

# A – Two Channel Overlapped Block Transform for Twofolder Plane Substance

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**ABSTRACT:** In transmission and storage of digital images compression is a key technology because huge data associated with them. This paper suggested a new compression scheme with DWT (Discrete Wavelet Transform) the effectiveness of this work is represented with real images experimental result demonstrates that high compression ratio is achieved by this work when compared with other work.

**KEYWORDS:** Image compression, DWT, JPEG, Huffman, Compression Ratio

## I. INTRODUCTION

Picture weight is a method of successfully coding propelled pictures [2] to diminish the amount of bits required [2] in addressing a photo. Picture weight accept a critical part in a couple of key and contrasting applications, including televideoconferencing, remote distinguishing, therapeutic imaging [3,6] and appealing resonation imaging [4]. With the extension of spatial assurance and swath, the space missions are faced with the need of dealing with an expansive measure of imaging data. A propelled picture gained by testing and quantizing a relentless tone picture requires a gigantic accumulating. For instance, a 24 bit shading picture with 512 x 512 pixels will include 768 KB accumulating on a hover and without weight only such pictures can fit in a singular insignificant plate. To transmit such a photo over a 28.8 Kbps, a modem would take pretty much 4 minutes. The wavelet Transform, made for banner and picture get ready, has been extended for use on social educational accumulations Picture weight investigate goes for reducing the amount of bits anticipated that would address a photo by emptying the spatial and spooky redundancies however much as could be normal. The basic idea behind the photo weight is that in a huge bit of the photos we find that their neighboring pixels are highly compared and have overabundance information.

## II. DISCRETE WAVELET TRANSFORMATION

### A. Haar Wavelets

The Haar[2] grid proposed in 1909 by Alfred Haar is the most straightforward conceivable wavelet and is a quick change. The premise vectors of the Haar[2] grid are consecutively requested. In arithmetic, the Haar wavelet is a grouping of rescaled —square-shapedl capacities. Specialized weakness of Haar wavelet is that it is not persistent furthermore, consequently not differentiable and takes after a stage work. This property is leeway for dissecting signals with sudden moves, such as observing of hardware disappointments in machines. It speaks to same wavelet as Daubechies 1.

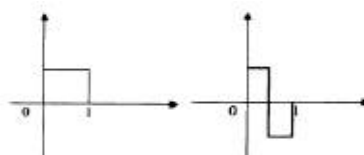


Figure 2. Scaling and Wavelet functions of HAAR

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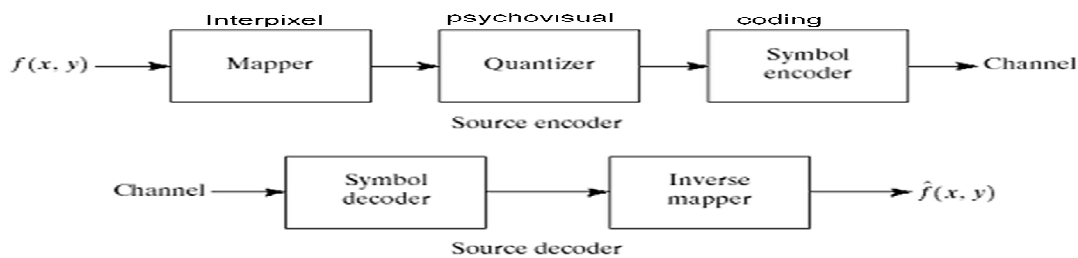
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Haar Transform haar Wavelet Solution be in the form

$$u(t_1) = \sum_{i=1}^{2M} a_i h_i(t_1) = \sum_{i=1}^{2M} a_i H_{il}$$

Haar Transform has poor vitality Compaction for pictures and is genuine and orthogonal i.e.  $Hr = Hr^*$ , the premise vectors of Haar network are dependably arrangement requested [1].

## General Image Compression Models



**Mapper :** The amount of area represented by one pixel depends on the satellite sensor is used, ie there is a 10 m, 20 m, 30 m, etc.. Size / values is called a spatial resolution of satellite sensors in question as described above. The composition of two-dimensional image data is called raster format so that the digital image data is often also called raster data.

**Quantizer:** Quantization, in mathematics and digital signal processing, is the process of mapping a large set of input values to a (countable) smaller set. Rounding and truncation are typical examples of quantization processes. Quantization is involved to some degree in nearly all digital signal processing, as the process of representing a signal in digital form ordinarily involves rounding. Quantization also forms the core of essentially all lossy compression algorithms.

