ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 4, Issue 2 , February 2017

# JPEG Image Compression using Different Techniques

**K. Sunil Manohar Reddy**

Assistant Professor, Department of CSE, Matrusri Engineering College, Hyderabad, Telangana, India

**ABSTRACT**: The Data Compression is a Technique of reducing the size of the data, where as its quality is to be retained whenever the data is uncompressed. We shall concentrate on the JPEG (Joint Photographic Expert Group) image compression that is general formatted image, obtained from the mobile phone. Since size of the image depends on the quality of image/pixels, to transmit large files uncompressed may take much time. The compression techniques include lossy, lossless, data hiding technique etc. All these techniques give the compression according to their capability and functionality. We try to result in the getting a better compression ratio using the techniques.

**KEYWORDS**: Data Compression, JPEG Image, Mean Absolute Difference, Image Processing.

## I. INTRODUCTION

Image Compression is so important now days that, the pixilation of the image is increasing to the terms of Megabytes. Hence transmitting the Image requires much time, high speed internet connectivity. We find the techniques to reduce the size of the Image by compressing. But After the Compression of the Image to the maximum extent, the Compression must not affect the Image Properties.

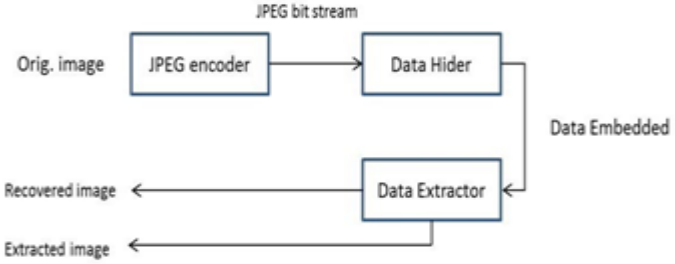
Hence we choose the techniques wisely, the main concentration on the JPEG image, because JPEG is the most common image format used by digital cameras and for transmission of digital images over the internet. And it achieves good compression ratios, preserving the visual quality of the compressed images. Some of the Techniques that are used to compression are data hiding, water marking image, Lossless, transformation coding loss compression. These all are different but all the techniques compress the data according to their capacity. We can try to find the technique that are better for compressing the image in simpler manner and that does not affect the quality of the image.

## II. LITERATURE SURVEY

### A. Data Hiding

As the Data hiding techniques of compression, rely or take the help of redundancy in the cover image. The method uses a measure called Mean Absolute Difference (MAD) values computed with pixel values. The code mapping methods hide data [1]. The JPEG Original Image is been sent the Image encoding to encode/get the image properties and the data Hiding techniques takes place with Data Compression. The same is been sent to extractor if the data needs to be fetched or required for Usage. The Data Hiding Techniques involve, is nothing but the same bits of the image are considered only once by the Algorithm/ techniques rest of the Bits are considered for Compression, then the Common bits are compressed. Hence the Compression of image will be higher.

Fig. 1: Data extraction and hiding process




In the Data Hiding Techniques, if Lena image factor is used, then the Image Compression will be successful for 70-80% compression at Phase Xk [1].

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 4, Issue 2 , February 2017

**B. Water Marking**

In Water marking Image, in the scheme, n-bit authentication watermark is embedded in every 8 × 8 DCT block of the original grey scale image or the luminance component of a color image. Let M× N are the size of the original image and s =M× N/64 the number of non-overlapping 8 × 8 blocks in the image [3]. Based on the User's Secret key K to Hide the Data, a pseudo random no. binary sequence A of size a= S x n is generated. The Authentication watermark Wi of n bits for blocks i is obtained by applying a hash function with the inputs and pseudo random sequence corresponding. To make the authentication watermark dependent on the block position, the block indices are converted to 12-bit binary sequences, denoted by b1,i and b2,i and the final authentication watermark [3] of n bits for block 'i' is obtained by applying a hash function with the inputs b1,i, b2,i.
The JPEG quantization matrix for the quality factor q1 is computed based on the standard luminance quantization matrix, denoted by Q50. The proposition gives 50% Compression efficiency [3]. The efficiency in terms of dB gives approximately of 44.36%.

