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# IMAGE COMPRESSION PROCESS USING EIGHT BIT PLANE CONSTRUCTION ON JOINT PHOTOGRAPHIC EXPERTS GROUP IMAGE IN MATLAB

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**Abstract: -** *Image compression is used to reduce the input image storage and transmit that image over the network. Eight bit plane construction method is divided the whole input images into an 8 bit image. Proposed method has selection the input image process, compression process, pre process and encryption process. First, the input jpeg is selected at specified file location. Second, the compression process is to reduce the storage capacity. Third, pre processing is converting the input image into a gray level image. Fourth, encryption process is to view the input image into an eight bit plane construction. Finally, the compressed image has less storage memory space without affect the image quality.*

**Keywords: -** Bit plane coding, Pre process, Compression, Matlab

## I. INTRODUCTION

An image defined as 2-D function f(x, y), where x and y are spatial coordinates and the amplitude of f at any pair of coordinates (x, y) is called the intensity or grey level of the image at that point. Image compression has two types are lossless image compression and lossy image compression. The lossy compression techniques achieve data compression by losing some information while maintaining the reconstruction quality. Hence, the data cannot be reconstructed exactly as the original one. This is used where low storage space and fast data transmission speed are needed while maintaining the acceptable reconstructed data quality. A bit plane of an input image is a set of bits corresponding to a given bit position in each of the binary numbers representing the signal. For example, for 16-bit data representation there are 16 bit planes: the first bit plane contains the set of the most significant bit, and the 16th contains the least significant bit. The first bit plane gives the roughest but the most critical approximation of values of a medium, and the higher the number of the bit plane, the less is its contribution to the final stage. Thus, adding a bit plane gives a better approximation. If the bit on the $n^{th}$ bit plane on an m-bit dataset is set to 1, it contributes a value of (m-n) to the power of 2, otherwise it contributes nothing. Hence bit planes can contribute half of the value of the previous bit plane.

## II. LITERATURE REVIEW

Sukhpal Singh et al., Shri JJT University , Rajasthan, India, in his study, JPEG compression schemes displays unwanted image artefacts to appear such as the 'blocky' artefact found in smooth areas of an image, caused by the coarse quantization of DCT coefficients. Various image filtering approaches have been analyzed in order to smooth out the discontinuities that appear across DCT block boundaries. Some of these approaches are able to decrease the severity of these unwanted artefacts to some extent; other approaches have certain limitations that cause excessive blurring to high-contrast edges in the image. In this paper, the image de-blocking algorithm aims to filter the blocked boundaries. This is accomplished by employing smoothening, detection of blocked edges and then filtering the difference between the pixels containing the blocked edge. The de-blocking algorithm presented has been successful in reducing blocky artefacts in an image and therefore increases the subjective as well as objective quality of the reconstructed image.

Anil Bhagat et al., Vidya pratishthan's college of Engineering, Maharashtra, India, in this paper to implement the hybrid wavelet coder to improve the gray image quality at low bit rate, such type of compression provide high compression ratio at low bit rate. It overcome the drawback of fractal image coding in spatial domain produces the artefact blocking effect this effect can be reduces by using fractal image coder in wavelet domain and also this coder provide high decoding time. Afterwards compare the result of wavelet fractal image coder and wavelet SPIHT algorithm. This is to improve image quality at low bit rate and also reconstructed image based on the iteration method. Finally compare the result based on performance parameter this result got from the MATLAB. This work presents a fractal image compression in wavelet domain based approach for the partitioning iteration function system (PIFS) and SPIHT algorithm. The plan of this work is to get better image quality with higher compression ratio and low bit rate achieved by the combination of wavelet image compression with SPIHT and fractal image compression. Proposed algorithm gives the comparison between the bit per pixel, compression ratio, mean square error and peak signal to noise ratio. This method can also be used for binary (white and black) images analysis.

