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Reducing Redundancy within the Image Using Buffer Technique for Image Compression

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ABSTRACT: The image compression is required in order to transmit the images in computer, mobile environment. The analysis in the field of image compression is enhanced its utilization in various fields. For efficient transmission and storage of images, image processing is required and plays an important role. The redundancy within the image will increase the size of the image unnecessarily. These extra pixels have to be eliminated from the image. The proposed technique use discrete cosine transformation with redundancy control mechanism in order to solve the problem. The simulation result shows that the problem is resolved and clarity of image is increased.

KEYWORDS: Image, DCT, Compression, Image Processing, Buffer.

I. INTRODUCTION

Now it is a computer era, dealing with the large amount of data often result in many difficulties. By using image compression techniques we store, retrieve, analyze and process digital information in an efficient way. Many digital technologies have been developed in the field of data storage, image acquisition, bitmap printing etc. Image compression is a technique under image processing. For efficient image transmission and image storage the image compression techniques are plays an important role. Compressing an image is significantly different rather than compressing raw binary data the compression can be used in order to compress the images, but the result is less than optimal, this is because image has certain statistical properties which can be exploited by encoders specially designed for them. It means the Lossy compression techniques can be used in this area. Image Compression identifies the problem of reducing the amount of data required to represent the digital image. We can achieve the mechanism of compression by removing one or more of three basic data redundancies: **Coding redundancy** : Coding redundancy present in image when code assign to a gray level do not take a full advantage of gray level probability. [1] In which same code are used by one or more pixel value. Therefore, in which duplication of code are present or redundancy. **Interpixel redundancy**: Interpixel redundancy also known as spatial redundancy. Interpixel redundancy present in image when correlation between different color planes and spectral bands are founded. [2] In image processing single pixel value can predicated with the help of their neighboring pixel values consequently, much of the single pixel to an image is redundant. **Pyscovisual redundancy**: Human view of the information in an image usually does not involve quantitative analysis of every pixel value in the image. In general, a viewer searches for different features such as edges or texture regions and mentally combines them into familiar grouping with previous knowledge in order to whole the image analysis process [1]. Due to these different features some information has less relative important than other information in normal visual processing with different eye sensitivity.

Coding redundancy and interpixel redundancy are present between the color components and pixels are common to each other. And psychovisual redundancy present from the fact that that human eye is very insensitive to certain interpixel frequencies.

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II. IMAGE COMPRESSION TECHNIQUES

Various techniques can be used to compress the images; we can classify compression techniques in two ways:

1) Lossless compression techniques

In lossless compression techniques, the reconstructed image after compression is numerically identical to the original image. No noise or any losses are found reconstructed image. In which statistical or decomposition techniques used to reduce redundancies [3]. Following are some lossless techniques:

a) Run length coding
b) Entropy encoding
c) Arithmetic encoding
d) Area coding

2) Lossy compression techniques

In lossy compression, the reconstructed image compression is not identical to the original image, some losses are found in sense of noise, blurring etc in reconstructed image. A lossy technique causes image quality degradation in each compression or decompression step [4]. Lossy techniques has greater compression ratio as compare to lossless techniques. Following are some lossy compression techniques:

a) Transformation coding
b) Vector quantization
c) Fractal coding
d) Block truncation coding
e) Subband coding

III. RELATED WORK

There are number of paper described the problem of redundancies. In order to build the base we analyzed the number of papers. These papers consider the compression technique for jpeg images. The images are compressed to reduce the size and storage space required to it during transmission. The transmission media are charge expenses if the data transferred are large. So, the compression is required. Properly compressed image used the less number of bits to represent the image as compare to original one [5].

In all the papers we analyzed the redundancy within the image due to pixel overlapping is not handled properly. The overlapping pixels will cause pixel distortion and intensity of the pixel becomes fade. The image plotting also is slow in nature [6]. The color of the pixel will be faded due to the overlapping. The problem of overlapping will be resolved by the use of redundancy handling mechanism in spatial domain [7]. The mean filter in discrete cosine transformation is used in order to handle the noise present within the image.

In the existing papers redundancy is handled by the use of complex strategies. The strategies are expensive in nature. In order to overcome the problem we propose a new algorithm which will reduce the redundancy using buffer method. In this method pixel positions are stored within the buffer. The new positions are compared with the existing positions if they are same then they will be eliminated from the result. The previous work is focused on the compression without considering the complexity and cost associated with the system. The proposed work concentrate on the reducing the complexity and improve performance by using buffer method.