**C. Lossy Compression**

In Lossy Hyper spectral [2], the technique employs a hybrid 3-D transform; it first applies the low-complexity Karhunen-Loeve transform (KLT) as multi-component extension to JPEG 2000, and then the JPEG 2000 2-D DWT, rate allocation and entropy coding to the spectrally transformed bands. Three levels are performed for the 2- D spatial transform[2]. The inverse KLT transform matrix is written in an MCT marker segment in the compressed file. The post compression rate-distortion optimization is operated on the complete 3-D set of transformed coefficients, ensuring optimal performance. The compression of required set of the 3-d image part/component is done first. In particular, rather than cancelling some least significant spectral components, rate distortion optimization selects an optimal number of bit-planes and coding passes to be retained in each code- block of all 224 transformed components, so as to obtain maximum reconstruction fidelity. Hence it gives the maximum compression for the data/images. A very desirable feature of a compression system for remote sensing images is the ability to generate quick look images without having to fully decode the compressed file [2]. With the increase in KLT and set of transformed coefficients the compression ratios will vary.

**D. Lossless Compression**

In Visual Lossless Compression [5][6], The proposed incremental compression method was compared to a reference compression system where an 8-bit image corresponding to the desired window settings is created from a 12-bit CT image first at the encoder. This image is then compressed to achieve visually lossless compression. When the window settings are updated, a new 8-bit image corresponding to the updated window settings is created and compressed in a visually lossless manner [5]. A JPEG2000 based image compression method to achieve visually lossless compression [6] for a given window level and width was then proposed. A validation study was performed to confirm that the images obtained using the proposed method cannot be distinguished from original windowed images.
This method is also extended to a client- server setting where the server transmits incremental data to the client to ensure visually lossless representation after adjustments to the window level and width are made at the client side.

## III. CONCLUSION

The Techniques presented for compressing the image, each technique implemented has its own capacity to compress the data, each time the compression would result in better compressing of image. Thus the compression of the image by water marking-based image authentication robust [3] gave better compression ratio of approximate 50% using the JPEG quality factor, when compared to the other techniques.
The paper sheds light on the reduction of the size of image for transmission over network, since large file might end up with the time complexity as it might take more time to upload and download an image. Water marking with DCT (Discrete Cosine Transform) techniques can be used for compressing the image, this technique also tries to overcome the loss of quality of image that might occur while compression.

## REFERENCES

[1] Sang-ug Kang_, Xiaochao Qu, and Hyoung Joong Kim, Compressing JPEG Compressed Image Using Reversible Data Hiding Technique 2014.

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 4, Issue 2 , February 2017

[2] Barbara Penna, Tammam Tillo, Enrico Magli, Gabriella Olmo, Transform Coding Techniques for Lossy Hyperspectral Data Compression, Ieee Transactions On Geoscience And Remote Sensing, Vol. 45, No. 5, May, 2007.

[3] R.O. Preda and D.N. Vizireanu, Watermarking- based image authentication robust to JPEG compression. 5th November 2015 Vol. 51 No. 23, pp. 1873–1875.

[4] A. M. Alattar, "Reversible watermark using the difference expansion of a generalized integer transform," IEEE Trans. on Image Processing, vol. 13, no. 8, pp. 1147-1156, 2014.

[5] Tony Leung1, Michael W. Marcellin1 and Ali Bilgin2, 1, Visually Lossless Compression of Windowed Images, IEEE Data Compression DOI 10.1109/DCC.2013.84 2013.

[6] H. Oh, A. Bilgin, and M. W. Marcellin, "Visually lossless encoding for JPEG2000," IEEE Transactions on Image Processing, Vol. 22, No. 1, pp 189-201, Jan 2013.