

Review of Robust Document Image Binarization Technique for Degraded Document Images

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ABSTRACT

Segmentation of badly degraded document images is done for discriminating a text from background images but it is a very challenging task. So, to make a robust document images, till now many binarization techniques are used. But in existing binarization techniques thresholding and filtering is unsolved problem. In the existing method, an Adaptive contrast map is first constructed then binarized and combined with canny edge map to identify text stroke edge pixels, the documented is further segmented by local threshold. So the existing methods are divided into four main steps out of which last two steps used two different algorithms. In the proposed method, we can modify algorithms and test degraded document images then compare the result that come from previous paper results.

Keywords

Adaptive Binarization Techniques, Document Segmentation, Image Processing, Denoising.

1. INTRODUCTION

Document pictures, as a substitute of paper documents, basically comprise of regular images, for example, manually written or machine-printed characters, images and design [1]. In numerous down to earth applications, we just need to keep the substance of the record, so it is sufficient to speak to content and graphs in parallel configuration which will be more proficient to transmit and process rather than the first dark scale picture. It is crucial to limit the record picture dependably so as to concentrate valuable data and make further preparing, for example, character recognition and feature extraction, particularly for those low quality archive pictures with shadows, non-uniform enlightenment, low differentiation, substantial sign ward commotion, smear and smudge[2]. Along these lines, thresholding a checked dim scale picture into two levels is the "rst step furthermore a discriminating part in most archive picture investigation frameworks since any blunder in this stage will spread to all later stages.

Document Image Binarization expects to section the closer view content from the document foundation and is performed in the preprocessing stage for record analysis [3]. For the following record picture preparing undertakings, for example, optical character recognition (OCR), a quick and exact archive picture binarization strategy is key. In spite of the fact that archive picture binarization has been created for a long time, the thresholding of corrupted record pictures is still an unsolved issue because of the high inter/intra- variety between the report foundation and the content stroke crosswise over diverse record pictures.



Figure 1

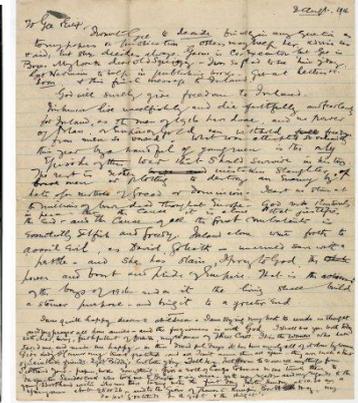


Figure 2

As represented in Fig. 1, the manually written content inside the debased records regularly demonstrates a certain measure of variety as far as the stroke width, stroke shine, stroke association, and record foundation. Likewise, recorded records are frequently corrupted by the drain through as showed in Fig. 1 and Fig. 2, where the ink of the other side leaks through to the front. Furthermore, authentic reports are regularly corrupted by diverse sorts of imaging curios. These diverse sorts of record corruptions have a tendency to prompt the report thresholding lapse and make debased archive picture binarization a major test to techniques [4]. Document picture binarization assumes a key part in report handling following its execution influences the degree of success in resulting character division and recognition. all in all, picture binarization is arranged in two fundamental classes: (i) worldwide and (ii) nearby. Binarization is a preprocessing stage for report examination and it is utilized to fragment the frontal area content from the archive foundation.

This system guarantees quicker and exact document picture handling tasks [5]. Most record investigation calculations are based in view of hidden binarized picture information. The utilization of bi-level information diminishes the computational load and aides in utilizing streamlined investigation techniques contrasted with 256 levels of dim scale or shading picture data. Document picture understanding systems oblige consistent and semantic substance conservation for thresholding. Despite the fact that record picture binarization has been considered for a long time, the thresholding of pictures is still a testing undertaking because of the high variety between the content stroke and the archive foundation. For a data picture, some handling stages ought to be utilized before the content extraction. One of the steps includes binarization.

2. RELATED WORK

Ioannis Pratikakis et al.[6] has talked about a challenge. The general focus of the challenge is to recognize current advancements in record picture binarization for both machine-printed and physically composed record pictures using appraisal execution measures that obey report picture

examination and recognition. The challenge points of interest have been depicted fusing the appraisal measures utilized furthermore the execution of the 23 submitted schedules and a short portrayal of each system.

