

IMPROVING PERFORMANCES OF COLOUR TO GRAY CONVERSION IN DOCUMENT IMAGE BINARIZATION

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ABSTRACT

A segment based binarization demonstration for prehistoric manuscript images is proposed, as well as a situation dealing out means that can advance any binarization scheme and an opinion genuineness production tool. Three quality map consequent beginning the segment in rank of an participation document illustration amount to the foundation of this binarization representation. These skin texture are the greatest minute of chapter congruency covariance, a in the vicinity subjective connote segment angle, in addition to a segment conserved denoised illustration. The projected model consists of three standard steps: 1) preprocessing; 2) main binarization; and 3) post processing. In the preprocessing and main binarization steps, the facial manifestation worn are for the mainly measurement phase consequent, whereas in the post processing step, focused adaptive Gaussian and medium filters are well thought-out. One of the outputs of the binarization step, which shows towering call to mind concert, is second-hand in a wished-for post dealing out scheme to advance the concert of other binarization methodologies. Finally, we increase an opinion truth production tool, called PhaseGT, to make straightforward in addition to rapidity up the position truth production progression for prehistoric paper metaphors.

1. INTRODUCTION

Image processing is a method to convert an image into digital form and perform some operation on it, in order to get an enhanced image or to extract some useful information from it. It is a type of single dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image.

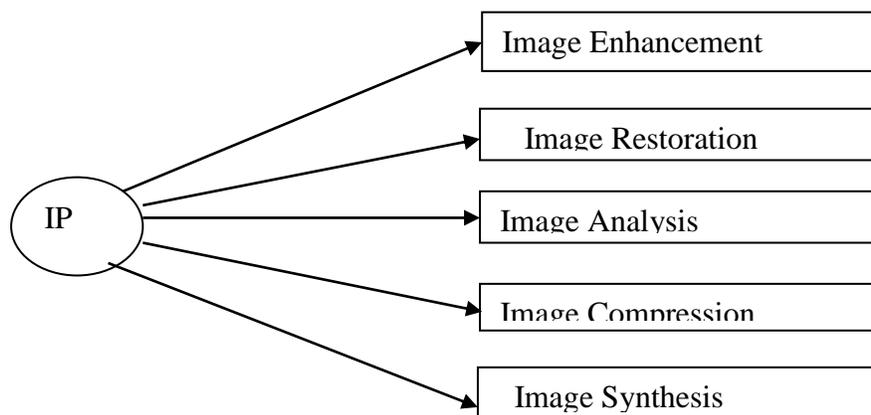


Fig.1 Image Processing Techniques

It is among rapidly growing technologies today, with its applications in various aspects of business. Image processing forms core research area within engineering and computer science disciplines. Image processing basically includes the three steps, importing the image with optical scanner or by digital photography. Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs. Output is the last stage in which result can be altered image or report that is based on image analysis.

2. EXISTING SYSTEM

In the existing system, to convert the color image to the binarized image thresholding techniques have been used. Thresholding is one of the most widely preferred binarization techniques. Many thresholding are used by various algorithms and global thresholding is the effective one which assigns single threshold value to all the pixels in the gray image. But the problem with this approach is effectiveness of the binarized image which means if the intensity variation between the foreground and background is high, this may not produce good results. The extra noise present in the image is not clearly removed in the existing system alternatives. In the color to gray conversion method, Filter optimization technique is performed to improve the clarity of foreground and background and OCR (Optimal Character Recognition) is applied to recognize the text.

2.1 Disadvantages

It is difficult to automatically assign the threshold value for finding the contrast between the text and the background and it is less efficient. if the additive white Gaussian noise is present ,there is no such algorithm to effectively remove the noise and intensity variation between the foreground and background is high.

3. PROPOSED SYSTEM

In the proposed system combination of algorithm is used. In this method color to gray conversion, denoising is done during preprocessing. The image is then segmented using Otsu method. The amount of noise is calculated and it is removed by using weighted encoding algorithm. Then phase presence analysis is used to find the resolution of each block. Based on the phase of the each pixel mean value is calculated. Using mean shift algorithm the average mean value is shifted to each block.