IV. PROPOSED ALGORITHM

A. Description of proposed algorithm

The proposed system deals with the redundancy within the image and managing it in such a way that the application of redundancy becomes useful. The redundancy will be eliminated by the use of buffer method in the proposed system. The proposed system will utilized the algorithm in following step:

STEP 1. Input the image

In order to perform the operation first of all image will be received and converted to bits so that the structure of the image can be represented in bit map (.bmp).

STEP 2. Buffer Operation

The retrieved values will be stored within the buffer.

STEP 3. Encoding

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The encoding operation will be performed using the values present within the buffer. The encoded image will be displayed onto the screen.

STEP 4. Transfer

The encoded image will be transferred from source to destination.

STEP 5. Buffer Operation

The values stored within the buffer will be compared against the values which are received from the source. If the pixel values repeat then redundancy is present within the image. The values which are redundant are rejected. The non redundant values are accepted.

STEP 6. Decoding

The values so received are passed from the decoder. The decoded image is again displayed onto the output device.

STEP 7. Comparison

After all the operation is performed then the image which is obtained before and after encoding and decoding is shown graphically. The comparison will list whether the image is distorted or not.

In the proposed system both encoded as well as decoded image will be displayed so that problems present within the image can be shown graphically. When problems are listed graphically then it is easy to understand as compared to command user interface.

B. Pseudo code for proposed system

Buffer = B
Buffer M(X, B)
Step 1. Input the values of pixel position (Xi)
Step 2. Enter the values of pixels within the buffer
Bi=Xi
Step 3. Now perform the comparisons of pixel position with buffer values
If (Xi==Bi)
Reject Xi
Else
i=i+1
End of if
Step 4. The above steps are performed for every pixel value
Step 5. Stop

V. SIMULATION RESULTS

The simulation is conducted in MATLAB. The tool of image processing is available in the software. The simulation indicates that the proposed system is better as compared to the existing technique. The proposed system will eliminate the redundancy and hence reduce the size of the image. The image will be enhanced since overlapping of pixels will be eliminated. In the proposed a buffer will be maintained. The buffer will contain the code of the encoded image which is already produced. When image encoding is done further codes for the image is produced. If the newly generated code is same as the previously generated code then the new code which is generated is rejected. The encoded image as well as decoded image will be displayed over the output device. The codes will be fetched from the buffer.

The simulation results in terms of images and tables will be as follows:

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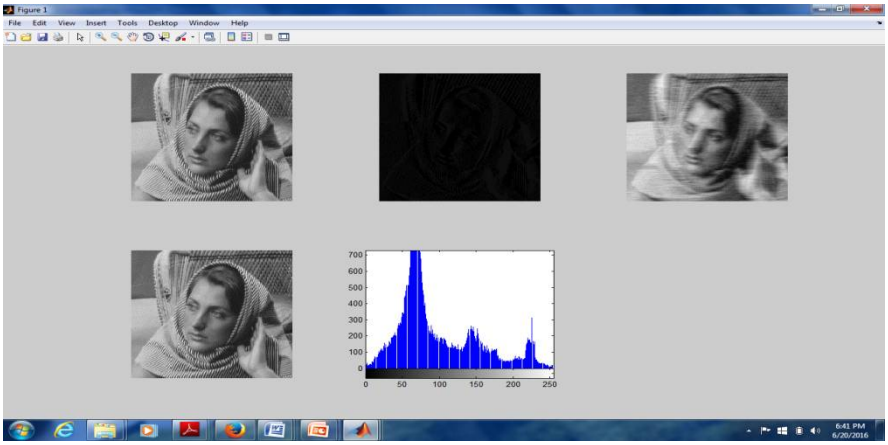

