A review of Degraded Document Image Binarization techniques

Ms. Abolee Patil

Abstract— Image binarization is vital step within the OCR (Optical Character Recognition). There are many techniques used for image binarization , however it is difficult to choose best technique that can be used for degraded images. The most objective of this paper is to present the survey on varied existing binarization techniques .This paper can act as guide for fresher's to begin their work on binarization.

Index Terms— Adaptive,Binarization, OCR,Threshold value, SNR

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1 INTRODUCTION

'T'HE Binarization methodology converts the gray scale image (0 up to 256 grey levels) in to black and white image (0 or 1). The result of OCR extremely depends upon the binarization. The prime quality binarized image will offer additional accuracy in character recognition as compared original image as a result of noise is gift within the original image . really drawback is that that binarization algorithm is suitable for all pictures. the choice of most optimal binarization rule is troublesome, as a result of completely different binarization rule provides completely different performance on different data sets. this is often very true within the case of historical documents pictures with variation in distinction and illumination.

The algorithms divide into 2 Parts A) global Binarization B) local Binarization. the worldwide binarization ways used single threshold value for whole image and therefore the local binarization method wherever the edge price calculated regionally for every pixel or for every region.The figure 1 shows the basic block diagram of binarization.
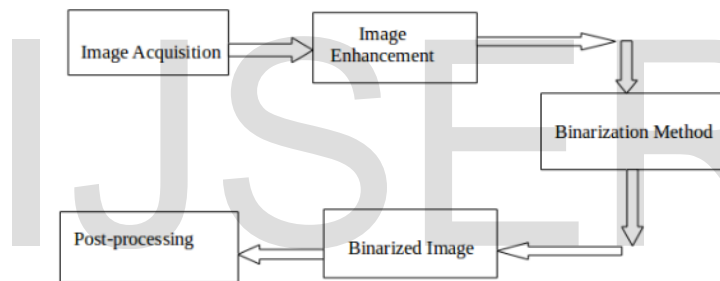

Figure 1:Basic Block Diagram of Binarization.

2 BINARIZATION METHODS

This section categorizes local and global binarization methods that are nowdays used for binarization. For global binarization :
1) Fixed Thresholding Method
2) Otsu Method
3) Kittler Method

For local binarization:
1) Niblack Method

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- Ms.Abolee Patil is currently pursuing masters degree program in computer engineering in Savitribai Phule Pune University, India, PH-8412029286. E-mail: aboleee.patil@gmail.com

2) Adaptive Method
3) Sauvola Method
4) Bernsen Method

3 LITERATURE SURVEY

Ioannis Pratikakis1 et al. (2013) [1] has mentioned a contest. the overall target of the competition is to tell apart current developments in document image binarization for each machine-printed and manually written account pictures utilizing assessment execution measures that adjust document image investigation and recognition. the competition details are represented incorporating the assessment measures used and additionally the execution of the twenty three submitted routines further as a brief depiction of each strategy.

Abdenour Sehad et al.(2013) [2] has gift a capable theme forbinarization of ancient and degraded document pictures, grounded ontexture qualities. The prompt technique is associate degree adaptive threshold-based. it's been calculated by employing a descriptor centred on a co-occurrence matrix and therefore the theme is verified objectively, on DIBCO dataset degraded documents what is more subjectively, utilizing a collection of ancient degraded documents offered by a national library. The outcomes area unit acceptable and reassuring,present associate degree improvement to classical approaches.

Hossein Ziaei Nafchi et al.(2013) [3] has complete that the pre- process and post process phases meaningfully advance the performance of binarization approaches, notably within the state of affairs of gratingly degraded ancient documents. associate degree unproven post process technique is given based on the section-preserved denoised image and additionally phase congruency options extracted from the input image.The central a part of the technique contains of 2 sturdy mask pictures which will be accustomed cross the false positive pixels on the assembly of the binarization technique. Firstly, a mask with associate degree extreme recall price is earned from the denoised image with the assistance of morphological procedures. In parallel, a second cowl is obtained dependent upon stage congruency options. At that time, a median filter is used to evacuate noise on these 2 masks, that then area unit utilised to rectify the yield of any binarization strategy.