**Symbol encoder:** Entropy decoding, after encoding, includes performing symbol decoding on a bitstream of a received residual picture in units of two, three, or four symbols according to a context model which is set in the two, three, or four symbol units, and ordering the decoded coefficients of the residual picture in their original order in the frequency domain. Symbol and level decoding may be performed together. A unique symbol value may be used.

**Channel:** Color digital images are made of pixels, and pixels are made of combinations of primary colors represented by a series of code. A channel in this context is the grayscale image of the same size as a color image, made of just one of these primary colors. For instance, an image from a standard digital camera will have a red, green and blue channel. A gray scale image has just one channel.

**Symbol decoder:** A symbol scanning and decoding device that is configured for capturing a series of images of a symbol over time and configured for providing a first (image processing) procedure that processes one or more of the series of images within a first period of time, and a second (image processing) procedure that processes one or more of the series of images within a second period of time, and where the first period of time is constrained to be less than or equal to, and the second period of time is not constrained to be less than or equal to, a period of time between a capture of an integral number of consecutive images of the series of images.

**Inverse mapper:** There are two approaches to twist an image. The in the first place, called forward mapping, look over the source picture pixel by pixel, and duplicates them to the suitable place in the goal picture. The second, invert mapping, experiences the goal picture pixel by pixel, and tests the right pixel from the source picture. The most vital component of reverse mapping is that each pixel in the goal picture gets set to something proper. In the forward mapping case, a few pixels in the goal won't not get painted, and would need to be inserted. We ascertain the picture misshapening as a turnaround mapping.

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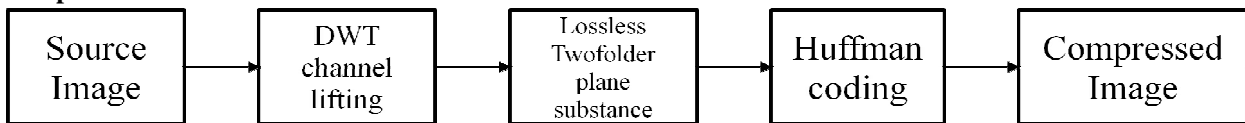
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## III. PROPOSED COMPRESSION TECHNIQUES

- A Two-Channel overlapped Block transform Lossless Two folder Plane Substance

### Block Based Two folder Plane substance Technique

#### Compression Model



### Block Based Twofolder Plane substance Technique

**DWT Channel lifting:** Modern neuroprosthetic systems must permit multiple signal channels to be sampled simultaneously. Furthermore, a DWT with multiple decomposition levels provides more accurate information about the original signal than a singlelevel DWT. Thus, to achieve the compression required for wireless neuroprosthetic implants, area and power efficient hardware is needed that can perform multi-channel, multilevel DWT in real time. Contrary to most modern. applications of DWT, neuroprosthetics can afford long computation intervals, up to 40μsec [1], relaxing hardware requirements. Integer lifting and B-spline DWT factorization schemes have very efficient hardware implementations. The lifting approach reduces the required arithmetic operations and requires less memory at the expense of a longer critical path [2, 3]. The B-spline factorization reduces the critical path delay by converting some of the required multiply operations into less computationally intensive shift-and-add operations.

**Lossless Twofolder plane substance:** The Two folder Substance technique<sup>1</sup> is used in the first stage. In this technique after applying the TWOFOLDER SUBSTANCE two files namely bit plane and data table are created. The bit plane is collection of 1's and 0's to represent whether a pixel is repeated or not. The data table holds only the necessary pixel values. The bit plane and data table are later merged into one file. On the data generated from Two folder Substance, the Difference<sup>7</sup> and Huffman coding<sup>6</sup> are applied in that order to further compress. The main objective of this technique is to take advantage of repeated values in consecutive pixels positions. For a set of repeated consecutive values only one value is retained. In the Binary plane technique the first part 'bit plane' holds the bit 0 for each a pixel similar to previous pixel and the bit 1 for each pixel different from previous pixel. The second part 'data table' holds only the necessary pixel values, i.e. for a set of consecutive repeated values; one value is stored in the data table. After merging the bit plane and data table Huffman<sup>6</sup> coding is applied and final form of compressed file is generated.

### Huffman Coding:

Huffman Coding is the most popular technique for removing coding redundancy. It is error free technique and when coding the symbols of an information source individually, it yields the smallest possible number of code symbols per source symbol.

The first step in Huffman's approach is to create a series of source reductions by ordering the probabilities of the symbols under consideration and combining the lowest probability symbols into a single symbol that replaces them in the next source reduction. This process repeated until a reduced source with two symbols is reached.

