International Journal of Contemporary Research in Computer Science and Technology (IJCRCST) ISSN: 2395-5325
Volume 3, Special Issue 3 (September '2017)
Proceeding of - International Conference on Recent Trends in Computational Life Science and Information Technology,
Conference held at Tiruppur Kumaran College for Women,Tirupur,Tamilnadu, India.

A REVIEW ON IMAGE COMPRESSION TECHNIQUES

P.Dhivyabharathi,
Research Scholar,
Department of Computer Science
Vellalar College for Women (Autonomous)
Erode, Tamilnadu,India.

V.Priya,
Assistant Professor,
Department of Computer Science,
Vellalar College for Women (Autonomous),
Erode,Tamilnadu,India.

Abstract: People may share a transmitting and storing millions of images each and every second. For transmission and storage of large dataset image compression technique is an essential approach. Although, data compression is typically done to avoid the more memory space and to enhance capacity of the storage devices. Consequently, to order of perfect, image compression algorithm is very high which can be used to make something less in size the resources usage. This technique is presented the study of various lossless compression and lossy compression techniques.

Keywords: Compression, Lossy compression, Lossless compression.

I.INTRODUCTION

In now a day an information technology and enhancements in data transmission have improved momentum in the area of human services. Digital image compression is a field that studies methods for reducing the total number of bits required to represent an image. Image compression is the application of Data compression on computerized images. The target of image compression is to decrease excess of the image information so as to have the capacity to store or transmit information in a productive structure [2,4].Compression is done for the accompanying reasons as to decrease the capacity necessity, handling time and transmission length of time. Image compression is minimizing the size in bytes of a description record without corrupting the nature of image. Image compression can be lossy or lossless. This is on account of lossy compression routines, particularly when utilized at low piece rates, present compression artifacts [7,8,9]. Lossless compression techniques used for high estimation, such as medical imagery or image examines made for a purposes. Lossy routines are particularly suitable for common images, for example, photographs in applications where minor loss of constancy is adequate to accomplish a significant diminishment in bit rate.

II.COMPRESSION TECHNIQUE

Image compression techniques can be divided into two categories. Like

- **Lossless compression technique**
- **Lossy compression technique**

In lossless Compression technique isto defined for the reconstructed image after compression is numerically identical to the original input image. In lossy compression technique is to defined for the reconstructed image contains degradation relative to the original input image.

1. LOSSLESS COMPRESSION TECHNIQUE:

Lossless compression technique is usually two-step algorithms. Then the first step transforms the original image to some other format in inter-pixel redundancy is reduced. The second step uses an entropy encoder to remove the coding redundancy. The lossless compression technique is a perfect inverse process of the lossless compression. In lossless compression Technique is can perfectly recover the original input image from the compressed image. It can also know as noiseless image. There are the following technique are included in lossless compression.

- **Run length encoding(RLC)**
- **Lempel-Ziv-Welch coding (LZW)**
- **Arithmetic coding**
- **Block Transform coding(BTC)**

RUN LENGTH ENCODING (RLC)

The Run length encoding replaces data by a (length, value) pair, where "value" is the repeated value and "length" is the number of repetitions. Then the run length compression technique is useful in case of repetitive data. In this technique the sequence identical symbol or pixel is replace and it is known as run by shorter symbol. This technique is especially successful in compressing bi-level images since the occurrence of a long run of a value is rare in ordinary gray-scale images.

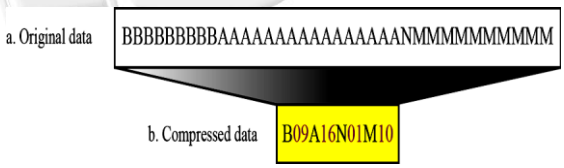

Figure 1:Run length encoding

.

LEMPEL-ZIV-WELCH (LZW)

Lempel-Ziv-Welch (LZW) coding, assigns fixed-length code words to variable length sequences of source symbols.LZW coding conceptually very simple. At the onset of the coding process, a codebook or dictionary containing the source symbols to be coded is constructed. For 8-bit monochrome images, the first 256 words of the dictionary are assigned to intensities 0,1,2,…,255.As the encoder sequentially examines image pixels, intensity sequences that are not in the dictionary are placed in algorithmically determined locations.