Jon Parker et al.(2013)[4] has studied that often documents of notable noteworthiness area unit ran across in an exceedingly state of decay. Such archives area unit often examined to all or any the whereas history and announce a revealing.Changing over the {information} found within suchreports to open information happens all the earlier and inexpensively if a programmed technique to upgrade these corrupted archives is used as hostile rising all document image by hand. a unique mechanized image upgrade approach that indulges no preparation data wasintroduced. The methodology was valid to photographs of sortwritten text additionally at hand transcription or each.

Konstantinos Ntirogiannis et al.(2013) [5] has analysed that document image binarization is of unimaginable price within the document image examination and recognition pipeline because it disturbs additional phases of the popularity procedure. The assessment of a binarization technique helps in examining its algorithmic conduct, and additionally confirming its adequacy, by giving qualitative and quantitative sign of its execution. A pixel-based binarization assessment approach for recorded handwritten/machine-printed document image has been projected. within the projected assessment procedure, the review and accuracy assessment measures area unit befittingly adjusted utilizing a coefficient set up that decreases any potential assessment unfairness. additional execution measurements of the projected assessment set up comprise of the speed rates of broken and uncomprehensible content, false alerts, foundation commotion, character amplification, and mixing.

Vincent Rabeux et al.(2013)[6]has associate degree approach to expect the end result of binarization algorithms on a illustrious document image accordingto its state of affairs of degradation. Document shaving degradation that end in binarization errors.To characterize the degradation of a document image by exploitation totally different options supported the strength, quantity and position of the degradation. These characteristics enable North American nation to create calculation models of binarization algorithms that area unit terribly correct in step with R2 values and p- values. The prediction models area unit accustomed choose the simplest binarization algorithmic program for a given document image.

Djamel GACEB et al. (2013) [7] has studied a smartbinarization technique of the photographs. during this technique thought-about totally different degradations document pictures. the character of each constituent is approximate employing a stratified native thresholding so as to classify it as foreground, background or ambiguous constituent. The ambiguous pixels that represent the corrupted zones can't be binarized with a similar native thresholding. the worldwide quality of the image is calculable from the density of theses degraded pixels. If image is degraded then apply a second separation on the ambiguous pixels to separate them into background or foreground. Second method uses our improved mathematical operation

Jewess Wagdy et al. (2013) [8] has enforced a fast and skillful document image finish off and binarization technique rely upon retinex hypothesis and world thresholding. this method joins of native and world thresholding with conception of retinex theory which might expeditiously improve the degraded and poor quality document image.Then, fast world threshold is used to alter over the document image into binary type. The new methodology conquers the restrictions of the connected world threshold techniques.

Vassilis Papavassiliou et al.(2012) [9] has mentioned associate degree capable technique dependent upon mathematical morphology for extracting text regions from degraded document pictures. the elemental stages of methodology area unit a) top-hatby reconstruction to construct a filtered image with smart backgroun b) region growing starting from a collection of seed points and attaching to every seed similar intensity neighbour pixels and c) conditional extension of the primary detected text regions supported the values of the second by-product of the filtered image.

Bolan Su et al. (2012) [10] has studied a document image binarization structure that creates utilization of the Markoff Random Field model. Structure isolates the document image pixels into 3 categories i.e. document background text, document foreground text, and unsure pixels established binarization methodology. unsure pixels area unit belong to foreground and background classes by incorporating MRF model and boundary data.

Patvardhan et al. (2012) [11] has studied that pictures might contain troublesome background i.e. shading or a denoising.Binarization methodology of document pictures creates them appropriate for OCR exploitation distinct curvelet rework. Curvelet rework is employed for eliminate troublesome image background, white gaussian noise and offers improved binarized document image. The Curvelet rework additionally helps to increased in text form still within the incidence of noise. This methodology is capable to eliminate high frequency mathematician noise and low frequency complicated backgrounds and shows higher performance.

4 CONCLUSION

This paper mainly focuses on the degraded document binarization techniques. Document binarization is a key application of vision processing. Worldwide thresholding technique is higher method for calculate the threshold values of a grey scale photographs. But it doesn't provide properoutcomes for coloured picture and under depth illumination. For such forms of pictures nearby thresholding techniques can be used like as Sauvola, Niblack and so on.

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