Enhancement of old images by hybrid binarization method

Mrs.Preeti.Kale, Dr.S.T.Gandhe.

Abstract— **In this paper we proposed general purpose ,hybrid thresholding methods to enhance the old images. The results after implementing on different data sets shows that,it deals effectively even with hard cases , while keeping the precision on high level. Documents already in good condition are not affected. Evaluation method can only be applied to printed documents also.**

Index Terms—**Image enhancement, IGT, Local threshold, Noise.**

I. INTRODUCTION

Old images and documents are of historical importance. In order to give the gift of culture and heritage to next generation we have to preserve them systematically. It may also happen that,these documents can be accessed through digital library by different scholars for their future study. But as the time evades documents obviously will be prone to different types of noises. Noises may be ,like presence of smear,strains,background of big variations and uneven illumination ,seepage of ink etc. Initially by using the digital camera photos of old images are taken , and then subjected to preprocessing. In this stage suitable digital filters are used to remove the maximum background noise. After preprocessing, apply the global thresholding for the entire whole document. Find out the remaining areas where still background noisel exists. Now,by applying the local thresholding to the part of entire image the noises can be removed to the maximum extent. Finally we get the enhanced image.
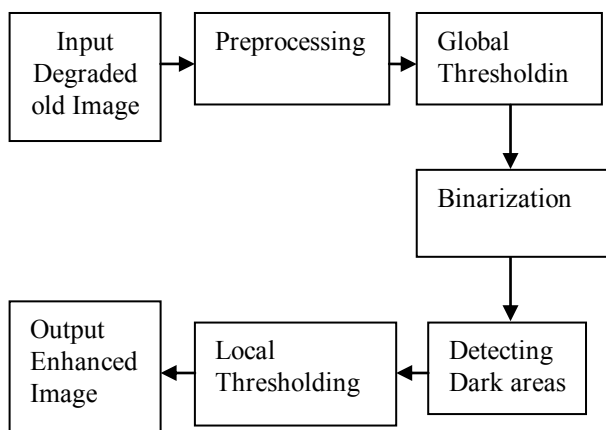
II. BLOCK DIAGRAM

Fig.2.1.Image enhancement by hybrid binarization method

III. DETAILS OF WORK

A.PRAPOSED APPROACH

In this paper we have implemented hybrid binarization method ie combination of both Iterative Global Thresholding and Local thresholding for image enhancement. Image enhancement is the process, where noises present in images are removed by using suitable algorithms ,the resultant image is more visually perceptive. The enhancement should not increase the inherent information content of the data, but it increases the dynamic range of the chosen features so that they can be detected easily.

Initially the image of the old historic documents has been captured by the digital camera. This old image is taken as input for the preprocessing. Here some digital filters are being used to remove the noises and preserves edges. We used average filter to remove the initial soft noises. Now image has been applied for global thresholding. Thresholding is the segmentation technique used in images analysis. If thresholding is applied to complete/whole image it is called global thresholding. It segments the foreground from background. This process leads to state in the image which is called binarization. Image has only two colors 0 for black and 1 for white. Hence it is called binarized Image.

Now divide the whole image into 4 sub images. Detect the noises present in these images. Then apply the local thresholding to the sub images. For these sub images we apply thresholding to remove the noises present ,that is called local thresholding. Like this by applying both global and local thresholding ,we can enhance the old images. That algorithm is called hybrid binarization technique.

B.DETECTION OF AREA WITH REMAONONG NOISE

A simple method is used for detection of areas that needs further processing. The areas that still contain background noise will include more black pixels on average in comparison with other areas, this is the main idea which is based on this fact. This is reasonable especially for document images that only include textual information.

The image is divided into segments of fixed size $n x n$. The frequency of black pixel is calculated in each segment. The segments that satisfy the following criteria are, then, selected as:

$$f(S) > m + ks$$

where $f(S)$ is the frequency of the black pixels in the segment S while m and s are the mean and the standard deviation of the black pixel frequency considering the segments of the entire page, respectively. The selected segments form areas by connecting neighboring segments in respect to their original position in the image.

