

# IMAGE COMPRESSION USING 2-D WALSH WAVELET TRANSFORM

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**Abstract**— *Image Compression is a science that is concerned with the reduction of the number of bits required to store, transmit and reconstruct the images without any loss of information. Though various transforms are used in the field of image compression. like EZW, SPIHT and EBCOT. In this research, Walsh wavelet transform are used to perform the transform of a test image. Experimental results show that the image quality is almost same when CRF is in small amount. We can calculate the size of compressed image and decompressed image with how much time it takes in compression as well as decompression.*

**Keywords**—*Image Compression, Matlab, PSNR, Walsh Wavelet, Wavelet family*

## I. INTRODUCTION

In recent years, wavelet[1] transform rapid develop, image compression is an important aspect of the application of wavelet transform. Its characteristic is high compression ratio and compression speed, compressed signal and image characteristics can be maintained unchanged, and anti interference in the transmission[2]. There is a lot of method based on wavelet transform compression.

In the last decade, there has been a lot of technological transformation in the way we communicate. This transformation includes the ever present, ever growing internet, the explosive development in mobile communication and ever increasing importance of video communication.

Data Compression is one of the technologies for each of the aspect of this multimedia revolution[3]. In this paper we use Daubechies wavelet base which is represented by dB.

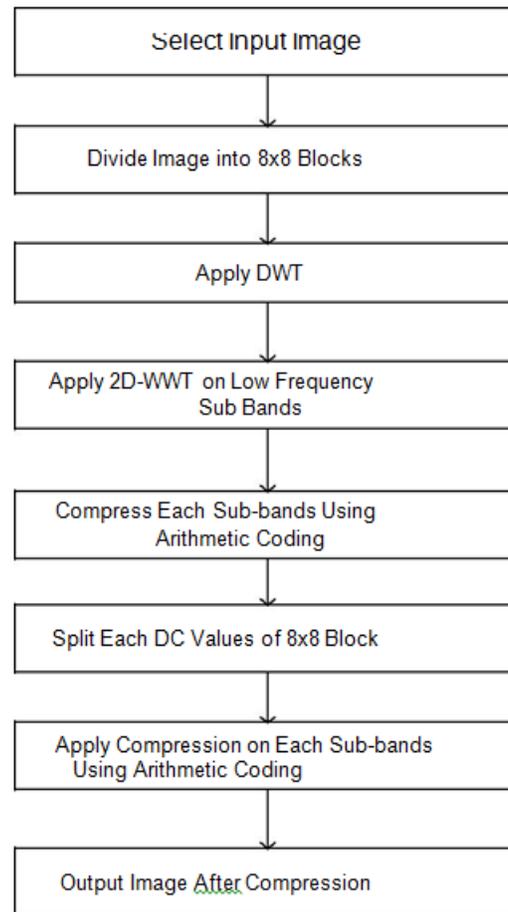
After that use of quantization factor to quantized the image then involve Compression Ratio Factor which are responsible in quality of an image. The compression algorithm will be evaluated on how closely the reconstructed image resembles the original, and how the performance measures, in terms of peak signal to noise ratio(PSNR)[4] with the effect of compression ratio factor(CRF). Images require much storage space, large transmission bandwidth and long transmission time.

## II. PROBLEM STATEMENT

As we all know that the images contain large amount of information that requires much storage space, large transmission bandwidths and long transmission times. Therefore it is advantage for us to compress an image by storing only the essential information needed to reconstruct the image. An image can be thought of as a matrix of pixel (or intensity) values. In order to compress the image, redundancies must be exploited, for example, areas where there is little or no change between pixel values. When we transmit any image we should convert it into digital form and the information is send in the form of signals that is wavelets. But there are lot noises or redundancy also added into it automatic so its very important that when we collect the output information at receiver side it should be original form. By removing the redundant data, image can be represented in a smaller number of bits, and hence can be compressed.

