



ISSN: 2350-0328

**International Journal of Advanced Research in Science,
Engineering and Technology**

Vol. 2, Issue 10 , October 2015

Intensification of Old Documents and Photos by Digital Image Processing Techniques

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ABSTRACT: Historical archives are a valuable source of knowledge and enlightenment but they recurrently undergo deterioration problems, such as constriction, haziness, yellowing of pages, blotting, unrecognizable text, uneven illumination etc. Quality and viewability of these documents can be revised using a method called as Binarization. In Binarization, global and local thresholding is used. Further, morphological methods i.e., erosion and dilation are used. These techniques work on the intensity of the documents and photos and divides pixels into phases according to their threshold. Firstly, global thresholding is used on the entire image. Parts of images often have lingering blurriness and poor contrast. Hence, these areas go through the thresholding process again which is called local thresholding. This technique has slow computational time and greater efficiency compared to older digital processing approaches. After intensification of these archives they can be stored in digital libraries and can be made available to everyone. One of the greatest advantage of this method is that unreadable documents and blurred images can be enhanced now to extract important usable information for scientific and archaeological intendment.

KEYWORDS: Image enhancement, Iterative global thresholding, Local thresholding, Hybrid binarization, Morphology, Background Noise.

I.INTRODUCTION

There are libraries in the world which has collections of historical & ancient documents which are of great scientific & cultural importance. To maintain the quality of the originals it is essential that the documents are transformed into digital form, by doing these scholars are provided to have full access to the information. Degradation problems are quiet common in these documents. Before libraries expose them to public view it is important to detach noise from historical document images and amend their condition and appropriate filtering methods should be developed as well. Noise is considered anything that does not fit with the of the document image. Binarization is used as an established procedure to convert a grey-scale image to binary image for analytics.

II.LITERATURE SURVEY

A lot of work has been put into the Binarization techniques to give viable results after the image has been processed. Global and Local thresholding plays a leading role when it comes to playing with the variation of pixel intensities to give the image a more profound look than how it was before This part contains a compilation of all the work done by researchers in this field. As we survey a few of the already existing systems we describe here in brief, how the researchers proceeded with their work. Kale [1] proposes a system of IGT wherein, the complexity of applying local thresholding to entire image is reduced by first refining the image in a global point of view and then applying local thresholding in the areas where noise still exists. J. RAMYA [2] proposes a new facility where in the already processed image goes through a Weiner Filter, further uses binarization with the divide and conquer strategy and finally transform using Median filter method. Jennifer [4] has proposed an extensively outforming algorithm including L0-smoothing in the first processing stage, followed by the derivation of contrast component within the local area and further using bi-level auto thresholding algorithm.[5] Fadoua DRIRA modifies the Weickert coherence enhancing diffusion filter for which new constraints are formulated to form the Perona-Malik equations.[6] Wei evaluated a method with psycho-physical and OCR methods to show its amazing performance among adaptive binarization methods in dealing with smudgy illumination and disruptions. Adin Ramirez Rivera [7] proposes a content-aware method that intensifies dark photos, sharpens edges, reveals details, and preserves the smoothness of flat regions. Ghimire and Lee [8] brought forth a technique wherein the image intensification was applied only to a single component of the image and other



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 2, Issue 10 , October 2015

components were kept constant to prevent the further deterioration of Image. Sudharsan [9] shows that a lower progressive spectrum of a camera results in the images to be extremely reliant on bright conditions. Multi Scale Retinex with Color Restoration (MSRCR) algorithm intensifies the documents and photos to the level so that it can be recognized in real time. In Zhang's work [10] Gauss filter processing method is used to enhance image specifics in the frequency domain and smooth the contours. Hybrid technique is used to enhance the documents and photos. [11] Optical Character Recognition is a method generally used for enhancement of Documents and Photos. Photos taken or documents scanned may have issues like movement smear, defocus and geometrical bends. [12] Papavassilou proposed a technique based on mathematical morphology for deriving text regions from degraded document. [13] Sehad, used an Adaptive threshold-based method for binarization of venerable and degraded document and photos, on texture qualities. In [14] process administers that images contains arduous backdrop i.e. shading or denoising. This method is proficient to eradicate high frequency Gaussian noise and low frequency convoluted background and shows better performance. [15] Wagdy uses Retinex hypothesis and global thresholding is used for photos and Documents clean-up and binarization.