ARITHMETIC CODING

The method of generating variable-length codes called arithmetic coding. Arithmetic coding is especially useful when dealing with sources with small alphabets, such as binary sources, and alphabets with highly skewed probabilities. Normally, a string of characters such as the

words "hello there" is represented using a fixed number of bits per character, as in the ASCII code. Arithmetic coding stands out in terms of elegance, effectiveness and versatility, since it is able to work most efficiently in the largest number of circumstances and purposes. When a string is converted to arithmetic encoding, frequently used characters will be stored with little bits and not-so-frequently occurring characters will be stored with more bits, resulting in fewer bits used in total.

BLOCK TRUNCATION CODING(BTC)

The image is divided into non overlapping blocks of pixels. For each block, threshold and reconstruction values are determined. The threshold is usually the mean of the pixel values in the block. Then a bitmap of the block is derived by replacing all pixels whose values are greater than or equal (less than) to the threshold by a 1 (0). Then for each segment (group of 1s and 0s) in the bitmap, the reconstruction value is determined. This is the average of the values of corresponding pixels in the original block.

2.LOSSY COMPRESSION TECHNIQUE:

Lossy compression is acceptable in many imaging applications. In video transmission, a slight loss in the transmitted video is not noticed by the human eye. Then the quantized is including removing psycho-visual redundancy to represent the packed information with as few bits as possible. The quantized bits are then efficiently encoded to get more compression from the coding redundancy. There are the following technique are included in lossy compression.

- **Vector Quantization**
- **Scalar Quantization**
- **Transformation coding**

VECTOR QUANTIZATION

The most powerful and quantization technique is used for the image compression is vector quantization (VQ).The vector quantization algorithms for reducing the transmission bit rate or storage have been extensively investigated for speech and image signals. The vector quantization (VQ) includes four steps: [1] vector formation, [2] Training set selection, [3] codebook generation, [4] quantization. The first step is to divide the input image into set of vectors.

The codebook of code words is obtained by an iterative clustering algorithm. Finally, in quantizing an input vector, closest code words in the codebook is determined and corresponding label of this code word is transmitted. The vector quantization is a classical quantization technique for signal processing and image compression which allows the modeling of probability density functions by the distribution of prototype vectors. Main use of vector quantization (VQ) is for data compression. Hence VQ is suitable for lossy data compression. It can also be used for lossy data correction and density estimation.

SCALAR QUANTIZATION

The most common type of quantization is known as scalar quantization. Scalar quantization, typically denoted as Y=Q (x), is the process of using a quantization function Q to map a scalar (one-dimensional) input value x to a scalar output value Y. Scalar quantization can be as simple and intuitive as rounding high-precision numbers to the nearest integer, or to the nearest multiple of some other unit of precision.

TRANSFORMATION CODING

The transformation coding is to convert the data into a form, so the compression is to be easier. This transformation coding will transform the pixels are correlated into a representation where they are decorrelated. The new values are smaller on more than the original values. The net effect is to reduce the redundancy of representation. Lossy compression technique, the transform coefficients can be quantized according to their statistical properties, producing a more compressed representation of the original input image data. The fundamental notion of accomplishing compression in this method is that just couples of critical coefficients are chosen and remaining is disposed of. The chosen coefficients are further quantized and entropy encoding is applied.

III.LITERATURE SURVEY

GauravVijayvargiya et al have discussed a point by point perspective of lossy and lossless image compression techniques are surveyed. The research observes objective is to estimate image compression under different image compression Techniques. The paper deliver a review of various existing lossless image compression techniques, thus contributing the needed information for medical image compression with high quality using same the lossy and lossless compression techniques.

Srikanth.S and Mehr.S et al have specified these algorithms were tested on different images, and it is seen that the results obtained by these algorithms have good quality and it provides high compression ratio as compared to the already existing lossless image compression techniques. Lossless compression techniques might likewise be favored for high esteem substance; Lossy routines are particularly suitable for common images, for example, photographs in applications where minor loss of constancy is adequate to accomplish a significant diminishment in bit rate. The lossy compression techniques that create cloudy contrasts can be called outwardly lossless.

