ABSTRACT

Digital image compression is playing an important role despite the rapid progress in digital communications and mass storage devices in the recent years. The efficient storage, manipulation and transmission of digitized pictures still remain a major challenge. In applications like video streaming, satellite imaging, medical imaging and high quality photography the size of data to be transferred is incredibly large when compared to the bandwidth available in the communication channel. Data compression is the technique to reduce the redundancies in data representation in order to decrease data storage requirements and hence communication costs. Image compression addresses the problem by reducing the amount of data required to represent a digital image. The uncompressed image data requires a large storage capacity and transmission bandwidth. The purpose of the image compression algorithm is to reduce the amount of data required to represent the image with less degradation in the visual quality and without any information loss. In a monochrome image, the neighboring pixels are more correlated. The discrete cosine transform (DCT) and wavelet transform are commonly used to reduce the redundancy between the pixels and for energy compaction. The JPEG standard uses the DCT and the JPEG2000 standard uses the wavelet Inter Color Correlation Based Enhanced Color In a color image, correlation exists between the neighboring pixels of each color channel and as well as between the color channels.
But pixels beyond the neighbor matrix will not match so we will introduce a new method that is based on the image byte streaming and color correlation.

**Keywords:** - Discrete cosine transform (DCT), wavelet transform, JPEG2000

### 1. Introduction

#### 1.1 Image Compression

Image compression addresses the problem of reducing the amount of data required to represent a digital image. It is a process intended to yield a compact representation of an image, thereby reducing the image storage/transmission requirements. Compression is achieved by the removal of one or more of the three basic data redundancies:

1. **Coding Redundancy**
2. **Interpixel Redundancy**
3. **Psychovisual Redundancy**

Coding redundancy is present when less than optimal code words are used. Inter pixel redundancy results from correlations between the pixels of an image. Psychovisual redundancy is due to data that is ignored by the human visual system (i.e. visually non essential information). Image compression techniques reduce the number of bits required to represent an image by taking advantage of these redundancies. An inverse process called decompression (decoding) is applied to the compressed data to get the reconstructed image. The objective of compression is to reduce the number of bits as much as possible, while keeping the resolution and the visual quality of the reconstructed image as close to the original image as possible. Image compression systems are composed of two distinct structural blocks: an encoder and a decoder.

![Diagram of image compression process](image.png)

### 2. Image Compression Techniques

The image compression techniques are broadly classified into two categories depending whether or not an exact replica of the original image could be reconstructed using the compressed image.
These are:
1. Lossless technique
2. Lossy technique

2.1 Lossless compression technique

In lossless compression techniques, the original image can be perfectly recovered from the compressed (encoded) image. These are also called noiseless since they do not add noise to the signal (image). It is also known as entropy coding since it uses statistics/decomposition techniques to eliminate/minimize redundancy. Lossless compression is used only for a few applications with stringent requirements such as medical imaging.

Following techniques are included in lossless compression:
1. Run length encoding
2. Huffman encoding
3. LZW coding
4. Area coding

2.2 Lossy compression technique

Lossy schemes provide much higher compression ratios than lossless schemes. Lossy schemes are widely used since the quality of the reconstructed images is adequate for most applications. By this scheme, the decompressed image is not identical to the original image, but reasonably close to it.

Figure: Outline of lossy image compression
As shown above the outline of lossy compression techniques. In this prediction – transformation – decomposition process is completely reversible. The quantization process results in loss of information. The entropy coding after the quantization step, however, is lossless. The decoding is a reverse process. Firstly, entropy decoding is applied to compressed data to get the quantized data. Secondly, dequantization is applied to it & finally the inverse transformation to get the reconstructed image.

Major performance considerations of a lossy compression scheme include:
1. Compression ratio
2. Signal-to-noise ratio
3. Speed of encoding & decoding.

Lossy compression techniques includes following schemes:
1. Transformation coding
2. Vector quantization
3. Fractal coding
4. Block Truncation Coding
5. Subband coding

3. Purposed method:-

Image is firstly converted into byte[] stream and match the values of color by using binary tree to sort the values of color and mark the reference of the
location of stream index. This index will fill the color of the reference location. This helps to no reduction of value to achieve the lossless image. There is no neighbor color co relation by which more efficient image compression will achieved.

4. Conclusion and Future work:-

In our image compression technique, we use bit reference so there is no way to effect to image for any type of generation of image artifacts. We use array of generic structure for the access the reference of bits which is cost effective and performance effective. So It provides a potential cost savings associated with sending less data over switched telephone network where cost of call is really usually based upon its duration. It not only reduces storage requirements but also overall execution time. In future As we focused on the DCT value and RGB on the pixel may vary and remove the save value of RGB on the image But the value of the pixel may vary from image to image as per the design and structure of image. So if the image has differently colored used or we can say that the pixel value are unique. In the image then image must be need some other enhancement. This may future work on this type of images.

REFERENCES:-


2. M. Santhi, R. S. D. Wahida Banu , “Inter Color Correlation Based Enhanced Color SPIHT Coder” Department of Electronics and Communication Engineering Government College of Engineering, Salem, TamilNadu, India

3. Risto Miikkulainen , “Effective Image Compression using Evolved Wavelets” Department of Computer Sciences, The University of Texas at Austin


5. Sonja Grgic, Marta Mrak, Mislav Grgic, “COMPARISON OF JPEG IMAGE CODERS” University of Zagreb, Faculty of Electrical Engineering and Computing Unska 3 / XII, HR-10000 Zagreb, Croatia

6. Xing San , Hua Cai t and Jiang Li “COLOR IMAGE CODING BY USING INTER-COLOR CORRELATION” Dept. of Electronic Eng. and Information Science, University of Science and Technology of Chinat Media Communication Group, Microsoft Research Asia, Beijng, China