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# "HYBRID MODEL FOR LOSSLESS IMAGE COMPRESSION USING THE OPTIMIZATION TECHNIQUES"

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## ABSTRACT

***Digital images are characterized by multiple parameters. The first feature of a digital image is its color mode. A digital image can have one of three modes: binary, grayscale or color. All this images are used in the various applications area such as medical science, military applications, general purpose applications for the any organization such as public or private sector, security system etc. Image compression takes advantage of the fact that there is a lot of redundant information contained in the original image. In this paper we proposed a comparative model for the image compression which is better in the terms of result by measuring performance evaluation parameters to increase the value of Peak Signal Noise Ratio, compression ratio and reduce the elapsed time etc. Our simulation done with Matlab software with some standard types of images such as cameraman image, boat image and lena image etc.***

***Keyword:*** *Image processing, PSNR, Optimization techniques, Compression ratio, Hybrid model.*

## I. INTRODUCTION

An image is an artifact that depicts or records visual perception. Group of pixels arranged in an order to form an image. There are various kinds of images are exist like binary, intensity, RGB images. Image or video or music compression is the technique is used to reduce the size of data without losing the data. This plays a very important wing is using inserting information and transferring information; henceforth it has an extent of application [1].

Images usually occupy more space on a hard disk or bandwidth in a transmission system than words. It goes against the saying, 'An image is worth a thousand words'. Hence, in the wide area of signal processing, efficient signal representations is a very high-activity research domain. Efficiency, in this perspective, means to include a representation from which we can recover some estimation of the original signal, which doesn't occupy larger space. Unluckily, these are conflicting requirements; to have better pictures, we usually require more memory. Digital image processing is the use of computer algorithms to perform image processing on digital images. It allows various algorithms to be applied to the input data and can overcome the problems such as the build-up of noise and signal distortion during processing [20].

Images are important documents today to work with them in some applications there is need to be compressed. Compression is more or less it depends on our aim of the application. Image compression plays a very important role in

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the transmission and storage of image data as a result of and storage limitations. The main aim of image compression is to represent an image in the fewest number of bits without losing the essential information content within an original image. Compression techniques are being rapidly developed for compress large data files such as images. With the increasing growth of technology a huge amount of image data must be handled to be stored in a proper way using efficient techniques usually succeed in compressing images. There are some algorithms that perform this compression in different ways; some are lossless and lossy. Lossless keep the same information as the original image and in lossy some information loss when compressing the image. Some of these compression techniques are designed for the specific kinds of images, so they will not be so good for other kinds of images [17].

Image compression is a utilization of information compression which lessens the measure of information by diminishing insignificance and excess of the image information, so information can store and transmit in an effective form. Digital image is essentially two dimensional exhibit of pixels. Good quality of image require more amount of space for maintaining quality of image [1]. With the continuing growth of modern communications technology, demand for digital image transmission and storage is increasing rapidly. Digital technology has given a great benefit to the area of image processing. Image compression is an economically viable alternative to these constraints by reducing the bit size required to store and represent the images, while maintaining relevant information content. The improvement of computer hardware including processing power and storage power has made it possible to utilize many-sophisticated signal processing techniques in advanced image compression algorithms [15]. Compression refers to reducing the quantity of data used to represent a file, image or video content without excessively reducing the quality of the original data. Image compression is the application of data compression on digital images.

The main purpose of image compression is to reduce the redundancy and irrelevancy present in the image, so that it can be stored and transferred efficiently. The compressed image is represented by less number of bits compared to original. Hence, the required storage size will be reduced, consequently maximum images can be stored and it can transferred in faster way to save the time, transmission bandwidth [14]. Data compression a method that takes an input data D and generates the data C (D) with the less number of bits as compared to input data. The reverse process is called decompression which takes the compressed data C (D) and reconstructs the data D' as shown in figure 1.

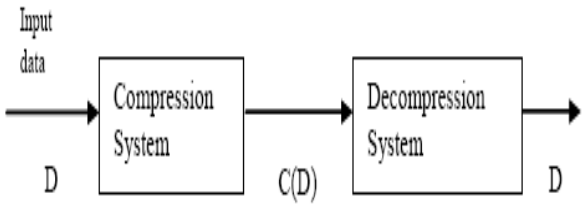


**Fig 1:** Conversion of an image.

## II. LOSSLESS IMAGE COMPRESSION

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 [2] image compression are PNG and GIF. When to use a certain image compression format really depends on what is being compressed. Lossless data compression techniques are applied on text data or scientific data and preferred for artificial images such as technical drawings, icons or comics. Lossless compression method may also be preferred for high value content, such as medical image scans made for archive purposes. Lossless compression is usually two steps algorithm. The first step transforms the original image to some other format in which the inter-pixel redundancy is reduced. The second step uses an entropy encoder to remove the coding redundancy. The lossless decompression is a perfect inverse process of the lossless compressor [13]. In the lossless compression the compressed image is totally replica of the original input image, there is not any amount of loss present in the image.