M.FerniUkritet al have proposed a survey on various Lossless compressing techniques in Medical image compression. Compression algorithms like lossless JPEG are analyzed and it is suggested that JPEG_LS is the best algorithm based on compression speed and compression ratio. An image compression is unlike continuous enhancements that are exploiting as a part of image compressions techniques.

Nilesh B et al have presented an Image compression using discrete wavelet transforms. To represent a various techniques of image compression. And it is suggested that, comparing the performance of compression technique is difficult unless identical data sets and performance measures are used. It is found that the lossless image compression technique is most effective over the lossy compression technique. It is delivered that in some area of the neural network origin algorithm are used for image compression.

Harjeetpalsingh and Sakhi Sharma et al have presents a hybrid model which is the combination of several compression techniques. The cross-breed image compression Using DWT, DCT & Huffman encoding techniques are used in lossless image compression techniques. And this technique demonstrates that the PSNR and MSE are better than the preceding algorithms because of the application of DWT and DCT. Good level of compression is also achieved. Thus the result shows that the cross-breed algorithm performs better in term of peak signal-to-noise-ratio with a higher compression ratio.

C. Rengarajaswamy, et al have presents to analyze different types of existing method of image compression. An image compression is significantly different then compression of binary raw data. To solve these uses different types of techniques for image compression techniques. There are mainly two types of image compression techniques exist. To comparing the performance of compression technique is difficult unless identical data sets.

Pralhadrao V Shantagiri, et al have specified a new spatial domain of lossless image compression algorithm for synthetic color image of 24 bits. They establish the principles of PSR (Pixel Size Reduction) lossless image compression techniques. They also had shown the approaches of compression and decompression of their presented algorithm. Future work of this Algorithm used to the other tree based lossless image compression techniques.

IV. CONCLUSION

This research paper consideration the idea of image compression and different progressive enhancements that are utilized as a part of image compression techniques. These are still a challenging task for the researchers and academicians. There are mainly two types of image compression techniques exist. The paper provides a review of various existing lossless image compression techniques, thus providing the needed information for various applications with high quality using lossless compression techniques. More than analyze can be extended by providing the image compressions using hybrid models.

V.REFERENCES

[1] Uli Grasemann and Risto Miikkulainen,Effective Image Compression using Evolved Wavelets, ACM, pp. 1961-1968, 2005.

[2] A. Sivanantha Raja , D. Venugopal , S. Navaneethan," An Efficient Coloured Medical Image Compression Scheme using Curvelet Transform", European journal of scientific research vol.80,2012.

[3] Suresh Yerva, Smita Nair and Krishnan Kutty, Lossless Image Compression based on Data Folding, IEEE, pp.999-1004, 2011.

[4] Joan Puatescheme to embed a digital signature in to an image "in signal processing laboratoryr4, Switzerland.

[5] Ashutosh Dwivedi, N Subhash Chandra Bose, Ashiwani Kumar."A Novel Hybrid Image Compression Technique": Wavelet -MFOCPN, 2012.

[6] Firas A.Jassim and Hind E.Qassim," Five Modulus Method for Image Compression", Vol.3, 2012.

[7] K. Rajakumar and T. Arivoli "Implementation of Multiwavelet Transform coding for lossless image compression," IEEE, pp. 634 637, 2013.

[8] Firas A. Jassim and Hind E. Qassim, "Five Modulus Method for Image Compression", SIPIJ Vol.3, No.5, pp.19-28, 2012.

[9] S. Sahami and M.G. Shayesteh,"Bi -level image compression technique using neural networks" IET Image Process, Vol. 6, Issue 5, pp. 496–506, 2012.

[10] Survey: Various techniques of image compression" Volume 10,NO-10, October 2013.

[11] PAO-YEN LIN "Basic image compression algorithm and introduction to jpeg standard" National Taiwan University, Taipei, Taiwan, ROC.

[12] G.M.Padmaja,P.Nirpuma "Analysis of various image compression techniques" APRN journal of science and technology VOL.2, NO.4,May 2012.