The second step in Huffman's procedure is to code each reduced source, starting with the smallest source and working back to the original source. Huffman's procedure creates the optimal code for a set of symbols and probabilities subject to the constraint that the symbols be coded one at a time. After the code has been created, coding and/or decoding is accomplished in a simple lookup table manner.

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### Algorithm for Huffman Coding

Basically in Huffman Encoding each unique value is assigned a binary code, with codes varying in length. Shorter codes are then used for more frequently used values. These codes are then stored into a conversion table and passed to the decoder before any decoding is done.

#### PROCEDURE HUFFMANCODE ()

/\* subroutine to apply Huffman coding on intermediate file & generate final form of compressed file \*/

```
//Data Items
hmcTable           // hash table to hold Huffman look up table
lstNodes           // linked list of nodes
key                // unique byte value of the intermediate file
count              // on of occurrences of the key value
cByte              // holds Huffman code a byte
```

#### BEGIN

```
open bpds file
while((key=read(bpds file))!=eof)
Begin
    search for key in hmcTable
    if found then
        increment count for the key
        write back (key,count) to the hmcTable
    else
        write (key,1) to the hmcTable
End
close(bpds file);
for every key in hmcTable
Begin
    construct a node with probability of occurrence
    insert into lstNodes in such way that the nodes in ascending
    order based on probability
End
build the tree
assign code "" to root
repeat until all nodes are assigned a code
Begin
    assign parentcode+"0" to left child
    assign parentcode+"1" to right child
End
from the tree build a hash table to hold the (key,huffmancode)
open bpds file
open comp file
while((cByte=read(bpds file))!=eof)
Begin
    search for the key cByte in hmcTable
```

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move the huffman code for the key in hcode  
write hcode to comp file

**End**

close bpds file  
close comp file

**END**

The Huffman algorithm is now briefly summarised:

- A bottom-up approach

1. Initialization: Put all nodes in an OPEN list, keep it sorted at all times (e.g., ABCDE).

2. Repeat until the OPEN list has only one node left:

(a) From OPEN pick two nodes having the lowest frequencies/probabilities, create a parent node of them.

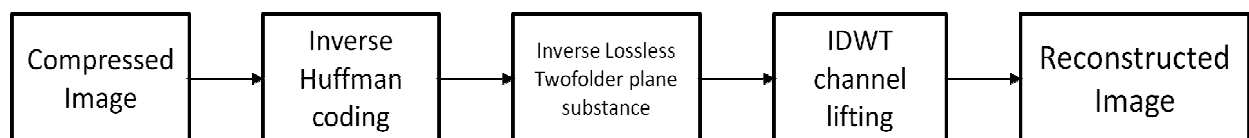
(b) Assign the sum of the children's frequencies/probabilities to the parent node and insert it into OPEN.

(c) Assign code 0, 1 to the two branches of the tree, and delete the children from OPEN.

**Compressed Image:** compressing an image is significantly different than compressing raw binary data. Of course, general purpose compression programs can be used to compress images, but the result is less than optimal. This is because images have certain statistical properties which can be exploited by encoders specifically designed for them. Also, some of the finer details in the image can be sacrificed for the sake of saving a little more bandwidth or storage space. This also means that lossy compression techniques can be used in this area.

Lossless compression involves with compressing data which, when decompressed, will be an exact replica of the original data. This is the case when binary data such as executables, documents etc. are compressed. They need to be exactly reproduced when decompressed. On the other hand, images (and music too) need not be reproduced 'exactly'. An approximation of the original image is enough for most purposes, as long as the error between the original and the compressed image is tolerable.

## IV. RECONSTRUCTION MODEL



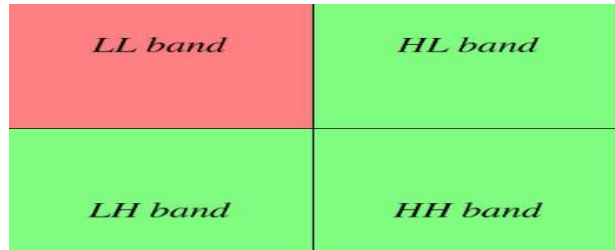
**Inverse Huffman coding:** *Inverse Huffman* is an exercise over the optimal encoding of a system of information, by a code of variable lengths. But the style of the exercise is in the inverse direction: the server gives you a code, and asks you to find a distribution of probabilities such that the given code is optimal.