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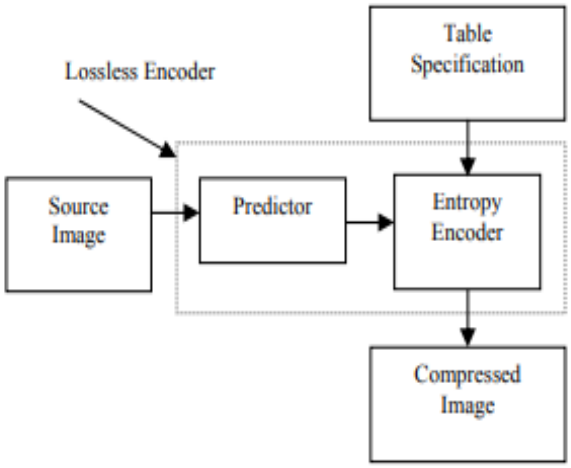


**Fig 2:** Block Diagram for Lossless Compression.

## III. PROPOSED WORK

In this section describe the proposed algorithm in a hybrid model for image compression using transform techniques with swarm intelligence techniques; here we apply the particle swarm optimization as swarm intelligence techniques for the compression of an image. Basically the swarm intelligence techniques provides the better optimal results than existing techniques, which is based on the their particle position and velocity updating, also communicate their particle value each time and exchange if they need. In this hybrid image compression model we used with particle swarm optimization which is used to improve the quality of image compression parameters measurements. Particle swarm optimization used for removal of redundant structure of packet in common similar block and create separate block and then both block forwarded for to decomposition of an image then we apply the image compression techniques and finally images are compressed and we getting the performance parameters measurement values. For the searching of redundant structure block and non-redundant structure block used fitness constrains function, those structure satisfied the given constraints are called non redundant structure else redundant structure. The proposed algorithm is a combination of discrete wavelet packet transform function and particle swarm optimization.

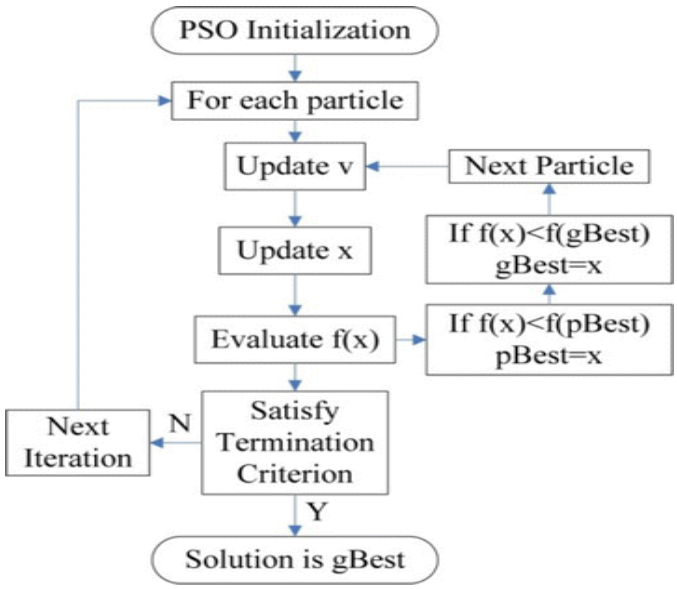


**Fig 3:** Architecture of Particle Swarm Optimization.

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## IV. EXPERIMENTAL WORK

In this section, experimental process of image compression is performed. This process of image compression is done by using three methods that are with discrete wavelet transformation and proposed methods i.e. particle swarm optimization techniques. This all methods implemented in Matlab simulation software.