3.1 PRE-PROCESSING

In the pre-processing period the input color picture is modified to gray scale picture employing `rgb2gray` purpose in MATLAB. The elimination of loud spans, flattening of background sense, difference enhancement is completed in this stage. The Wiener filter is utilized to remove the sound such as blur in the image. The gray scale basis picture is modified to filtered gray scale picture afterward requesting the Wiener filter.

ALGORITHM:

Step 1: Start.

Step 2: Read an image using “imread”, select the path of an image from a folder
imread (“path”).

Step 3: Resize the image and convert the color image to gray scale image using
rgb2gray() function.

Step 4: Denoise the image using weiner filter.

Step 5: Now view the enhanced image using “imshow”.

Step 6: End.

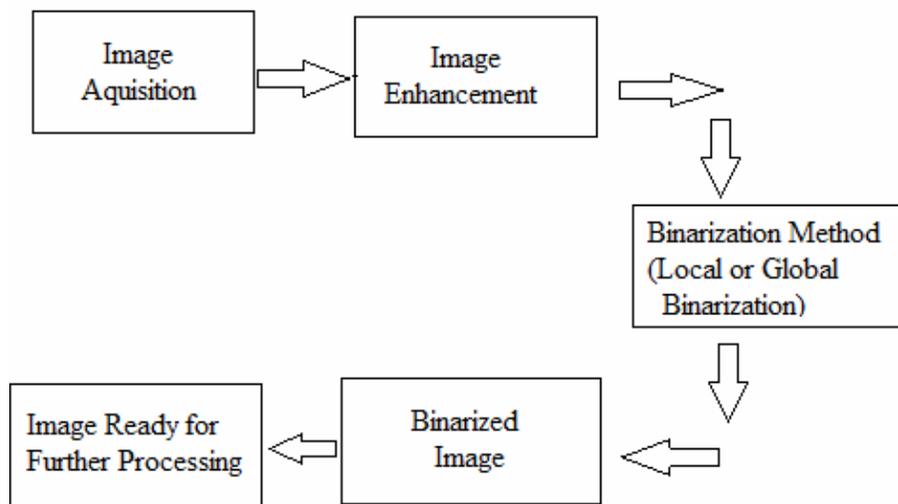


Fig: 2 Steps of Binarization

PCA can be employed to compute an ellipsoid in color space that is a least-square best fit for the cloud of points formed by all the image color values. The effectiveness of PCA depended upon the color space; we found that the larger the ratio between the primary and secondary axes, the more likely the technique created distinctive gray values for different colors.

Mean Shift Algorithm

Mean shift is a non-parametric feature space scrutiny method for discovering the maxima of a density function. It is a procedure for discovering the maxima of the density function. It is functional for noticing the modes of the density and it is an iterative method. The kernel purpose $K(x_i - x)$ determines the heaviness of adjacent points for re-estimation of the mean.

$$K(x_i - x) = e^{-c||x_i - x||^2}$$

$$m(x) = \frac{\sum_{x_i \in N(x)} K(x_i - x) x_i}{\sum_{x_i \in N(x)} K(x_i - x)}$$

$$\sum_{x_i \in N(x)} K(x_i - x)$$

The weighted mean of the density purpose in the window ambitious by K . $N(x)$ is the area of x , a set of points for that $K(x) = 0$. The difference $m(x) - x$ is the mean shift. The mean shift algorithm sets x , $m(x)$ and recap the estimation till $m(x)$ converges.

ALGORITHM:

Step 1: Read the input image

Step 2: Compute the histogram and probabilities of each intensity level.

Step 3: Set up the initial probability ω_i and mean μ_i

Step 4: Step through all possible thresholds $t=1 \dots$ maximum intensity.

Step 5: Update ω_i and μ_i .

Step 6: Compute the variance σ .

Step 7: Desired threshold corresponds to the maximum variance.

Step 8: Choose the radius of the search window.

Step 9: Initialize the location of the window $x_j, j = 1,$

Step 10: Compute the Mean Shift vector $mh, G(x_j),$

Step 11: Translate the search window by computing $x_{j+1} = x_j + mh, G(x_j),$

$$j = j + 1$$

Step 12: Step 3 and step 4 are repeated until reaching the stationary point.

Step 13: Initialize Nonlocal coding Vector to zero and generate dictionary

Step 14: LOOP : Iterate on $k=1,2,3 \dots K;$

Step 15: First compute vector.

