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IMAGE ENHANCEMENT BY WAVELET DECOMPOSITION WITH HISTOGRAM SHAPING AND SHIFTING

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ABSTRACT

In this paper a method of image Enhancement is proposed. This combines two very popular technology of enhancement, Wavelet decomposition with histogram shaping & shifting. We use this method for enhancement of commercial images as well as natural images. In this algorithm, a image (gray scale and colour image) is first decomposed in its wavelet coefficients. Then these coefficients filtered by global thresholding. This threshold is calculated by histogram shaping & shifting method with the variable value of coefficient K. Inverse wavelet transform of filtered and modified coefficients of image give the reconstruction of original image. With this algorithm, a new and efficient algorithm for reshaping of histogram that is capable in enhancing local details as well as properly preserving the image brightness is presented. In this paper, we show that a modified version of the measurement of enhancement by entropy (EME) can be used as an image imilarity measure, and thus an image quality measure. Until now, EME has generally been used to measure the level of enhancement obtained using a given enhancement algorithm and enhancement parameter. In terms of EME values, this combination will produces better results.

Keywords: ***Contrast Entropy, Contrast Measure, Discrete wavelet transform, Equalizer, Image Enhancement, Transform Histogram.***

I. INRODUCTION

Contrast Enhancement is a common operation in image processing which enhances human perception of details in the scene and improved the rapid recognition of targets. It makes various contents of images distinguishable through suitable increase in contrast. Histogram Equalization effectively spreads out the most frequent intensity Values, which results in a better distribution on the histogram. Contrast shaping technique are the most popular methods used in the electronics industry. Histogram modeling techniques provide sophisticated methods for modifying the dynamic range and contrast of an image by altering each individual pixel such that its intensity histogram assumes a desired shape. The goal of research in objective image quality assessment is to develop quantitative measures that can automatically predict perceived image quality. An objective image quality metric can

play a variety of roles in image processing applications and calculate the rate of information of enhancement image quickly.

II. PARAMETER MEASURED

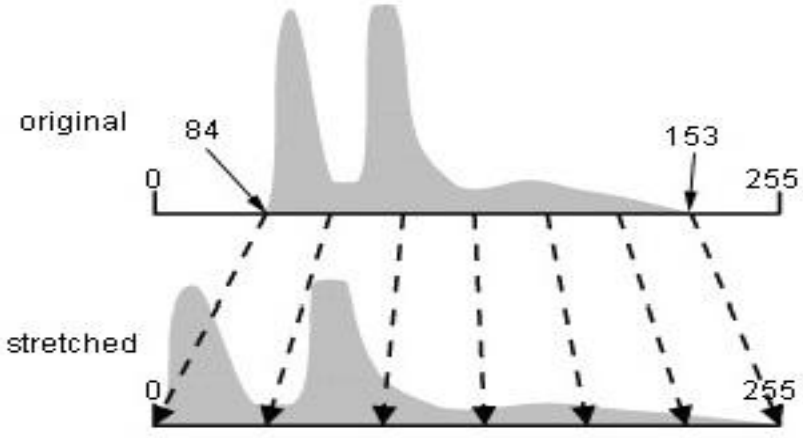
In order to test the proposed method, Simulation using MATLAB 7.7.0 (R2008b) are performed on input images. To evaluate the image enhancement performance, EME used as the criterion.

EME:-Measure of Enhancement Higher value of EME denotes a higher contrast and information clarity in the Image.

III. Proposed Work

3.1. Histogram Shaping

A histogram is a graphical representation of the brightness values that comprise an image. The brightness values (i.e. 0- 255) are displayed along the x-axis of the graph. The frequency of occurrence of each of these values in the image is shown on the y-axis. The exact histogram specification is based on ordering among image pixels by calculation of local mean values for contrast enhancement.