IV SEQUENCE DIAGRAM

IV.SIMULATION RESULTS

Fig 4.1.a   Fig 4.1.b

Above Fig 4.1.a and Fig4.1.b shows the old image and enhanced image respectively

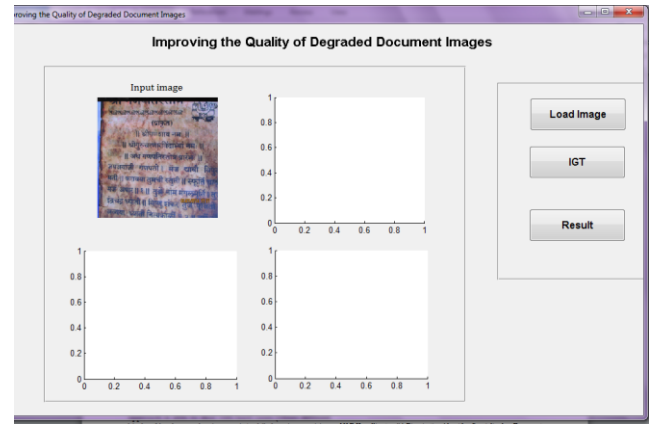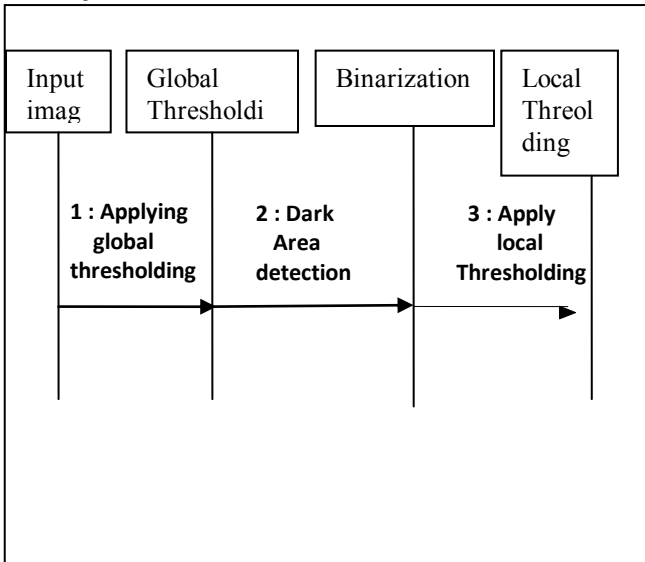Fig.4.2.First window where image has to be loaded by using controls present 1.Load Image 2.IGT 3.Result

Fig 4.2.Loading of the old images from the given data set

Fig 4.3. Applying average filter for pre-processing and global threshoding for the image.

