ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

A Survey on Hybrid Image Compression Techniques for Video Transmission

Marugandla Madhavaiah
M.Tech
Department of Electronics and Communication Engineering,
Global College of Engineering and Technology(GCET),
Kadapa, A.P 516162, India.

T. Rama Mohan Reddy
Assistant Professor
Department of Electronics and Communication Engineering,
Global College of Engineering and Technology(GCET),
Kadapa, A.P 516162, India.

Abstract:
The lossless compression is that allows the original data to be perfectly reconstructed from the compressed data. Lossless compression programs do two things in sequence: the first step generates a statistical model for the input data, and the second step uses this model to map input data to bit sequences in such a way that probable. The main objective of image compression is to decrease the redundancy of the image data which helps in increasing the capacity of storage and efficient transmission. Image compression aids in decreasing the size in bytes of a digital image without degrading the quality of the image to an undesirable level. Image compression plays an important role in computer storage and transmission. The purpose of data compression is that we can reduce the size of data to save storage and reduce time for transmission. Image compression is a result of applying data compression to the digital image.

Keywords: ***Lossless image compression, Arithmetic coding, Huffman coding and Data folding***

INTRODUCTION

Digital processing is the use of computer algorithms to perform image processing on digital images. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. IMAGE COMPRESSION: Image compression is minimizing the size in bytes of a graphics file without degrading the quality of the image to an unacceptable level. The reduction in file size allows more images to be stored in a given amount of disk or memory space. It also reduces the time required for images to be sent over the Internet or downloaded from Web pages. Types of image compression: A. Lossless Compression Techniques: Lossless compression compresses the image by encoding all the information from the original file, so when the image is decompressed, it will be exactly identical to the original image. Examples of lossless image compression are PNG and other images in which geometric shapes are relatively simple. • Run Length Encoding • Entropy Encoding • Huffman Encoding • Arithmetic Coding • Lempel–Ziv–Welch Coding B. Lossy Compression Techniques: Lossy compression is most commonly used to compress multimedia data (audio, video, and still images). Lossless compression is typically required for text and data files, such as bank records and text articles. In many cases it is advantageous to make a master lossless file that can then be used to produce compressed files for different purposes; for example, a multi-megabyte file can be used at full size to produce afull-page advertisement in a glossy magazine, and a 10 kilobyte lossy copy can be made for a small image on a web page. • Predictive coding • Transform coding.

Cite this article as: Marugandla Madhavaiah & T. Rama Mohan Reddy, "A Survey on Hybrid Image Compression Techniques for Video Transmission", International Journal & Magazine of Engineering, Technology, Management and Research, Volume 6 Issue 2, 2019, Page 26-29.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

BASIC CONCEPT OF IMAGE COMPRESSION

The motivation of data compression is using less quantity of data to represent the original data without distortion of them. [11]Consider the system in (Fig. 1), Encoder receives the target image; it converts the image into bit stream b. On the Other hand, the decoder receives the bit stream and then converts it back to the image I quantity of bit stream b less than the original image then we call this Process Image Compression Coding.

Fig 1.Original image 83261bytes

Fig 2.Decoded image 15138bytes

There is an example in (Fig. 2) using JPEG image compression standard. The compression ratio is 15138 / 832610.1818, about, around one fifth of the original size. Besides, we can see that the decoded image and the original image are only slightly different.

PROCEDURE FOR IMAGE COMPRESSION

The general steps involved in compressing an image are • Specifying the Rate (bits available) and Distortion parameters for the target image. • Dividing the image data into various classes, based on their importance. • Dividing the available bit budget among these classes, such that the distortion is a minimum. • Quantize each class separately using the bit allocation information derived in step 3. • Encode each class separately using an entropy coder.

LITERATURE SURVEY

Sri kanth.S and Mehr S. (2013)" [1] Compression efficiency for combining different embedded images"[1]In this paper we using different wavelet families and after that compare the PSNRs and bit rates of these families. 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 previous exist lossless image compression technique. In which we use the different embedded Wavelet based image coding with Huffman-encoder for further compression. In this paper they implemented the SPIHT and EZW algorithms with Huffman encoding. Nilesh B (2000)"image compression using discrete wavelet transform" [2] this paper presents various techniques of image compression. In which we 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. In which we analyze the different type of existing compression methods. In present time some other techniques are added with basic method. In some area the neural network genetic algorithm are used for image compression. Y.Suresh at all (2011)"lossless image compression based on data folding" The basic concept of data compression which is applied to modern image and