III. PROPOSED SYSTEM

In this paper we will achieve our goals as follows:

enhance old photographs and documents that have been deteriorated over the years, preserve important data in digital form, transform blurred old photographs to increase clarity and contrast. Binarization is the first conversion stage of various document and image processing operations like optical character recognition (OCR) and repairing of documents and images. It converts a gray-scale document or image into a binary type image and accordingly proceeds with the tasks such as document skew estimation and document layout analysis. As images are scanned, rapid and detailed binarization is becoming essential. Though image binarization has been studied for quite some time, the thresholding of degraded document images is still an impenetrable issue. This can be postulated by the fact that the layout of the document foreground/background is problematic due to various types of document degradation such as irregular illumination, variation in contrast of image, blotting and smear. We try to develop a prosperous and profitable document image binarization technique which will be able to outturn superior results for badly degraded old photos and physical data.

But, often **binarization** results in too dark or too light documents and images.

This is because since binarization is governed simply by taking the approximate value of an objective pixel and comparing it to the average value of the bounds which contains the objective pixel, the shades is confined and a particularly subsided low frequency composition is generated to the image. Computation of average density has another drawback that , the already binarized image is not repeated and consequently the flow of intermediate shades becomes disordered at the overlapping parts between the detached images after binarization processing and thus picture condition deteriorates.

Hence, sometimes these process documents and images do not yield a viable output.

Given the drawbacks of binarization techniques, in this paper we overcome them by using morphological image processing techniques.

Morphological operations affect the form, structure or shape of an image. Applied on binary images . They are used in pre or post processing operations like filtering, thinning, and pruning or for getting a representation or description of the shape of objects in the image.

The two principal morphological operations are dilation and erosion.

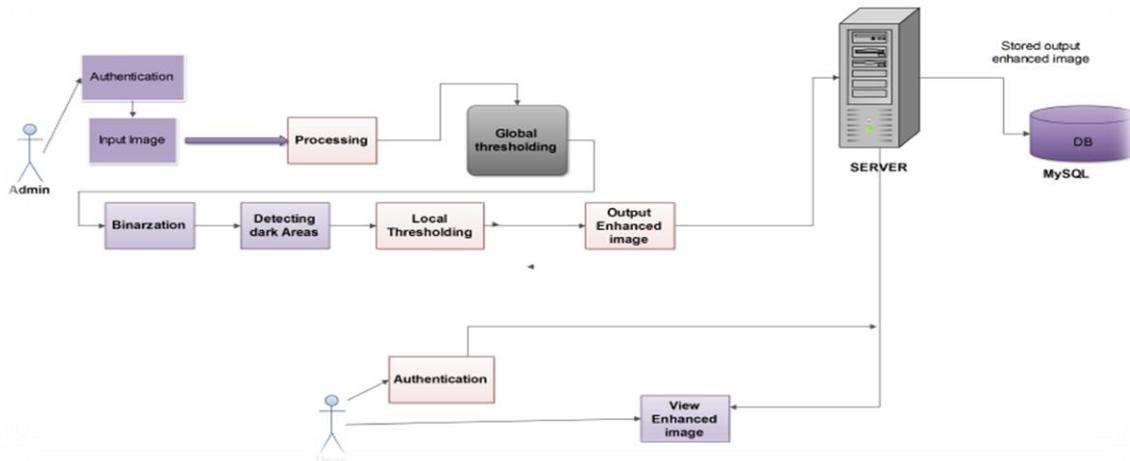
Dilation firstly, magnifies the image to reveal the broken areas of the image that are disjoint and distorted. Further, it processes these parts using convolution to refine them and bring clarity.

The dilation process is performed by reposing the structure and sliding it through the image in a convoluted way.

1. If the original element corresponds with a 'white' pixel in the image, there is no change and advancing on to the next pixel
2. If the original element corresponds with a 'black' pixel in the image, make all pixel black.

The erosion process brings back the image, in the sense that it shrinks the image back to its original form by eroding the lonely pixels contained in the image.

Therefore, it can be concluded that dilation means "expansion" and erosion means "compression".

A.SYSTEM ARCHITECTURE**IV.CONCLUSION & FUTURE SCOPE**

Finally, combining techniques of local and global Thresholding which are collectively referenced under the process of binarization and overcoming its limitations by the use of morphological techniques, old documents and photos have been ENHANCED.

A hybrid approach is proposed to combine the advantages of local and global thresholding. Additionally, if compared to original local thresholding tactics, since only a fixed number of areas (and not the entire image) requires to be processed individually, the time-cost of the system remains on low level. Therefore to evaluate the proposed way, a degree is characterized in which the legibility of the photo has been amended.

We further propose the creation of an online system wherein the processed documents and photos can be stored in digital libraries and can be retrieved when required.

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ISSN: 2350-0328

**International Journal of Advanced Research in Science,
Engineering and Technology**

Vol. 2, Issue 10 , October 2015

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