GPU, Parallelization, Binarization

I. INTRODUCTION

1) Grayscale
2) Conversion
3) Image Segmentation
4) Post Processing

Document Image Binarization is acted in the pre-handling stage for report examination and it plans to portion the frontal area text from the archive foundation. A quick and precise record picture binarization method is significant for the resulting archive picture handling undertakings like optical character acknowledgment. Record picture binarization read for a long time, the thresholding of debased report pictures is as yet a perplexing issue because of the great Inter/Intra variety between the content stroke and the archive foundation across various record pictures. As represented in Fig. 1, the transcribed content inside the corrupted archives regularly shows a specific measure of variety as far as the, stroke brilliance, stroke width, stroke association, and record foundation. Authentic archives are regularly corrupted by various sorts of imaging antiques. These various kinds of record corruptions will in general prompt the archive thresholding blunder and make debased report picture binarization a major test to most best in class procedures. Algorithms

II. LITERATURE SURVEY

A. Existing System

There are numerous thresholding strategies have been accounted for archive picture binarization. As many debased reports don't have an unmistakable bimodal example so worldwide thresholding is normally not an appropriate methodology for the corrupted record binarization. In versatile thresholding which gauges a neighborhood limit for each archive picture pixel is regularly a superior way to deal with manage various varieties inside debased record pictures. The nearby picture contrast and the neighborhood picture slope are extremely valuable highlights for fragmenting the content from the record foundation in light of the fact that the archive text normally has certain picture differentiation to the adjoining report foundation. They are exceptionally compelling and have been utilized in many record picture binarization procedures. The old framework essentially utilizes a sequential methodology for preparing record pictures. Because of this the preparing season of a picture is high thusly it requires some investment to produce the yield. A sub-space of PC vision is a field that arrangements with the transformation of a picture into computerized frame and play out certain procedure on it. To get an upgraded picture or to extricate some evaluable data from it. It is a sort of sign regulation wherein input is a picture like photo or video edge and yield might be picture or qualities related with that picture. A picture preparing framework incorporates regarding pictures as two-dimensional signs while applying effectively set sign handling techniques to them. The motivation behind picture handling can be essentially separated into 5 gatherings, specifically:

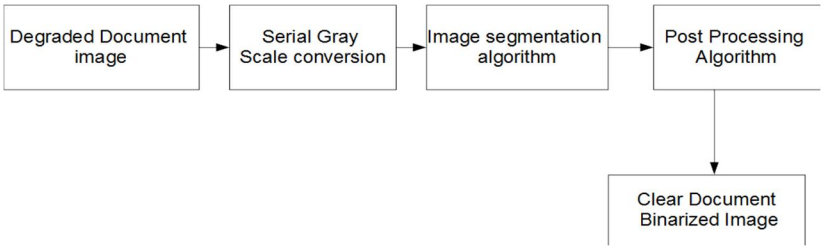
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1) *Visualization:* Observe the objects that are not visible.
2) *Image Sharpening And Restoration:* to create a better image.
3) *Image Retrieval:* seek for the image of interest.
4) *Measurement of Pattern:* measures various objects in an image.
5) *Image Recognition:* Distinguish the objects in an image.

III. PROPOSED METHODOLOGY

Computerized picture preparing has become an applied exploration region that goes from proficient photography to a few distinct fields like meteorology, cosmology, PC vision, clinical imaging among others. The point of advanced picture preparing is to improve the pictorial data to perform in this manner different errands, for example, picture based characterization, design acknowledgment or highlight extraction . Picture preparing is typically a tedious and costly undertaking. The utilization of a GPU to parallelize assignments began quite a while prior, in 2004 proposed another engineering utilizing various GPUs for picture handling and PC vision. They got critical accelerate over a CPU execution. Quick calculations are significant for effective picture preparing frameworks for dealing with an enormous arrangement of estimations. To accelerate the handling equal execution of a calculation should be possible utilizing the Graphics Processing Unit. GPU is broadly useful calculation minimal expense and equipment programmability make it useful. Binarization is a broadly utilized method in acknowledgment applications and picture analysis.We examine the exactness and - execution qualities of GPUs on notable worldwide binarization.

A. Architecture



As the system starts we give degraded document images as the input to the system. Then the image is converted tograyscale format after that the image segmentation algorithm is applied to get the clear binarized image as output.