Rajeswari, et al., SCSVMV University, Kanchipuram, in this work presents image compression is to reduce irrelevance data and redundancy of the image data in order to be able to store or transmit data in an efficient form. Image compression scheme either be in lossy method or lossless method. Lossy algorithms are especially suitable for transmit images across the network with minor loss of fidelity of information. In this effort, propose MPC (Maximum PSNR using Coefficient) using DCT algorithm for image compression and reconstruction taking benefit from the advantages of DCT algorithms. The proposed work performs the Discrete Cosine Transform (DCT) on the

coefficients. The aim of the proposed system is to study how the image is compressed using MPC method and discrete cosine transforms to attain maximum PSNR value. Finally, to attain maximum PSNR value, using coefficient, the images are analyzed and get compressed image with good quality. Coefficient is the most important factor that affects the image quality. Using Coefficients in Matlab, the images are analyzed and get maximum PSNR value is attained.

Mr. Neeraj Manglani, Jagannath University, Jaipur, India, in his study, the process of reducing the size of a data file is referred to as data compression. Lossy image compression is useful because it helps in resources usage reduction, such as data storage space or transmission capacity over internet. This paper proposes a compression technique for scanned documents and images, based compression method using discrete wavelet transformation (DWT), Discrete Cosine Transformation, (DCT) and Code Book Vector. The significance of the DCT in an image compression is that it takes correlated input image and concentrates its energy in just the first few transform coefficients. This feature of DCT makes it useful in data compression. The effectiveness of the algorithm has been justified over some real images and scanned documents. The performance of the proposed algorithm has been compared with other common compression algorithm.

R. Aarthi et al., Sakthi College of arts and science for women, oddanchatram, India, image encryption plays a major role in information security. In this paper, to convert the original image into another form using proposed method. In this effort, propose a bit plane slicing of digital image to provide the more security. To enhance security of the bit plane decomposition based image encryption methods, this paper introduces a novel image encryption algorithm using a bit plane of a source image as the security key bit plane to encrypt images. It focuses on three techniques such as image scrambling, bit plane slicing and image rotation for efficient image encryption. Arnold scrambling and bit plane slicing process is performed in the source image. After the decomposed source image, exacting bit plane is assigned as the security key bit plane to perform the encryption process in the original image. As an example, this paper also proposes a bit-level scrambling algorithm to change bit positions. Simulations and security analysis are provided to demonstrate an excellent encryption performance of the proposed algorithm.

## III. PROPOSED WORK

In this proposed work, the processes are

1. **Select the input image**
2. **Compress that image**
3. **Pre processing that input image**
4. **Encrypt that image**

The image file format has different types as .jpg, .bmp, .tiff etc., but in proposed work, focused on .jpg images. Compression is the processing of reduce storage space. It is very helpful to transfer those images across the network. The input image is compressed and stored in particular memory location with less space at the sender and whenever we transfer that image, the original image quality will be appeared at the receiver. Pre processing is the process of noise removal of input image. In image processing the two important functions are encryption and decryption. Encryption is the process of encrypt the input image at sender. Decryption is the process of decrypt the output image at receiver.

First, select the processing input jpeg file second, compress that input image with compression ratio calculation. Third, pre process that input image. Pre processing is the noise removal of input image. Here in the pre processing, the input image is converted into a gray level image with noise reduction.

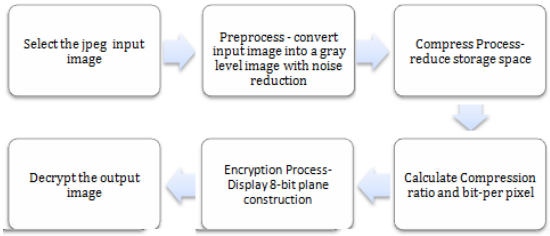


**Fig 3.1 Proposed work-process diagram**

## IV. RESULTS AND DISCUSSION

In proposed work, various input image are tested. Different gray scale jpeg image and rgb jpeg images are tested in matlab. Matlab is very helpful to write script programming and execute that program. Here the lena gray scale image and parrot rgb colour image are tested in matlab and displayed the result as follows. The whole input image is divided into 8-bit image. Each 8-bit block input image is processed under compression, pre process, encryption and decryption. Here the input image with memory size is specified, that image is compressed under compression technique and calculating the compression ratio of that 8-bit input image. The output image memory size is calculated using bytes. Table1. displays the input memory size, compression ratio and output memory size.