3.2 Block Diagram

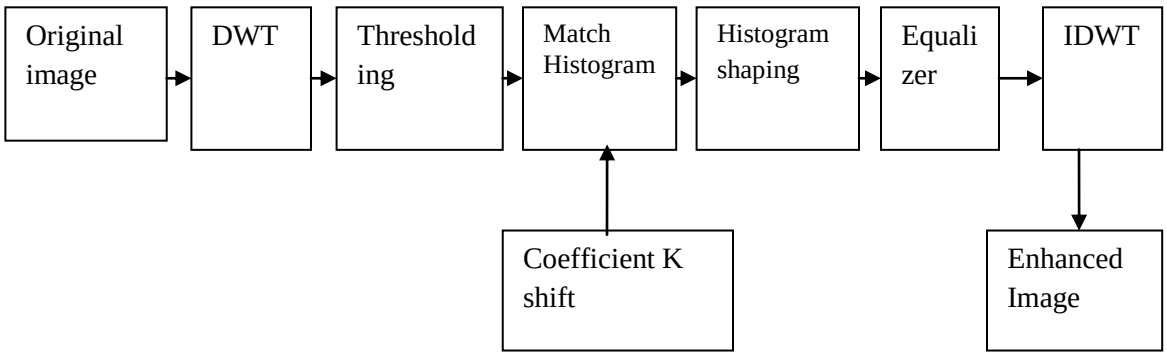


Fig 1. Proposed Block Diagram

3.3 Proposed Method

The following steps are used in this algorithm:

Step 1: Upload an original image in Matlab.

Step 2: Plot histogram of the original image.

Step 3: Calculate minimum and maximum value of the frequency component in the histogram

Step 4: Wavelet decomposition of load image.

Step 5: Plot LL, LH, HL, HH Histograms.

Step 6: plot LL orig+ shifted, LH orig+ shifted,HL orig+ shifted, HH orig+ shifted Histograms

Step 7: Take Enhanced image, if it is not met go to step 3.

Step 8: Calculate the EME of the original image.

Step 9: Calculate EME of the enhanced image.

One of the standard methods for image enhancement is histogram equalization. Histogram equalization is similar to the stretching operation. However, instead of utilizing the entire dynamic range, the goal of histogram equalization is to obtain a flat histogram. This is motivated by information theory, where it is known that a uniform probability density function (pdf) contains the largest amount of information.

IV. SIMULATION & RESULT DISCUSSION

We have tested proposed method on various types of images.

