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NUMERIC IMAGE ENHANCEMENT TECHNIQUES

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ABSTRACT- In this Paper we will show a comparison between different Numeric enhancement techniques. As we know discrete Numeric image enhancement algorithms not only enhance image but also enhance noise signal with the image.
Hence Method of lifting can best deal with multi-resolution analysis which consumes a lot of time and memory which makes its real-time application quite difficult.
So, the lifting and discrete image enhancement algorithms are compared here and the result of the experiment indicates, the quality of image has been improved and peak to signal ratio is high in case of lifting wavelet transform. The calculated time to run the program is low. So it is better than discrete wavelet Numeric image enhancement.

Keywords - Numeric Image Enhancement; Lifting Wavelet

I. INTRODUCTION

Image resolution enhancement is the process of Manipulating or improving an image so that resultant image is Good quality image. Image enhancement can be done In many areas like medical, traffic signals etc. The conventional method using Wavelets along with interpolation, gives an image that is better in visual quality. For much better image a new Method, which uses lifting wavelet will be compared with the existing method. Also these techniques will be mainly focusing on numeric images i.e images containing numbers like number templates.
For instance the cameras placed on highways to capture the bikes/cars crossing that area. These cameras generally capture images containing motion blur and degraded quality of images so we need some methods to resolve such problems. Though there are certain methods available but they are not much efficient. Hence by comparing the two methods we can find which method is efficient than other in terms of quality. The following study will help us in determining which of the two algorithms/Techniques can result in a better resolution in a smarter way.

1.1 Image Enhancement Using Lifting Wavelet Transform

The basic idea of image enhancement using lifting wavelet transform is given below:
• Decompose the given numeric image into four sub-images with lifting wavelet transform.
• Base on the gain coefficient of each sub-image obtains the new wavelet coefficient.
• According to the new amplified gain coefficient, reconstruct the new image.
The algorithmic framework is as follow (figure 1):

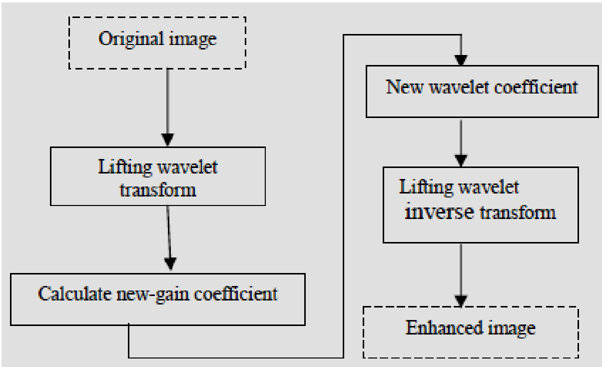


Figure 1 Image enhancement based on lifting wavelet transform

Above figure shows that how the original image is processed by Lifting Wavelet Transform which results in the enhanced image with better wavelet coefficient.

1.2 Lifting Wavelet Transform Process

The lifting algorithm works in three steps which are Split, predict and update. They are described in following diagram:

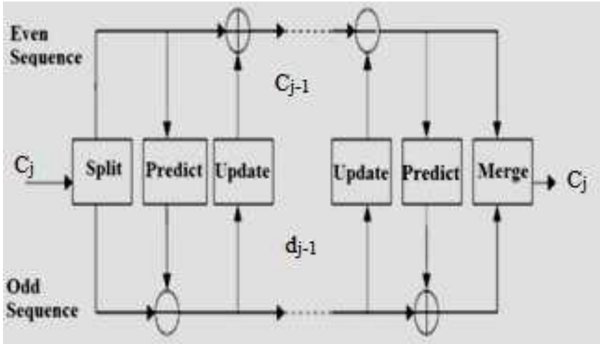


Figure II lifting algorithm diagram

The diagram above shows the actual working of the process wherein the original image is split(c_{j+1}) [4,1] into two non-intersecting subsets. The pixel is sequenced as even and odd.

Then using similar pixel next most appropriate pixel i.e d_{j+1} is calculated using the pixel obtained by split. This is done with the help of a predict operator P and this does not depend on any pixel values. The difference between split and predicted pixel is the wavelet coefficient representing the closeness of both the obtained pixel sets. If the prediction turns out to be good then the obtained data set contains lesser values as compared to the original set. The prediction as with following function: $d_{j+1} = c_j(2n+1)-P(c_{j+1})=d_{j+1}-P(c_{j+1})$ [4,1]

The data set obtained will not match the original set i.e will be inconsistent; therefore, we need to update it. We do this by using an update operator U to generate a better subset by using following function: $c_{j+1}=c_j(2n) + U(d_{j-1})=c_{j+1}+U(d_{j+1})$ [4,1]

So after n times of decomposition we can obtain the better quality image.

1.3 Result

The images enhanced using lifting wavelet techniques have a very wide grey scale scope and each level of gradation has pixel, the details are much clearer and contrast is also big. Also the peak signal to noise ratio is much high in lifting wavelet technique as compared to any other primitive methods. Therefore we can say that lifting wavelet technique is better for enhancing numeric images.