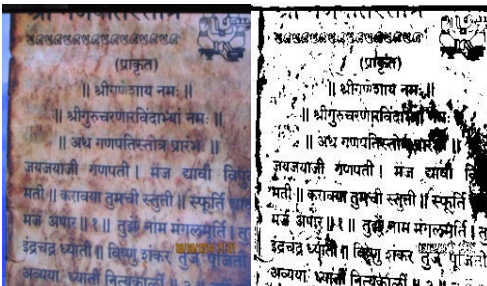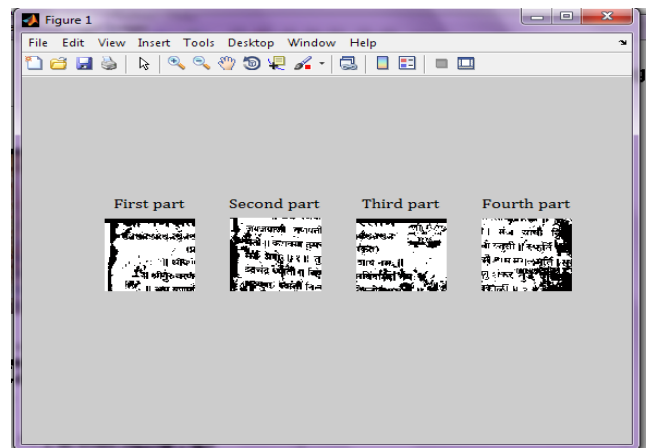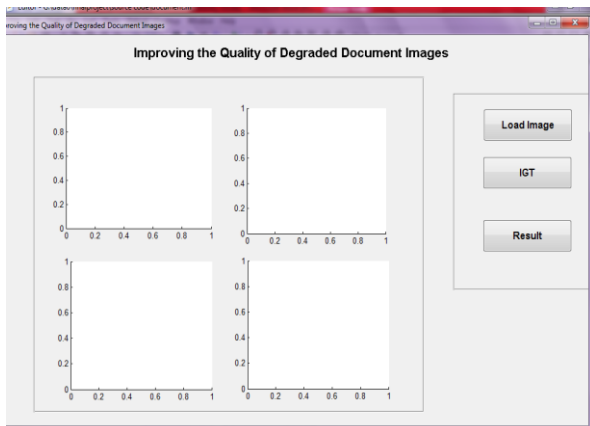Fig.4.4. Applying local thresholding for the sub images

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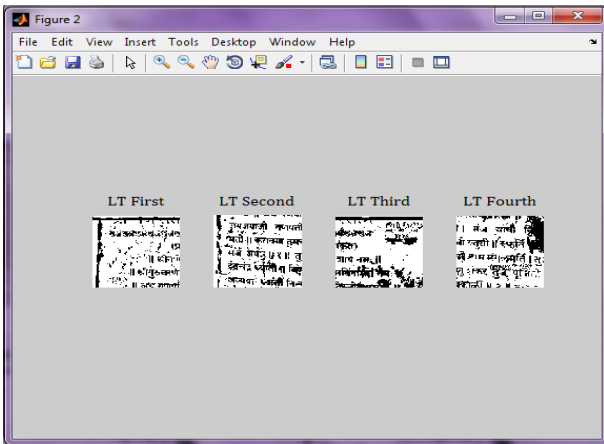*Volume 3 Issue 9, September 2014*

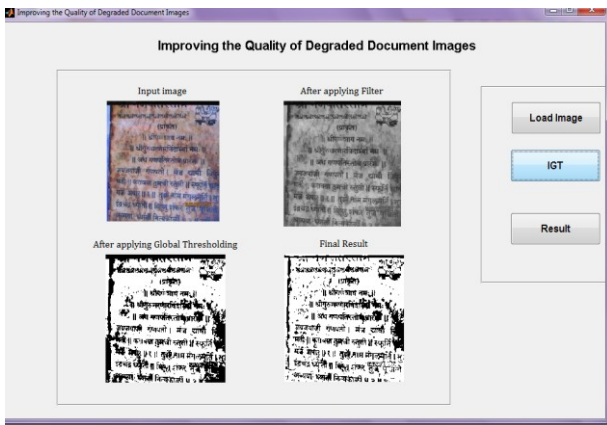Fig.4.Applying local thresholding for the sub images

Fig.5 Final enhanced image

III. CONCLUSION

In this paper an   attempt of combining the advantages of local and global thresholding was made.Hybrid binarization approach is presented aiming at removal of background noise from the ancient and historical documents.This algorithm has low computational and time cost. The evaluation results using a historical document collection indicates that the proposed approach is able to deal with hard cases (where different kinds of background noise coexist) while keeping precision on high level (i.e., the document images already in good condition are not affected). This process can be used in the framework of libraries who are willing to provide public access to their collection of historical documents as well as a preprocessing step in document image analysis systems.

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