Fig 1. Simulation result for image1

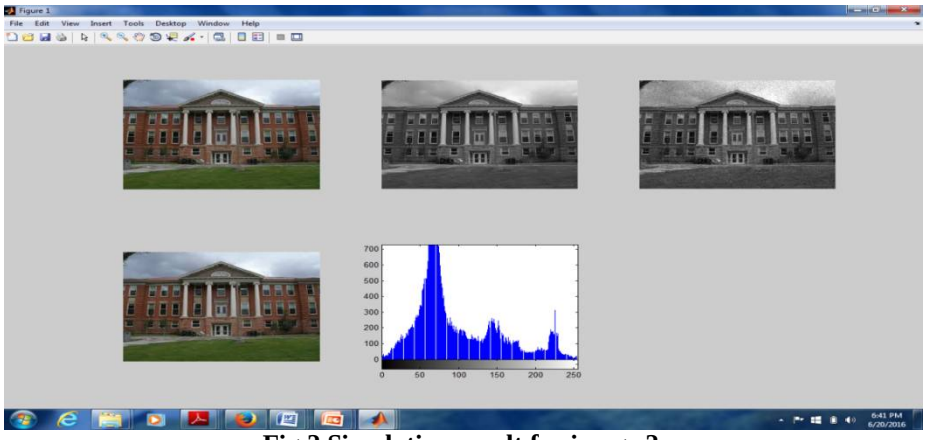

Fig 2.Simulation result for image 2

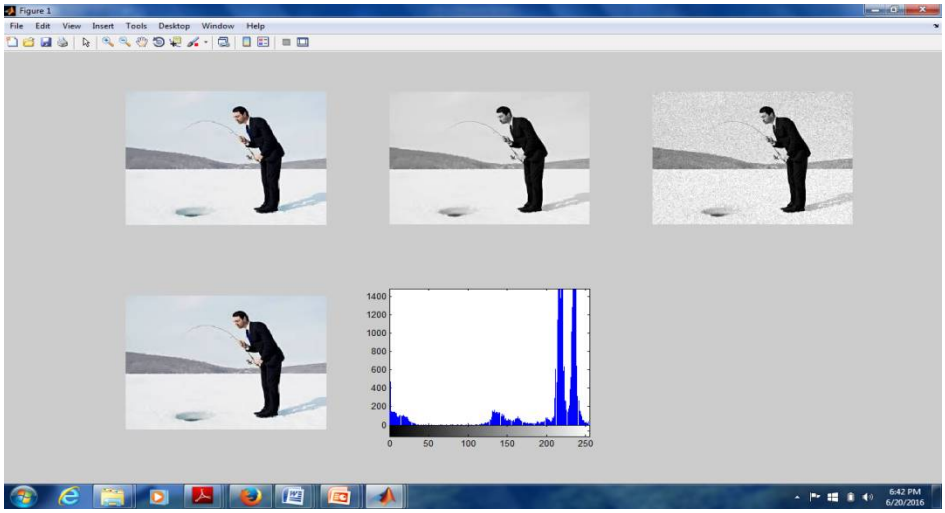

Fig 3.Simulation result for image 3

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The Comparison between the existing and proposed system is plotted as follows

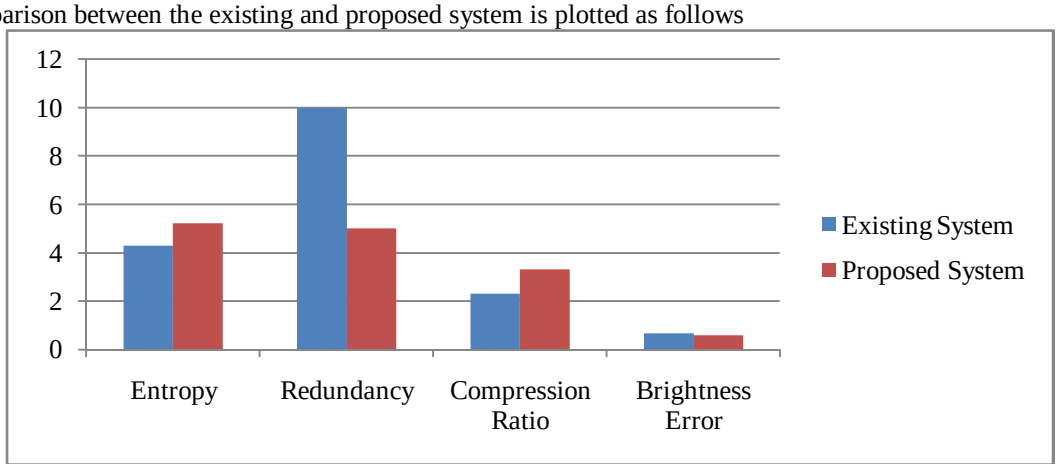

Figure 4: Showing the Comparison of existing and Proposed System

The comparison indicates that the performance of the proposed system is better as compared to the existing system.

VI. CONCLUSION AND FUTURE WORK

In the existing system redundancy is handled by the use of complex strategies. The strategies are expensive in nature. In order to overcome the problem we propose a new algorithm which will reduce the redundancy using buffer method. In this method pixel positions are stored within the buffer. The new positions are compared with the existing positions if they are same then they will be eliminated from the result. The previous work is focused on the compression without considering the complexity and cost associated with the system. The proposed work concentrate on the reducing the complexity and improve performance by using buffer method. So the proposed work will reduce the size of the image and provide the compressed image with less redundancy. The compression ratio is also improved. The proposed system deals with the redundancy within the image and handling it in such a way that the exertion of redundancy becomes useful. The future work will be reducing the number of comparisons required to plot the pixel.

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