The post-processing algorithm is applied to get character and image clearer and more readable. Some key features ofthe system are as follow:

1) Processing image using parallel computing.
2) To generate Clear output from Degraded Images.
3) Text Stroke Identification.
4) Parallel Image Segmentation

B. Algorithms

1) Algorithm for Gray Scale Image

Algorithm: Gray scale transformation in a serial approach.
Input: I image vector
Output: GI gray scale image
a) for i = 0 to (width(I) ×height(I))do
b) GI[i] = (I[i×3] + I[i × 3 + 1] + I[i × 3 + 2])/3
c) End for
Algorithm :- Gray scale transformationInput:
I image vector
Output: GSC gray scale image
1. For each GPU task i = blockidx.x ×(blockdim.x × blockdim.y) + blockdim.x × threadidx.y + threadidx.x;2. GSC[i] = (I[i×3] + I[i × 3 + 1] + I[i × 3 + 2])/3
3. End for

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2) Algorithm for Image segmentation

Image Segmentation Algorithm

a) Input

- G is Gray Scale image vector.
- Set threshold value th.iii.Set window size Ws
- BZ for binarized image vector.

b) For each row 1 to height -WsFor each column 1 to width -WsCurrpixel=G[row, column];
If
(currpixel < avg - th) label BZ [row, column]=0;Else
Label BZ [row, column]=1;End;
End;
Return binarized image BZ;

3) Algorithm for Post ProcessingPost Processing Algorithm

a) Input: The Input Document Image I , Initial Binary Result B and Corresponding Binary Text Stroke Edge ImageEdge

b) Output: The Final Binary Result BF

- Find out all the connect components of the stroke edge pixels in Edg.2: Remove those pixels that do not connect with other pixels.
- for each remaining edge pixels (i, j): do
- Get its neighborhood pairs: (i − 1, j) and (i + 1, j);(i, j − 1) and (i, j + 1)
- if the pixels in the same pairs belong to the same class (both text or background) then
- Assign the pixel with lower intensity to foreground class (text), and the other to background class.
- end if
- end for
- Remove single-pixel artifacts along the text stroke boundaries after the document thresholding.10: Store the new binary result to BF.

C. Important modules

Following are the various modules to be made

1) Gray Scale Module: We take degraded document image as the input to the system. After passing the degraded document to the system the document will first converted into gray. For converting of the document into grayscale, we are apply a serial approach as well as a parallel approach so that we can calculate the time for both approaches to generate the result. From that, we come to know which approach is fast.

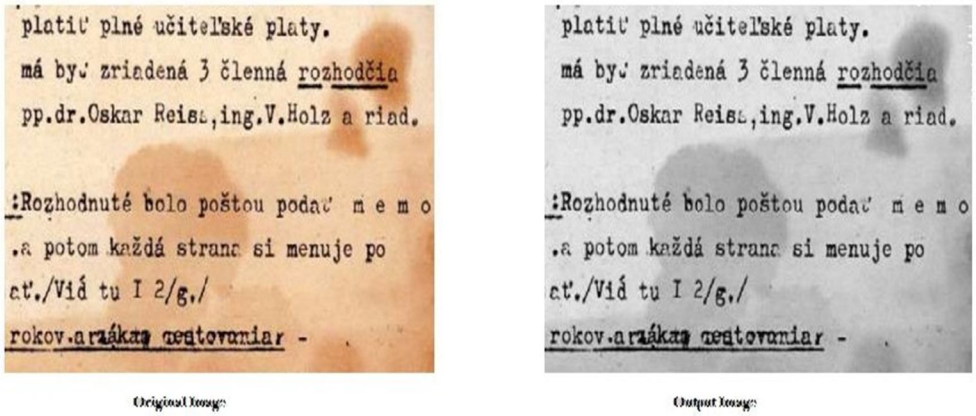


Fig . 1: Example: Gray Scale image

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2) *Window Intensity Calculation:* After converting the document into grayscale, we are calculating the intensity of each window for the document image in equal methodology and at the equivalent time, we are planning the edge for every window in sequential methodology by watchful edge identification for each window of the archive picture.
3) *Image Segmentation:* The window power estimation in done then we are applying the Image segmentation algorithm. We are partitioning a image into segments and figuring the limit an incentive for each segment in the parallel approach. by applying the the segmentation algorithm, we will get the correct threshold value for each segment of the document image.
4) *Post Processing:* We are applying the post processing Algorithm in the final step to identify the letters in the documentimage. If the letters are type halfly then by postprocessing Algorithm the letters can be recognized automatically by the post-processing algorithm.