## III. PROPOSED ARCHITECTURE AND METHODOLOGY

Architecture and algorithms of our proposed method for image compression is given below:



**Figure 1: Flow chart of proposed method**

Major steps of our proposed method for image compression summarizing following steps:

1. Choose the input image from database which you want to compress.
2. Divide selected input image into 8x8 blocks.
3. Apply two levels discrete wavelet transforms.
4. Apply 2D Walsh Wavelet Transform on each 8x8 block of the low-frequency sub-band.
5. Split all DC values form each transformed block 8x8
6. Apply for compression each sub-band by using Arithmetic coding
7. Output image obtained by the compression.

Apply Walsh Wavelet transform and then using arithmetic coding for compress an image.

Step 4 consists of the following:

- i) Two Levels Discrete Wavelet Transform.
- ii) Apply 2D Walsh-Wavelet Transform on each 8x8 block of the low frequency sub-band.
- iii) Split all values form each transformed block 8x8.
- iv) Compress each sub-band by using Arithmetic coding, the first part of Walsh Wavelet compression steps for high frequency, domains, and then second part of Walsh Wavelet compression steps for low frequency.

#### IV. IMPLEMENTATION DETAIL AND RESULT ANALYSIS

The experiments presented in this thesis shows Daubechies wavelet-based "ImagecompressionC Using 2-D Walsh Wavelet Transform". The quantitative comparison is made using PSNR and the qualitative comparison is made using the Daubechies family (db2-d10) and Compression ratio factor with the quantization factor values(.05-.5). We present a comprehensive correlation analysis of the quantitative and qualitative results. In addition, we compare the quantitative and qualitative results to the original image and after decompression image. The following summarizes the varying factors in the experiments. Here we use Matlab for the implementing our work.

Example:

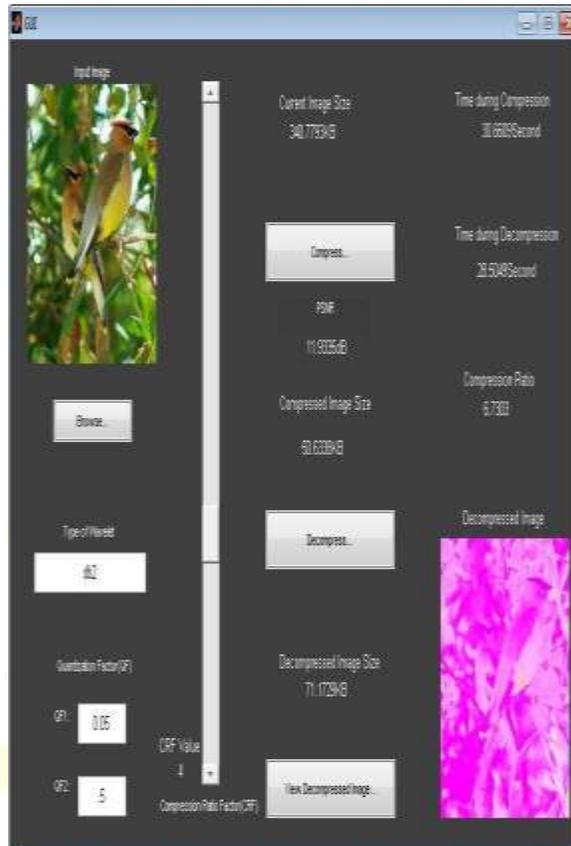


Figure 2. Parrot image tested in db2 with CRF value 4

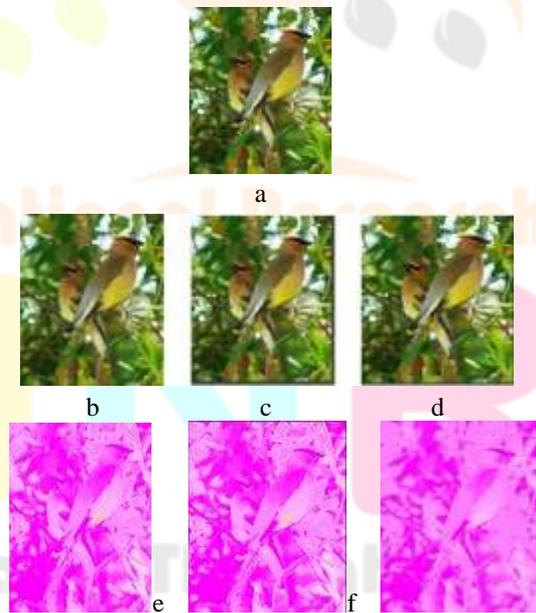


Figure 3. Parrot image tested outputs (a) original image (b) db2 with crf 2 (c) db5 with crf 2 (d) db10 with crf 2 (e) db2 with crf 4 (f) db5 with crf 5 (g) db10 with crf 4

## V. CONCLUSION AND FUTURE WORK

The WT is a powerful tool to analyze signals. There are many applications of the WT, such as image compression. Daubechies wavelet transform for image compression is simple and crudest algorithm as compared to other algorithms it is more effective. The quality of compressed image is also maintained. In this paper, we present an image compression framework that adopts Daubechies wavelets with Walsh Transform to remove redundancy from images. In this correspondence, we have proposed an improved image compression algorithm. Due to the delivered assistant information, our presented framework is able to remove enough regions so that the compression ratio can be greatly increased. Our presented Daubechies wavelets with Walsh Transform method is capable in effectively restoring the removed regions for good visual quality, as well.

Our future work we can extend the picture quality with the increasing compressed ratio factor also we can extend this method for image compressing from input image by using interactive compression techniques and different transform apply on these techniques as well as using different discrete wavelet like produce better results with minimizing noise to improve the compression.

#### REFERENCES

- [1] Liu Bo, Yang Zhaorong Harbin University of Science and Technology Harbin China Image Compression Based on Wavelet Transform ©2012 IEEE proceeding of International Conference on Measurement, Information and Control (MIC)
- [2] G Boopati, Dr. S.Arockiasamy An Image Compression Approach using Wavelet Transform and Modified International Journal of Computer Science Issues, Vol. 8, Issue 5, No 2, September 2011
- [3] Myung-Sin Song Wavelet Image Compression 1991 Mathematics Subject Classification. Primary 42C40.
- [4] Matthew C. Stamm and K. J. Ray Liu WAVELET-BASED IMAGE COMPRESSION ANTIFORENSICS Proceedings of 2010 IEEE 17th International Conference on Image Processing September 26-29, 2010, Hong Kong
- [5] J. Shapiro, Dec. 1993. Embedded image coding using zero trees of wavelets coefficients, IEEE Trans. Signal Processing, vol. 41, no. 12, pp. 3445–3462
- [6] K. Veeraswamy, S. Srinivas Kumar Adaptive AC-Coefficient Prediction for Image Compression and Blind Watermarking, of Multimedia, VOL. 3, NO. 1, MAY 2008.
- [7] Jagadish H. Oujar, Lohit M. Kadlas of Image Compression and Decompression using Huffman Coding Techniques, Journal Applied of Information Theoretic Technology © 2005 - 2010 JATIT.
- [8] S. Parveen Banu Dr. Y. Venkataramani, —An Efficient Hybrid Compression Scheme based on Correlation of Pixels for Storage and Transmission of Images, Journal of Computer Internal Applications (0975–8887) Volume 18–No.3, March 2011.
- [9] Yu Yanxin, Song Xue, —A Remote Method Suited to Spaceborne Application, 2011 International Conference on Computer Science and Network Technology
- [10] S.P. Raja, Dr. A. Suruliandi Analysis of Efficient Wavelet based Image Compression Techniques 2010 Second International conference on Computing, Communication and Networking Technologies Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India
- [11] Internet PSNR, [http://en.wikipedia.org/wiki/PSNR\\_Page](http://en.wikipedia.org/wiki/PSNR_Page)
- [12] Karen Lees Dr. Joab Winkler Image Compression Using Wavelets 2002