**Table1. Compression ratio and memory size**

| Input image | Memory Size | Compression ratio | Output image |
|---|---|---|---|
| **Lena.jpg (gray)** | 14336 | 2.08 | 7168 |
| **Parrot.jpg (rgb)** | 7168 | 2.48 | 9216 |

**Input image selection**

```
global I1 map
[F P]=uigetfile ('\Images\*.jpg');
[I1, map]=imread ([P F]);
I1=imresize (I1, [128 128]);
axes (handles.axes1);
imshow (I1);
```

```
title ('Selected Image', 'FontSize', 12);
```

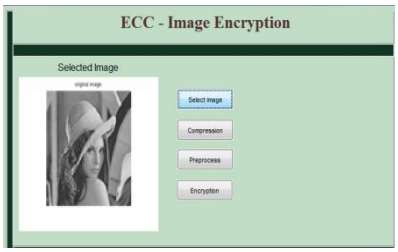


**Fig4.1 Input image selection**

**Compression process**

```
global I1 Xc X
X=I1;
[CR, BPP] = wcompress ('c', X,'compressed.wtc','gbl_mmc_h','bpp', 0.5);
Xc = wcompress ('u','compressed.wtc');
figure, imshow(X);
axis square;
xlabel ({['Compression Ratio: ' num2str (CR,'%1.2f %%')] ...
    ['Bit-Per-Pixel (BPP): ' num2str (BPP,'%3.2f')]})
imwrite (Xc, ['Compressed.jpg']);
```

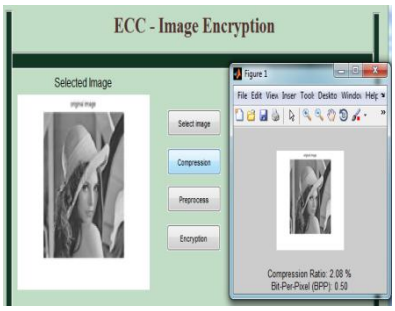


**Fig4.2 Compression process**

**Pre processing**

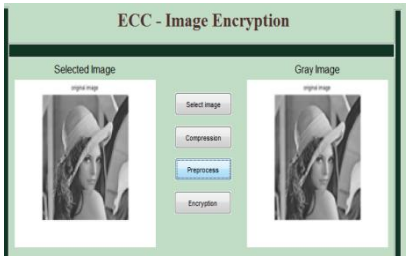


**Fig4.3 Pre processing**

**Encryption process**

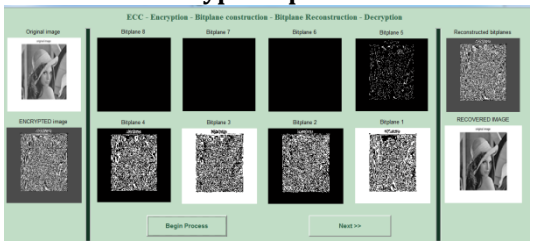


**Fig4.4 Encryption process**

**RGB Colour Image- Compression Process**


**Fig 4.5 RGB image –compression process**

**RGB Colour Image- Encryption Process**

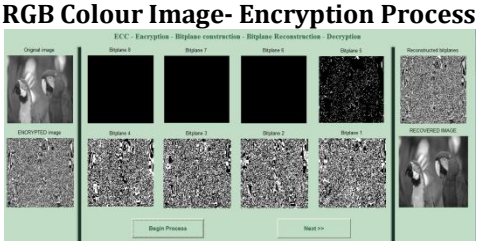


**Fig 4.6 RGB image- Encryption process**

## V. CONCLUSION AND FUTURE SCOPE

Image compression is the main process in image processing. All images are transferred over the internet. So it needs more memory space to store all images. Image compression is the process of reducing the storage space. Encryption and decryption is the main function in image compression. Encryption is done at sender, decryption is done at receiver. In proposed work, the gray scale input image is compressed, pre processed, encrypted and decrypted. Similarly, the RGB colour image is tested under Matlab. The gray scale output image has less memory space compared than input memory size. But RGB colour output image has more memory space compared than input memory size. In future, focusing on RGC colour image.

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