II. DECOMPOSABLE PIXEL COMPONENT ANALYSIS ALGORITHM

In this study we dealt with the blur caused by motion in which the cameras follow out of plane translatory motion. Solving the deblurring problem of motion blur has significant importance for the preservation of essential details which are normally blurred or fade out due to the blur caused by motion. The study formulates an effective deblurring algorithm (**Decomposable Pixel Component Analysis Algorithm**) [2,3] for feature restoration and eliminating the effects of motion blur using decomposable pixel component analysis. The algorithm is verified and testified with the several natural deblurred images which weren't as efficient as those of previous ones.

2.1 Model

In our framework, points on various imagery planes are modeled based on homogeneity of its repetition of pixels. Their projection on the blurred image is constrained, availing following optimization. Let us suppose that for a given image represented as I of m n (row-column order) for the neighboring pixel position P, where is a blurred image of n pixels; such that the mathematical equivalent of the function of optimal deblurred images. Steps:

Step.1: Initialize Partition Matrix

Step.2: For $a_i=(a_{i1},a_{i2},a_{i3},\ldots,a_{ip})$ evaluate cluster sets $b_j=(b_{j1},b_{j2}\ldots b_{jq})$ for given MSI image based on homogeneity of the pixel intensity is derivable.

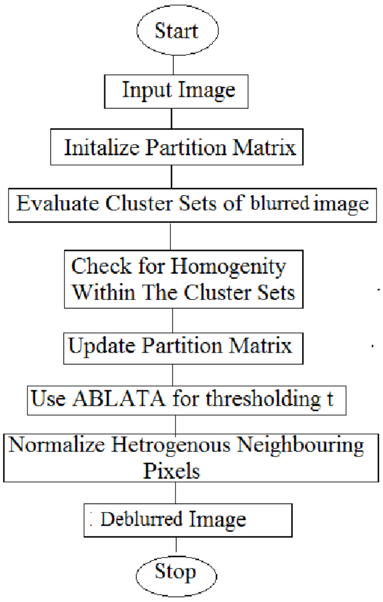
Step.3: Check for Homogeneity of repeated pixels within pixel cluster sets, based on that formulates the new matrix for the partition at runtime.

Step.4: Normalize the heterogeneous neighboring pixels.

Step.5: Repeat step 2 to 3 until whole image is traversed.

Step.6: End Process

2.2 Flowchart



The Flowchart shows how the algorithm works on the given image as input. The image goes through all the steps mentioned in the flowchart and finally an enhanced image is obtained.

Here ABLATA is Attribute Based Level Adaptive Thresholding Algorithm for Object Extraction. [2,7]

2.3 Result

This method just removes the motion blur and does increase or enhances the image quality hence the PSNR is low as compared to lifting wavelet transform method so from here also we can say that lifting wavelet has an edge over this method for image enhancement.

Though this method includes pixels for motion blur but is less effective for improving the image quality

III. CONCLUSION

This work is done for the image enhancement based on lifting wavelet transform, the comparison based on the lifting wavelet image enhancement effect and the tradition wavelet image enhancement effect. Through the experiment, we found that using the lifting wavelet to enhance the image has a wide grey scale scope and detail is clear. Therefore, the lifting wavelet algorithm is superior to tradition wavelet algorithm. Hence this technique is better than the traditional and many other discrete algorithms mentioned.

IV. REFERENCES

[1] Mayank Agrawal, Ratnakar Dash 2014. Image Resolution Enhancement using Lifting Wavelet and Stationary Wavelet Transform

[2] Dileep Kumar Sahu 2015, IMAGE DEBLURRING ALGORITHM FOR MOTION BLUR & FEATURE RESTORATION

[3] Shravani Reddy, Guruswamy Karthikeyan 2013, A Combined Image Deblurring Using Image Enhancements

[4] SUNAYA U.SHIRODKAR 2014, IMAGE RESOLUTION ENHANCEMENT USING VARIOUS WAVELET TRANSFORM

[5] C.M.Patil, Sudarshan Patilkulkarani, Iris FeatureExtraction for Personal Identification usingLifting Wavelet Transform, IEEE Trans. Image Processing,2009.

[6] J. J. Ding, W.-D. Chang, Y. Chen, S.-W Fu, C.-W Chang, and C.-C. Chang. "Image deblurring using a pyramid-based Richardson-Lucy algorithm." In Digital Signal Processing (DSP), 2014 19th International Conference on, PP. 204-209. IEEE, 2014.

[7] A. Rai, Attribute Based Level Adaptive Thresholding Algorithm for Object Extraction, Journal of Advancement in Robotics, Volume 1, Issue 2, 2014.

[8] Shravani Reddy, Guruswamy Karthikeyan A Combined Image Deblurring Using Image Enhancements, IJCSMC, Vol. 2, Issue. 10, October 2013.

[9] M. M. Bronstein, A. M. Bronstein, M. Zibulevsky, and Y. Y. Zeevi, “Blind deconvolution of images using optimal sparse representations,” IEEE Trans. Image Process., vol. 14, no. 6, pp. 726–736, Jun. 2005.

[10] International Journal of Advanced Engineering Technology E-ISSN 0976-3945 IJAET/Vol.II/ Issue III/July-September, 2011/329-332 Research Article COMPARISON OF IMAGE ENHANCEMENT USING DISCRETEAND LIFTING WAVELET TRANSFORM Er.Amit kumar, Er. Geeta Kaushik.