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Lossless Image Compression Technique Using Lzw Methods

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ABSTRACT: *The development of multimedia and digital imaging has led to high quantity of data required to represent modern imagery. This requires large disk space for storage, and long time for transmission over computer networks, and these two are relatively expensive. These factors prove the need for images compression. Image compression conveys the difficulty of reducing the amount of space needed for representing a digital image to provide a compact representation of an image. Then it reduces the image storage or transmission time requirements. The main idea is to remove redundancy of data presented with in an image to reduce its size without affecting the essential information of it. We proposed lossless image compression in this paper. Our proposed approach is a mix of a number of already existing techniques. Our approach is follows: first, we apply the well known Lempel-ziv-welch (LZW) algorithm on the image in hand. The result from the first step is forward to the second step where the Bose, chaudhuri and hocquenghem (BCH) error correction and detected algorithm is used.*

Keywords: image compression; LZW; BCH.

I. INTRODUCTION

Image compression is a type of an application for data/image compression. In this technique the basic image gets encoded with the limited bits. To lower the irrelevance and the redundancy of image data is the major target of the image compression is for enabling them to get saved or transmit the data in the better form. Image compression is the lowering of the size of the image data, also maintains with the required details. The basic objective of the image compression is to show an image in small quantity of bits also the needed content of information does not lost within the actual image.

Compression techniques are developed rapidly to compress huge files of data like images. By the rapid growth of the technology a large quantity of image data should be managed to store those images in the proper manner by the use of effective techniques normally results in the compressing images.

Image compression is one of the known techniques in the image processing. This technique may have varied implementations and performs a major role in the effective storage and transmission of the images. The image compression is focused at decreasing the redundancy in the image data to record or sends only few numbers of the samples and by this also a good accession can be reconstruct for the actual image corresponding with the perception of human visual. Block diagram of image compression system is shown in below figure.

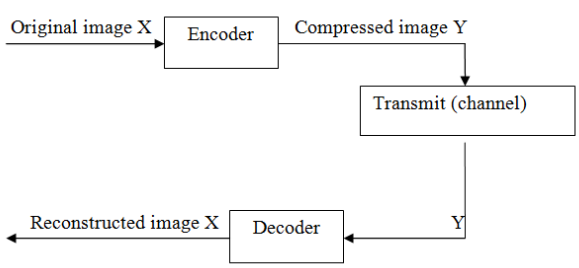

FIG 1. BLOCK DIAGRAM OF IMAGE COMPRESSION SYSTEM.

Compression is obtained by eliminating any of one or more of the below three fundamental data redundancies:

1. Coding redundancy: This is presented when the less than best (that is the smallest length) code words were used.

2. Inter-pixel redundancy: This results from the correlations between the pixels of an image.

3. Psycho-visual redundancy: This is because of the data which is neglected by human visual-system (that is, visually not required information).

II.TYPES OF IMAGE COMPRESSION

Image compression can be further classified or divided in two separate types such as lossy compression and lossless compression. In the lossy compression as its name indicated that it results in the loss of little information. In this technique the compressed image is same as to actual/original uncompressed image yet not exact to the previous one as within the compression process littler information related to the image has been lost. So they are normally applied for the photographs. The very natural example of the lossy compression is a JPEG.

Where are in Lossless compression, it compresses an image by encoding it's all information from the actual file, so in case if the image is get decompressed again, then it will be the exactly same as the actual image. For examples of the lossless technique of image compression are PNG and GIF i.e., GIF only provides 8-bit images. At the time of using a specific format of image compression that basically based on what is being get compressed.

The following are the some of the
lossless and lossy data compression techniques:

Lossless coding techniques

1. Run length encoding
2. Huffman encoding
3. LZW coding
4. Area coding

Lossy coding techniques

1. Transformation coding
2. Vector quantization
3. Fractal coding
4. Block Truncation Coding
5. Sub band coding

III.PROPOSED SYSTEM

The objective of the proposed method in this paper is to design an efficient and effective lossless image compression scheme. This section deals with the design of a lossless image compression method. The proposed method is based on LZW algorithm and the BCH algorithm an error correcting technique, in order to improve the compression ratio of the image comparing to other compression techniques in the literature review.

The proposed method is a lossless compression scheme which is applied to all types of image based on LZW algorithm that reduced the repeated the value in image and BCH codes that detect /correct the errors.

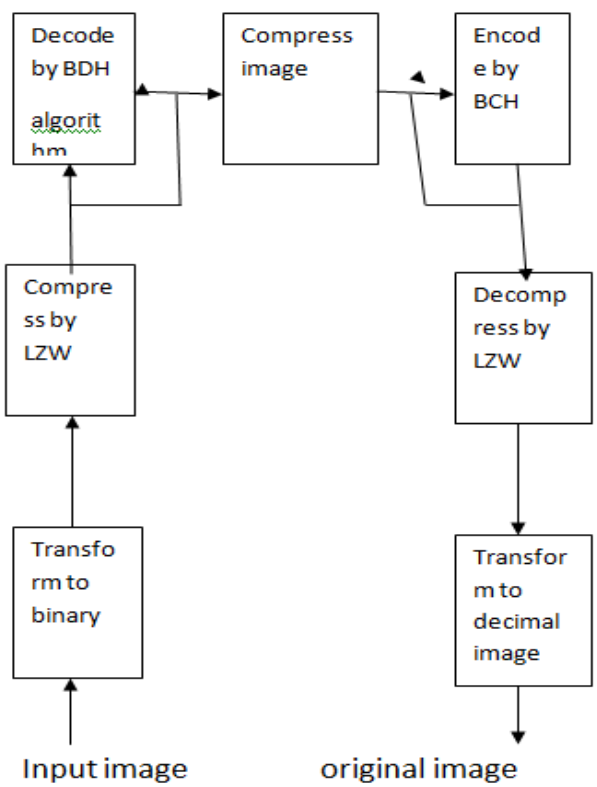

FIG. 2 LOSSLESS COMPRESSION

The compression system improves the compression of the image through the implementation of LZW algorithm. First, the entered image is converted to the gray scale and then converted from decimal to binary to be a suitable form to be compressed. If the patterns are not presented in the dictionary a code phrase is created based on the data content of that pattern, and it is stored in the dictionary.

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IV.RESULTS

FIG. 3 INPUT IMAGE

FIG. 4 COMPRESSED IMAGE

V.CONCLUSION

This paper was motivated by the desire of improving the effectiveness of lossless image compression by improving the BCH and LZW. We provided an overview of various existing coding standards lossless image compression techniques. We have proposed a high efficient algorithm which is implemented using the BCH coding approach.

The proposed method takes the advantages of the BCH algorithm with the advantages of the LZW algorithm which is known for its simplicity and speed. The ultimate goal is to give a relatively good compression ratio and keep the time and space complexity minimum. The experiments were carried on collection of dataset of 20 test images. The result evaluated by using compression ratio and bits per pixel. The experimental results show that the proposed algorithm improves the compression of images comparing compared with the RLE, Huffman and LZW algorithms; the proposed method average compression ratio is 1.636383, which is better than the standard lossless image compression.

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