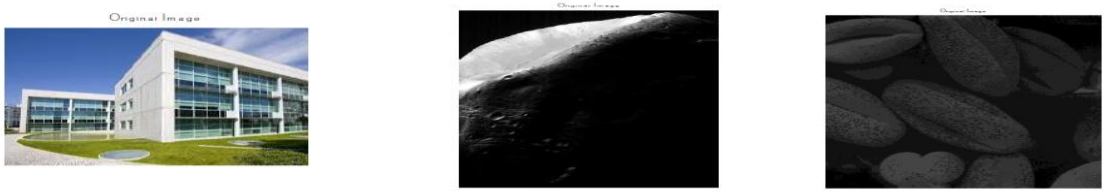


Figure 2 . Original Images- a) Building b) Rock c) Seed

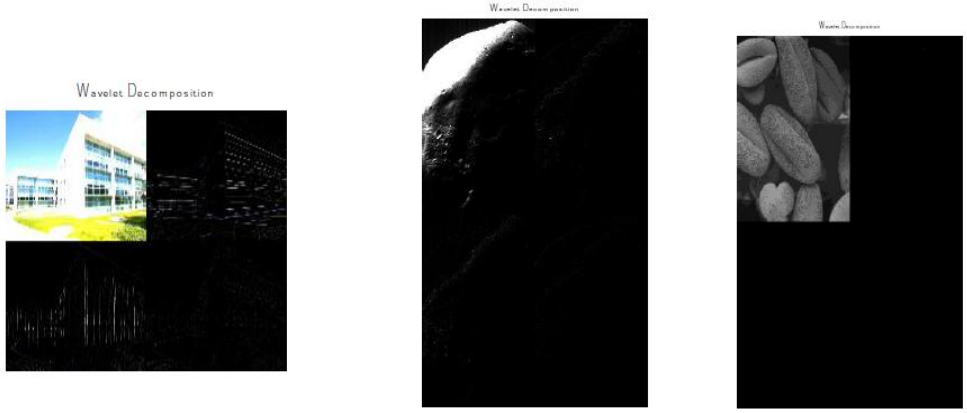


Figure 3 Wavelet Decompostion of a,b,c Images Respectively

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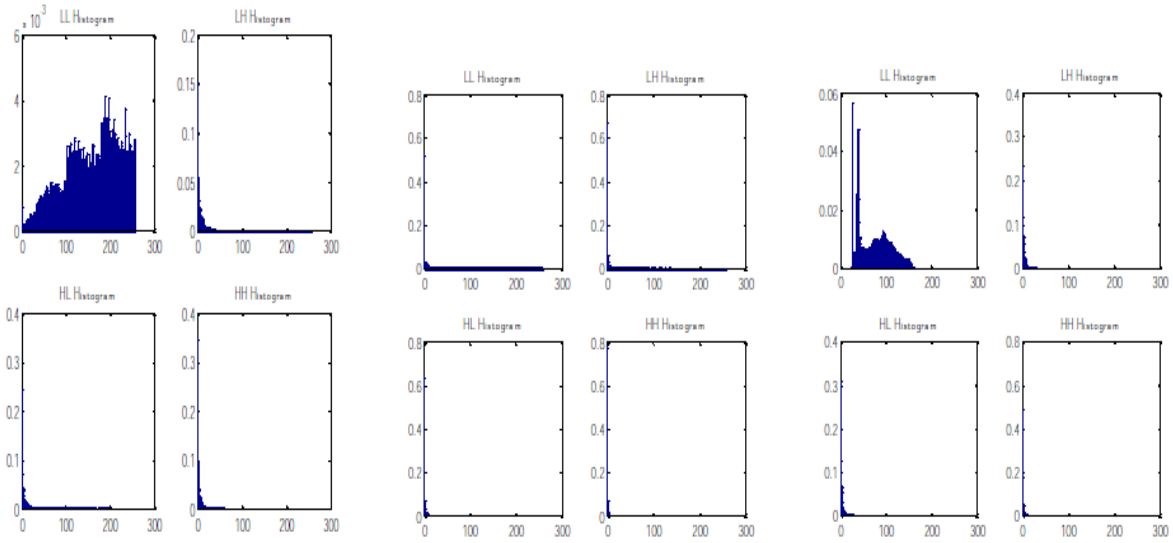