Abdenour Sehad et al.[7] has present a skilled plan for binarization of antiquated and degraded document pictures, grounded on surface qualities. The proposed method is a versatile limit based. It has been computed by utilizing a descriptor focused on a co-event framework and the plan is confirmed equitably, on DIBCO dataset corrupted reports besides subjectively, using a set of antiquated debased records offered by a national library. The results are worthy and guaranteeing, exhibit a change to established methodologies.

Hossein Ziaei Nafchi et al.[8] has presumed that the preprocessing and post preparing stages definitively propel the execution of binarization methodologies, especially in the circumstance of cruelly degraded antiquated archives. An unconfirmed post preparing system is introduced established on the stage saved denoised picture furthermore stage congruency peculiarities extricated from the data picture. The focal piece of the procedure involves two powerful cover pictures that can be utilized to cross the false positive pixels on the generation of the binarization method. Firstly, a veil with an amazing review worth is achieved from the denoised picture with the assistance of morphological strategies. In parallel, a second cover is procured needy upon stage congruency characteristics. By then, an average channel is used to clear clamor on these two covers, which then are used to redress the yield of any binarization system.

P Lopes, N.V.et al.[9] has present a programmed histogram edge methodology taking into account a fluffiness measure. Utilizing the ideas of fluffy rationale, the issues included in discovering the base of a paradigm capacity are evaded. Similitude between dark levels is the way to discover an ideal edge. Two starting locales of dim levels are characterized at the limits of the histogram. After that utilizing a file of fluffiness, a likeness methodology is begun to discover the limit point. A huge complexity in the middle of articles and foundation is accepted. Histogram leveling is utilized as a part of pictures having little differentiation distinction.

S.J. Pai, Y.T.et al.[10] present a versatile calculation for productive archive picture binarization with low computational intricacy and elite. This is especially suitable for utilization in versatile gadgets, for example, PDA, cellular telephones which are checked by their constrained memory space and low computational capacity. This strategy partitions the report picture into a few squares by incorporating the idea of worldwide and nearby routines. After that an edge surface is built in view of the differing qualities and the force of every locale to determine the twofold picture. Trial results demonstrate the viability of the proposed technique.

Zhou et al. A[11] binarization system is displayed in light of edge data for feature content pictures. It endeavors to handle pictures with complex foundation with low differentiation. The form of the content is distinguished, after that nearby thresholding system can used to search for the inward side of the shape; along these lines, the forms of the characters are topped off to structure characters that are conspicuous to OCR programming.

Ntirogiannis et.al.[12] present a new archive picture binarization strategy, as an enhanced variant of the versatile intelligent level method (ALLT). The first ALLT makes utilization of altered windows for removing fundamental gimmicks (e.g., the character stroke width). In any case, there

are potential outcomes of characters with a few diverse stroke widths inside an area. This may prompt incorrect results. In this paper, neighborhood versatile binarization is utilized as a manual for versatile stroke width discovery. The skeleton and the form purposes of the binarization yield are consolidated to recognize the stroke width provincially. Also, a versatile neighborhood parameter is characterized that improves the characters and enhances the general execution accomplishing more exact binarization results for both manually written and printed reports with a specific concentrate on degraded authentic archives.

N.Stathis et al.[13] proposed another method for the approval of report binarization calculations. Creators assert that the proposed system is basic in its execution and can be performed on any binarization calculation since it doesn't oblige much else besides the binarization stage. As a showing of the proposed strategy, we utilize the instance of corrupted recorded records. The proposed method is assessed with 30 binarization calculations for execution correlation.

Bradley et al.[14]presents a continuous versatile utilizing the fundamental picture of the information. The system proposed is powerful to light changes in the picture suitable for preparing live feature streams at an ongoing edge rate which makes it suitable for the intuitive application.

3. PROBLEM FORMULATION

In the current framework they creator have utilized edge discovery procedure for recognizing the edges of the old records original copies, however the system were new furthermore the yields were enhanced from the current strategy yet not that much precise. In the proposed framework we will attempt to execute existing framework utilizing morphological operators and will enhance the estimations of parameters like PSNR, F-Measure and NRM.