Step 16: Update the nonlocal coding vector ;

Step 17: Evaluate the residual.

Step 18: Compute the weights.

4. ARCHITECTURE DIAGRAM

The architecture diagram shows that the input image is converted into binarized image by processing the image in multiple stages. The first stage is the preprocessing stage where color to gray, denoising and image resizing is done. Color to gray is converted using `rgb2gray()` function in the matlab. Image resizing is done to ensure efficient binarization. Denoising is to remove the noise which is present in the input image so that it won't be projected to next stages. The next stage is the binarization where the image is binarized using Otsu method. The amount of noise is calculated and it is removed by using weighted encoding algorithm. Then principle component analysis is used to find the resolution of each block. Based on the phase of the each pixel mean value is calculated. Using mean shift algorithm the average mean value is shifted to each block to smoothen the resolution.

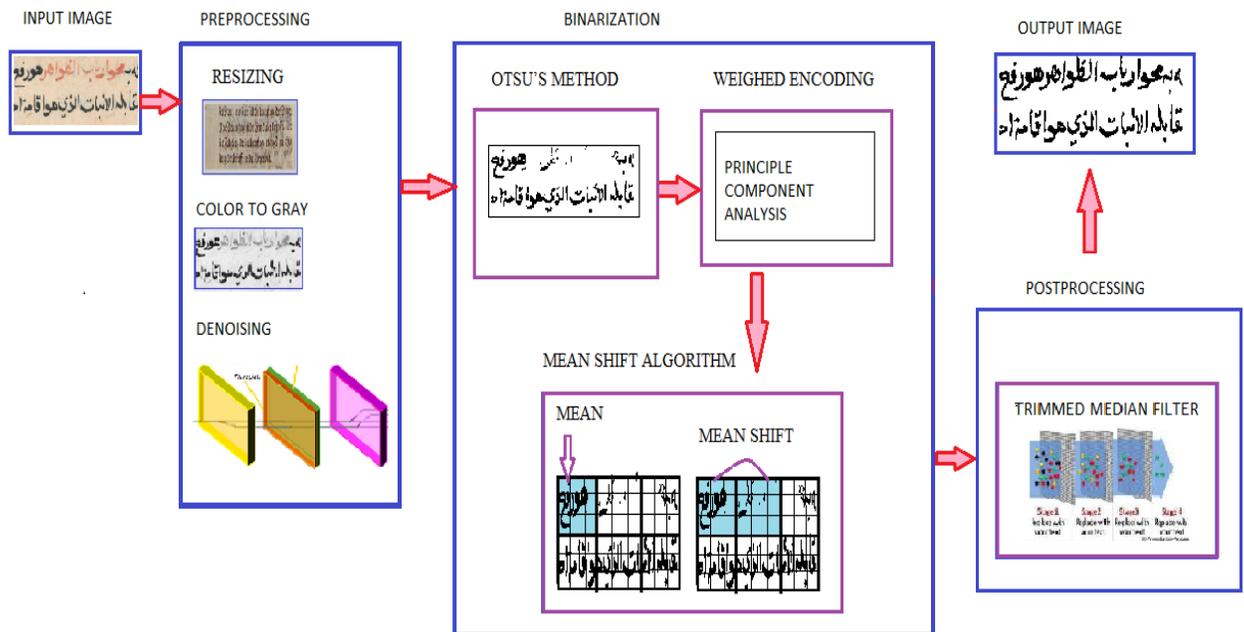


Fig. 3 Architecture diagram

5. MODULE: POST PROCESSING

In Table 1.3 gives the test case design in which it consists of test case number, Input, Expected output and the Actual output. Also describes the status of the project, whether it is pass or fail. This determines whether the mixed noise is removed

Table 7.3 Test case design for Post processing

TEST CASE NO	INPUT	EXPECTED OUTPUT	ACTUAL OUPUT	PASS/FAIL CRITERIA
1	User presses the output button	Output image appears	Output image is appeared	Pass
2	User presses the output button	Output image appears	Output image is not appeared	Fail
3	Degraded Image	Mixed noise removed image	Mixed noise is removed	Pass
4	Degraded Image	Mixed noise removed image	Mixed noise is not removed	Fail