**Fig 4:** This figure shows that the select the boat input image for experimental work using the previous method.

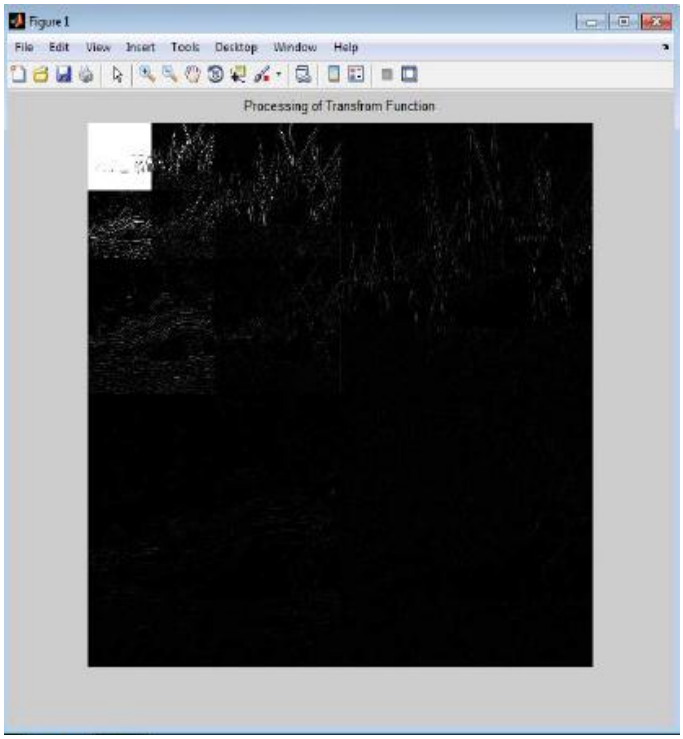


**Fig 5:** This figure shows that the image transformation window for experimental work using the previous method.

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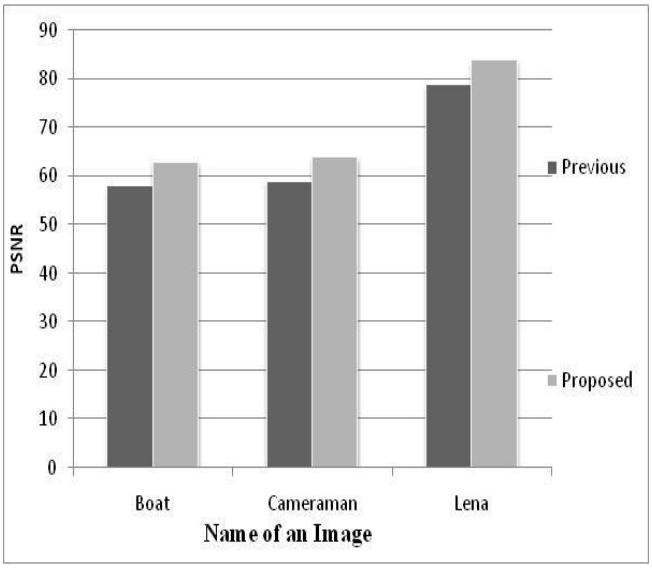


**Fig6:** The above figure show that the comparative experimental study for image compression techniques using the boat, cameraman and lena input image and the performance parameter is PSNR.

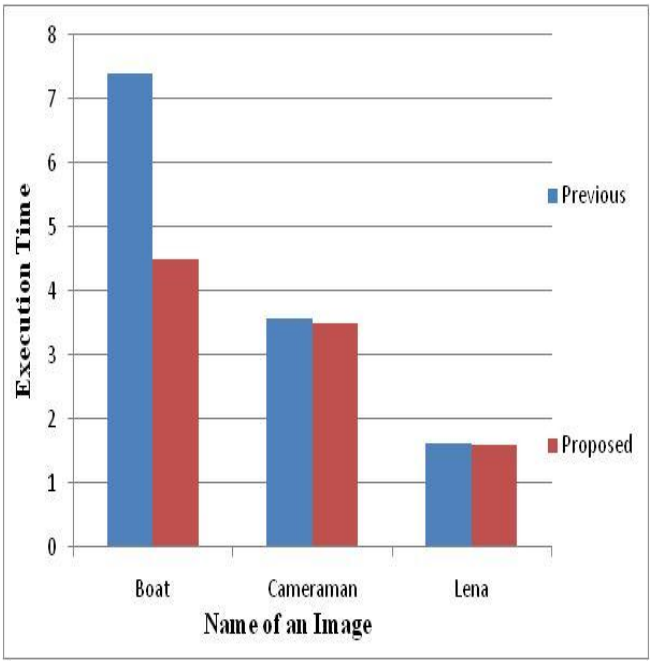


**Fig 7:** The above figure show that the comparative experimental study for image compression techniques using the boat, cameraman and lena input image and the performance parameter is execution time.

## V. CONCLUSION

In this paper we design a new hybrid model for the image compression to improve the quality of an image which is measured in the form of performance parameters such as PSNR, compression rate and compression ratio etc. our proposed methods compare with existing image compression techniques and our proposed methods show better results than existing techniques. Our result analysis based on the experimental process we simulate with Matlab software with standard image databases such as lena, cameraman and boat image etc.

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