IV. CONCLUSIONS

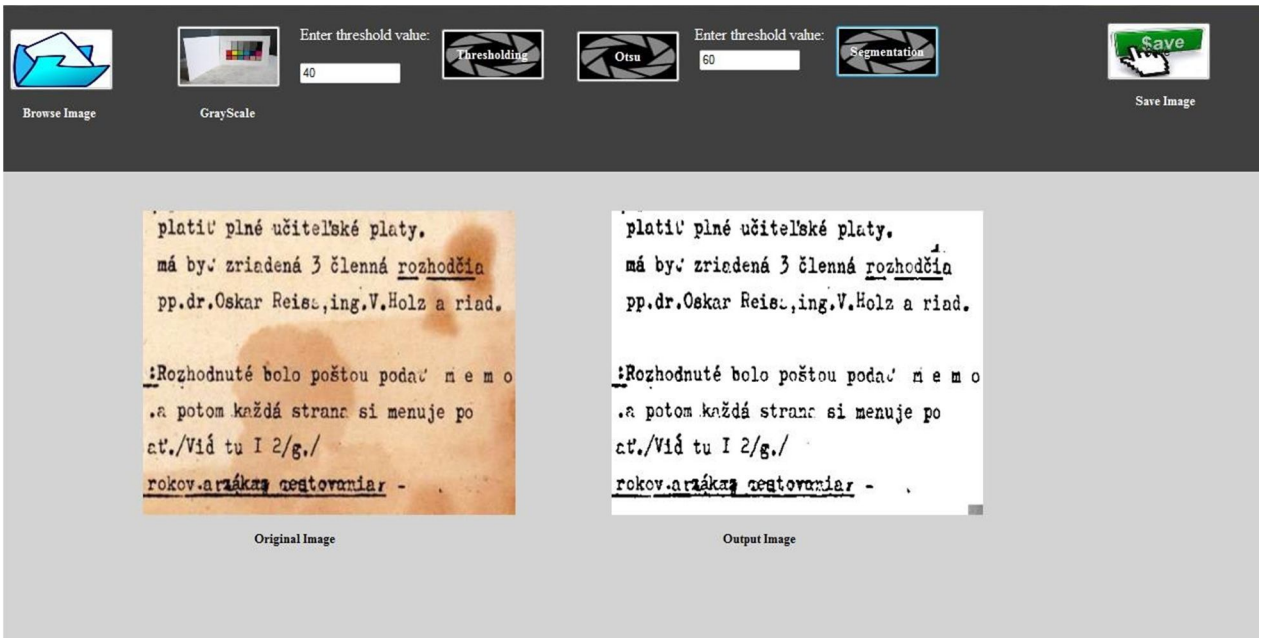


Figure 2: clear output after post processing algorithm

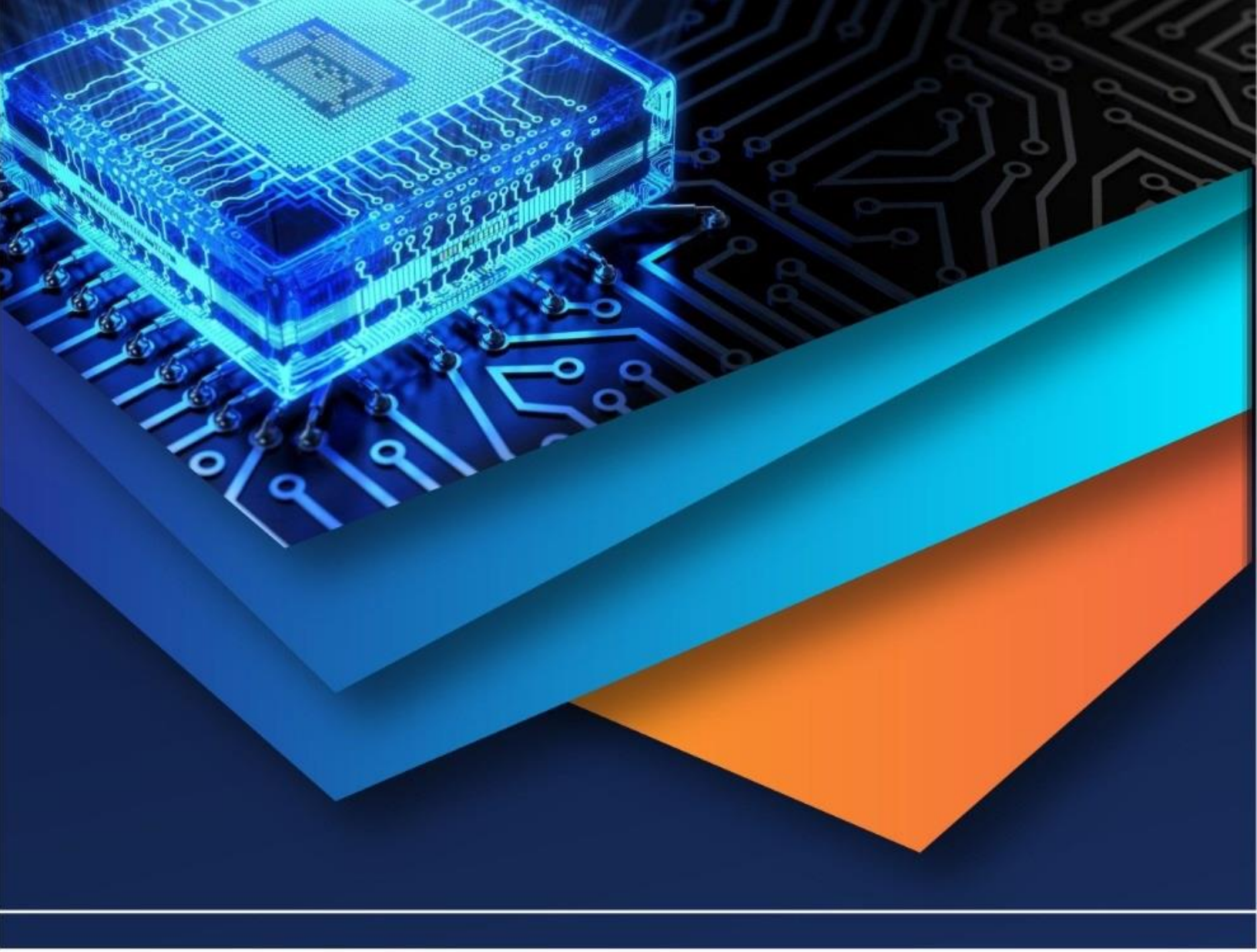
The system provides document image Binarization technique .The Proposed system makes use of edge detection and image segmentation algorithm in image processing based on threshhold segmentation It also has an advantage in noise restraining which is a good edge detecting image segmentation algorithm.Problems occurred in Canny's edge detection will be overcome by Proposed System We havepresented an approach for document image processing using parallel computing using C# .Net

REFERENCES

[1] Sehad, Abdenour, et al. "Ancient degraded document image binarization based on texture features." Image andSignal Processing and Analysis (ISPA), 2013 8th International Symposium on IEEE, 2013.
[2] Nafchi, Hossein Ziaei, Reza Farrahi Moghaddam, and Mohamed Cheriet. "Application of Phase-Based Features and Denoising in Postprocessing and Binarization of Historical Document Images." Document Analysis and Recognition (ICDAR), 2013 12th International Conference on. IEEE, 2013.
[3] Parker, Jon, Ophir Frieder, and Gideon Frieder. "Automatic Enhancement and Binarization of Degraded Document Images." Document Analysis and Recognition (ICDAR), 2013 12th International Conference on IEEE, 2013.
[4] D. Doermann and K. Tombre, "Handbook of Document Image Processing and Recognition. ", Published in2014.
[5] Fabrizio Russo, "An Image Enhancement Technique Combining Sharpening and Noise Reduction", Published in4 AUGUST 2002 on IEEE Explorer
[6] Bhawna Dhruv; Neetu Mittal; Megha Modi,"Analysis of different filters for noise reduction in images", Published in 14 May2018 on IEEE Explorer.
[7] Vibhor Sharma,Dheresh Soni,Deepak Srivastava,"Filtration Based Noise Reduction Technique in an Image",Published in 2019 on IEEE Explorer.

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