Figure 4. LL,LH,HL,HH Histograms of Images a,b,c Respectively

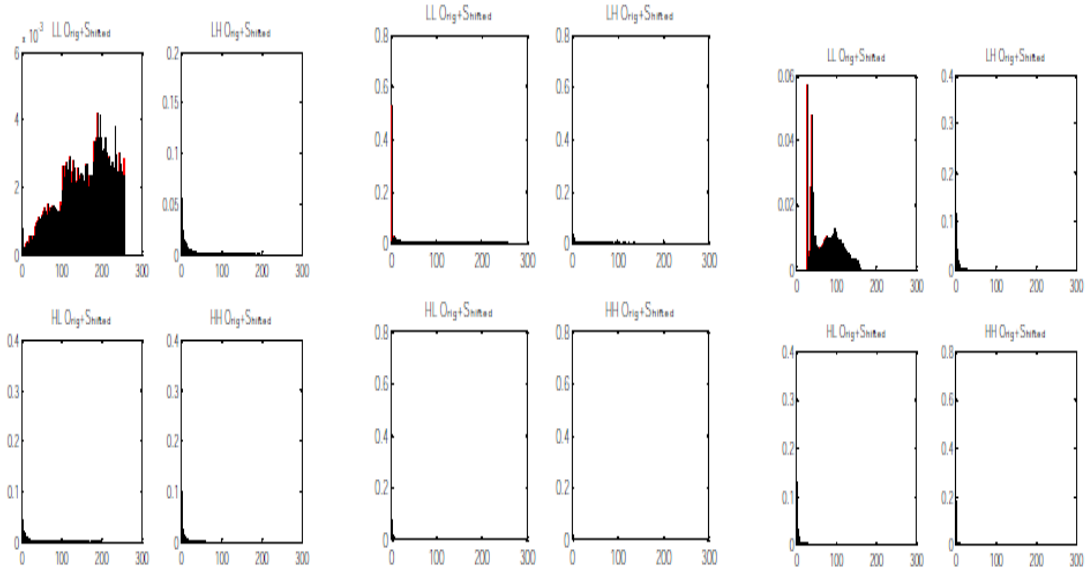

Figure 5 LL,LH,HL,HH's Orig + Shifted Histograms of Images a,b,c Respectively

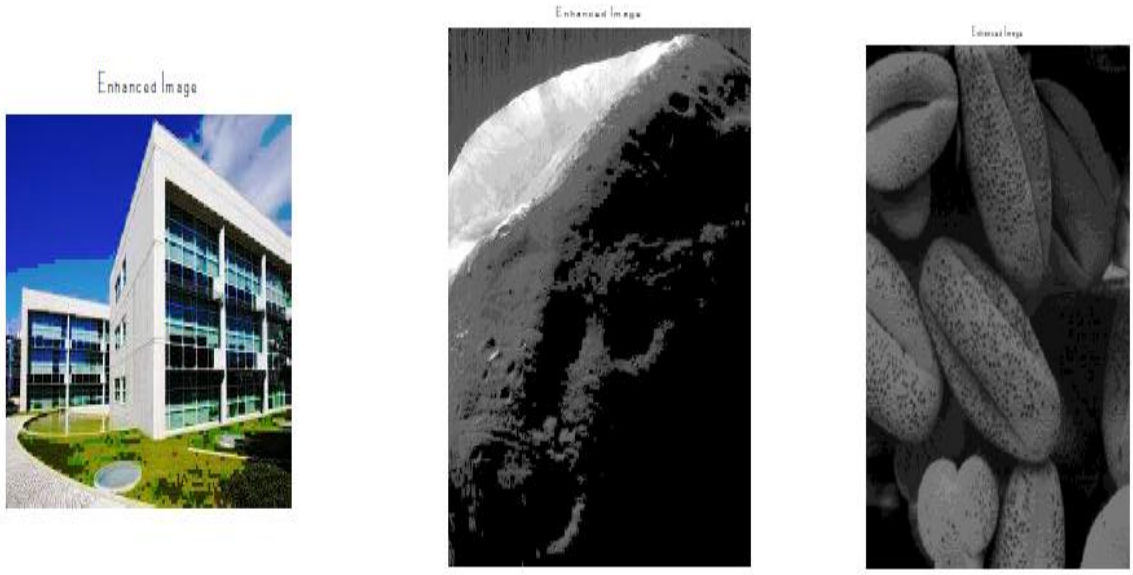

Figure 5.1.4. Enhanced Version of Loaded Original Images

Images	***Building***	***Rock***	***Seed***
EME	7.5837	4.1406	6.6926

V. CONCLUSION

It is concluded from the paper that Wavelet decomposition by histogram shaping & shifting method has better contrast enhancement. The final result shows the good visual quality without any inconvenient wash-out effect. It also increases the value of measurement of enhancement entropy (E M E). This work shows the comparison for different images over EME parameters. The dynamic range of the image is much improved after proposed method and the details hidden in the original image are enhanced. Transform histogram shaping is the best method presented in this paper.

REFERENCES

[1] Debashis Sen, Sankar K. Pal, "Automatic exact histogram specification for contrast enhancement and visual system based Quantitative Evaluation." IEEE Transactions on image processing, Vo l. 20, No. 5, May 2011.

[2] Bin Liu, Weiq i Jin, Yan Chen, Chongliang Liu, and Li Li, "Contrast enhancement using No n-overlapped Sub-blocks and Local Histogram Projection." IEEE Transactions on Consumer Electronics, Vo l. 57, No. 2, May 2011.

[3] S. S. Agaian, B. Silver, K. A. Panetta, "Transform coefficient Histogram-based image enhancement algorithms using contrast entropy," IEEE Trans. Image Process, vol 16, no. 3, pp. 741-758, Mar 2007.

[4] Agaian, SOS S., Blair Silver, Karen A Panetta,"Transform Coefficient Histogram- Based Image Enhancement Algorithms Using Contrast Entropy", IEEE Transaction on Image Processing, Vol. 16, No. 3,March.2007

[5] B. Silver, S. S. Agaian, and K. A. Panetta, "Logarithmic transform coefficient Histogram, Matching with spatial equalization," presented at the SPIE Defense and Security Symp., Mar.,2005.

[6] J. Duan, G. Qiu, "Novel Histogram Processing for Colour Image Enhancement," Third Int'l.,Conf on Image and Graphics 2004, pp. 55- 58, Dec 2004.