RESULTS AND DISCUSSION

IMAGE SELECTION PANE

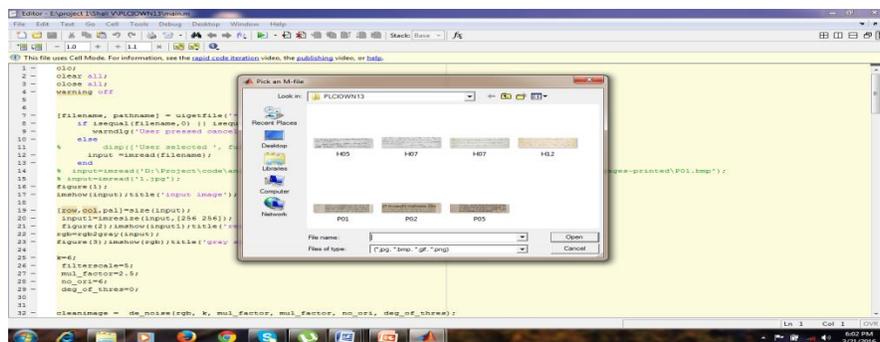


Fig. 4 Image selection pane

In the image selection pane, set of images appear. The user has to select an image as the input image of size greater than or equal to size of 256X256 and the format can be jpg, bmp, gif, png.

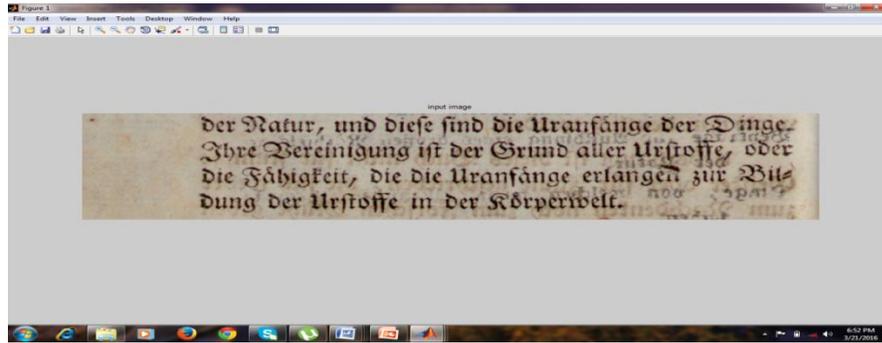


Fig.5 Degraded color image

After the image is selected by the user the original image is displayed first with no variation in the pixel value or image size. The original input image is displayed to the user.

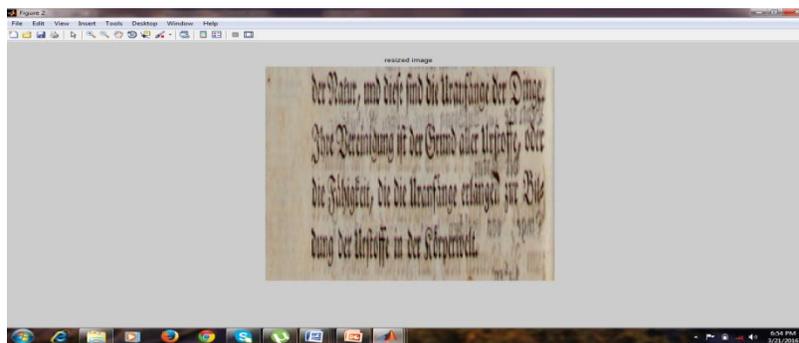


Fig. 6 Resized image

After the original image is displayed to the user, the image is resized for efficient binarization.

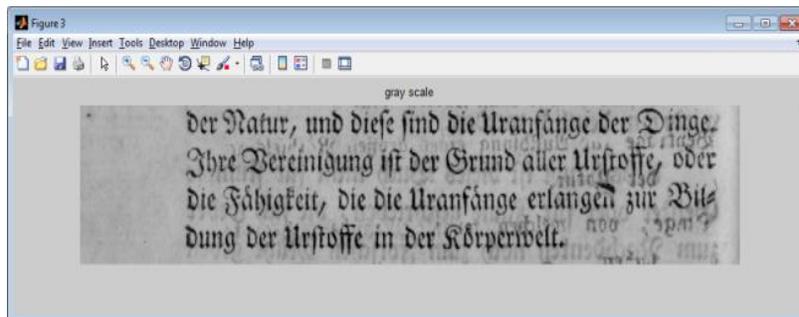


Fig. 7 Gray scale image

After the resized image is displayed to the user, the program converts the resized image is converted to gray scale image. The gray image is shown to the user afterwards.