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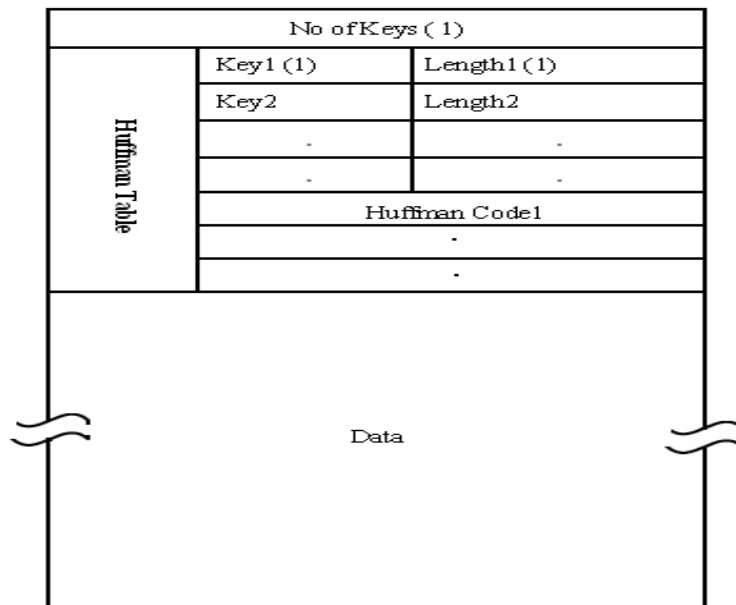
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Two-dimensional wavelet transform

### Compressed File Format



Compression ratio of proposed work

S.No.	Image Name	Raw (in bytes)	JPEG (in bytes)	Proposed Work	CR with proposed work	CR with JPEG
1	Barbara	22500	21924	3194	85.8045	2.560001
2	Beboon	262144	93176	29245	55.376	-42.175311
3	Coin	18972	21467	10672	43.748	-13.150959

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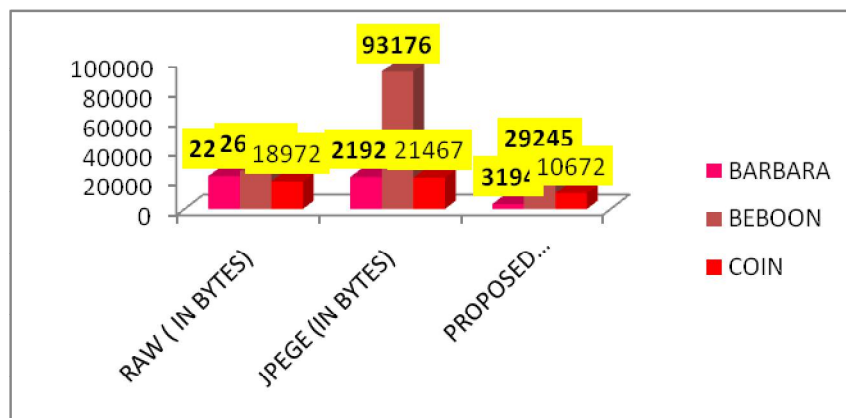
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## SAMPLE RESULTS



Comparison between Raw (in bytes), JPEG, (in bytes), proposed work (in bytes)



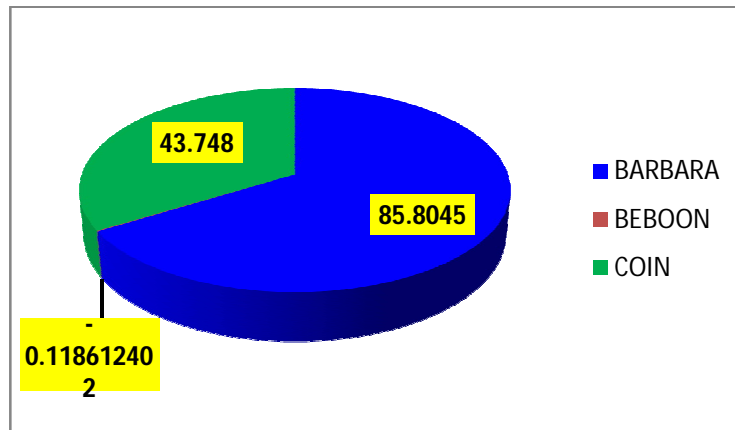
Comparison between CR with proposed work and CR with JPEG

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In this work 3 images are considered recorded their sizes in bytes in raw, jpeg and proposed work, essential parameter compression ratio is calculated with respect to raw vs proposed and raw vs jpeg most of the time the proposed work attaining good compression ratio which is shown in the above graph.

### V. CONCLUSION

A novel image compression scheme based on DWT is proposed in this work. This work provides high compression ratios with acceptable image availability when image is reconstructed. The robustness of this approach is justified with set of images. The future directions of in this research work is a compression technique using ANN (Artificial Intelligence Network)

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