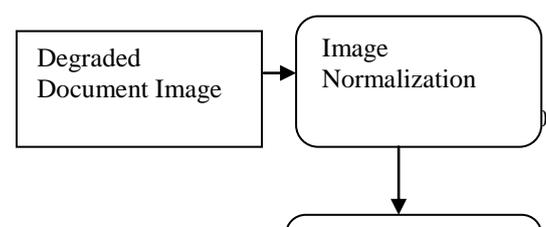
4. PROPOSED WORK

This section describes the proposed document image binarization techniques. Given a degraded document image, an adaptive contrast map is first constructed and the text stroke edges are then detected through the combination of the binarized adaptive contrast map and the canny edge map. The text is then segmented based on the local threshold that is estimated from the detected text stroke edge pixels. Some post-processing is further applied to improve the document binarization quality.

In the proposed document image binarization technique mainly four steps occurs.

1. Construction of Contrast Image
2. Detection of text stroke edge pixels
3. Estimation of Local Threshold
4. Reduction Of Noise

Merit: In output part noise level very low compared to previous method.



6. REFERENCES

- [1] Yibing, and Hong Yan. Yang, "An adaptive logical method for binarization of degraded document images.", 2000.
- [2] Bir. Bhanu, *Multistrategy Learning for Computer Vision. California univ riverside coll of engineering.*, 1997.
- [3] Basilios, Ioannis Pratikakis, and Stavros J. Perantonis. Gatos, "Adaptive degraded document image binarization.", 2006.
- [4] Bolan, Shijian Lu, and Chew Lim Tan. Su, "Robust document image binarization technique for degraded document images.", 2013.
- [5] Basilios, Ioannis Pratikakis, and Stavros J. Perantonis. Gatos, "Improved document image binarization by using a combination of multiple binarization techniques and adapted edge information.", 2008.
- [6] Ioannis, Basilios Gatos, and Konstantinos Ntirogiannis Pratikakis, "ICDAR 2013 Document Image Binarization Contest (DIBCO 2013)," in *Document Analysis and Recognition (ICDAR), 2013 12th International Conference on.IEEE, 2013.*
- [7] Abdenour, et al. Sehad, "Ancient degraded document image binarization based on texture features.," in *Image and Signal Processing and Analysis (ISPA), 2013 8th International Symposium on.IEEE, 2013.*
- [8] HosseinZiaei, Reza FarrahiMoghaddam, and Mohamed Cheriet Nafchi, "Application of Phase-Based Features and Denoising in Postprocessing and Binarization of Historical Document Images.," in *Document Analysis and Recognition (ICDAR), 2013 12th International Conference on.IEEE, 2013.*
- [9] N.V., Mogadouro do Couto, P.A., Bustince, H., Melo-Pinto, P Lopes, "Automatic histogram threshold using fuzzy measures", 2010.
- [10] Y.T., Chang, Y.F., Ruan, S.J. Pai, *Adaptive thresholding algorithm: efficient computation technique based on intelligent block detection for degraded document images.*, 2010.
- [11] Z., Li, L., Tan, C.L. Zhou, "Edge based binarization for video text images. ," in *In: Proceedings of 20th International Conference on Pattern Recognition (ICPR),* , 2010.
- [12] K., Gatos, B., Pratikakis, I. Ntirogiannis, "Ntirogiannis, K., Gatos, B., Pratikakis, I.,"A modified Adaptive logical level binarization technique for historical documents images" , 2009.
- [13] P., Kavallieratou, E., Papamarkos, N. Stathis, *An evaluation technique for binarization algorithms.*, 2008.
- [14] D., Roth, G. Bradley, *Adaptive thresholding using the integral image.*, 2007.

Figure 3: Block diagram of proposed system

5. CONCLUSION

This paper presents an adaptive image contrast based document image binarization technique that is tolerant to different types of document degradation such as uneven illumination and document smear. The proposed technique is simple and robust, only few parameters are involved. Moreover, it works for different kinds of degraded document images. The proposed technique makes use of the local image contrast that is evaluated based on the local maximum and minimum. The proposed method has been tested on the various datasets. In output part noise level very low compared to previous method in term of the F-measure, pseudo F-measure, PSNR, NRM, MPM and DRD.