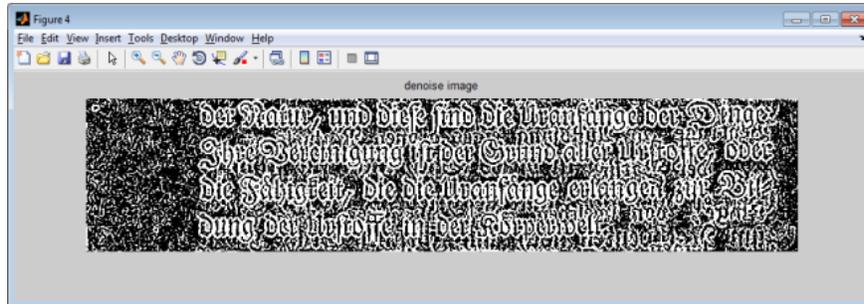


Fig. 8 Denoised image

The gray scale image is then filtered to remove the unwanted noise present in the gray image. So the denoised image is obtained and shown to the user.

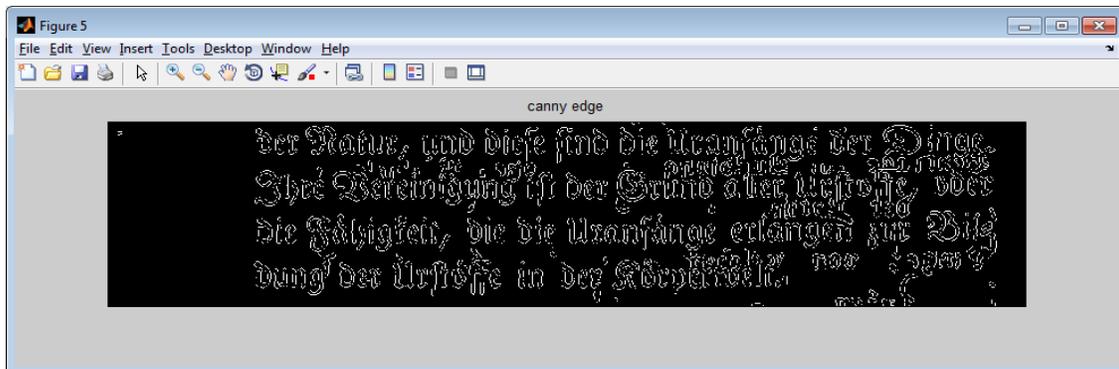


Fig. 9 Canny edge detection

After the denoised image is displayed to the user, the edges present in the image is detected using canny edge detection.

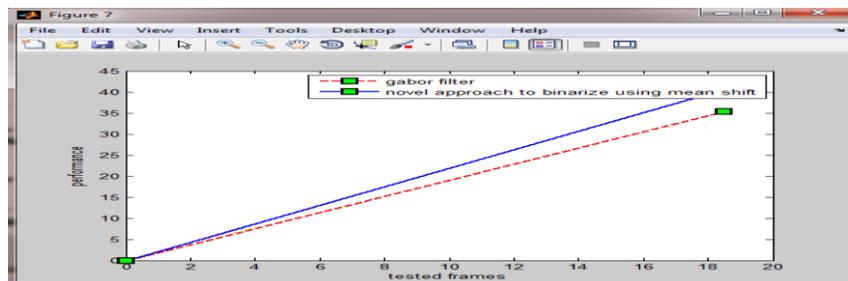


Fig. 10 Comparison graph

The binarized image is shown to the user and the results are then compared between the existing and proposed method .so the comparison graph is displayed.

CONCLUSION AND FUTURE ENHANCEMENT

The novel approach shows promising results compared to the state-of-the art, specifically in cases where the document is subjected to different kinds of degradation and noise. The proposed models are stable, robust and it reduces the error rate. In the future work, a multi scale binarization framework is introduced which can be used along with any adaptive threshold-based binarization method.

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