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

video compression techniques such as JPEG, MPEG, and MPEG-4 and so on. The basic idea of data compression is to reduce the data correlation. By applying Discrete Cosine Transform (DCT), the data in time (spatial) domain can be transformed into frequency domain. Because of the less sensitivity of human vision in higher frequency, we can compress the image or video data by suppressing its high frequency components but do no change to our eye. We introduce a method called Motion Estimation (ME). In this method, we find similar part of image in previous or future frames. Then replace the image by a Motion Vector (MV) in order to reduce time correlation [3]. Puate j and Jordon F ("using Fractal scheme to embed a digital signature in to an image" [4]. We propose a new scheme based on a fractal coding and decoding. A fractal coder exploits the spatial redundancy within the image by establishing a relationship between its different parts. We describe a way to use this relationship between its different parts. Concerning a low pass filtering, the tests that have been performed for n=4, show some weakness against blurring convolutions. But n=8 the technique appeared to be very robust, even when the blurring attack was followed by a JPEG compression. Dwivedi A at al (2012), "A Novel Hybrid Image Compression Technique" [5] in this survey, they combined the classical wavelet based method with MFOCPN. In this they analysis that Haar wavelet results in higher compression ratio but the quality of the reconstructed image is not good. In which db6 with the same number of wavelet coefficients leads to higher compression ratio with good quality. Overall they found that the application of db6 wavelet in image compression out performs other two. In this scheme several tests are used to investigate the usefulness of the proposed scheme. Jassim F and Qassim E (2012)"Five modules method for image compression" [6] in this paper we converting each pixel value 8x8 pixel value. A multiple of 5 for each of RGB array. After that the value could be divided by 5 to get new values which are bit length for each pixel and it is less in storage space than the original values which is 8 bits. The advantage of their method is it provided high PSNR (peak signal to noise ratio) although it is low CR compression ratio. This method is appropriate for bi-level like black and white medical images where the pixel in such images is presented by one byte (8 bit). In 2013, K. Rajkumar, et al presents an "Implementation of multiwavelet transform coding for lossless image compression" [7]. In this paper the performance of the IMWT (Integer Multiwavelet Transform) for lossless studied. The IMWT provides good result with the image reconstructed. In this paper, the performance of the IMWTfor lossless compression of images with magnitude set coding has been obtained. In this proposed technique the transform coefficient is coded with a magnitude set of coding & run length encoding technique. The performance of the integer multi wavelet transform for the lossless compression of images was analysed. It was found that the IMWT can be used for the lossless image compression. The bit rate obtained using the MSVLI (Magnitude Set-Variable Length Integer Representation) with RLE scheme is about 2.1 bpp (bits per pixel) to 3.1 bpp less then that obtain using MS-VLI without RLE scheme. In 2012, Firas A. Jassim, et al presents a novel method for image compression which is called "five module method for image compression"[8]In this method converting each pixel value in 8x8 blocks into a multiple of 5 for each of RGB array. After that the value could be divided by 5 to get new values which are bit length for each pixel and it is less in storage space than the original values which is 8 bits. This paper demonstrates the potential of the FMM based image compression techniques. The advantage of their method is it provided high PSNR (peak signal to noise ratio) although it is low CR (compression ratio). In 2012, S.Sahami, et al presents a "bi-level image compression techniques using neural networks"[9] It is the lossy image compression technique. In this method, the locations of pixels of the image are applied to the input of a multilayer perceptron neural network. The output the network denotes the pixel intensity 0 or 1. The final weights of the trained neural-network are quantized, represented by few bites, Huffman encoded and then stored as the compressed image. Huffman encoded and then stored as the compressed image. In the decompression phase, by applying the pixel locations to the trained network, the output determines the intensity.

The results of experiments on more than 4000 different images indicate higher compression rate of the proposed structure compared with the commonly used methods such as comite consultant international telephonique of telegraphic graphique (CCITT) G4 and joint bi-level image expert group (JBIG2) standards.

CONCLUSION

This research paper surveys the idea of image compression and different progressive enhancements that are utilized as a part of image compression. A review is performed on the most key compression systems, by studying the fundamental ideas of image compression. The paper provides a review of various existing lossless image compression techniques, thus providing the needed information for medical image compression with high quality using both the lossyand lossless compression techniques. Further the research can be extended by providing the image compressions using hybrid models.

REFERENCES

[1] S.Srikanth, SukadevMeher,"Compression Efficiency for Combining Different Embedded Image Compression Techniques with Huffman Encoding" IEEE, 2013.

[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, pp.416-422,2012.

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

[4] Joan Puate, Fred Jordan "Using fractal compression scheme to embed a digital signature in to an image "in signal processing laboratoryr4, Switzerland.

[5] AshutoshDwivedi, N Subhash Chandra Bose, AshiwaniKumar."A Novel Hybrid Image Compression Technique": Wavelet -MFOCPN, 2012.

[6] FirasA.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.