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Block Truncation Coding Using Bit Shift Technique

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Abstract: ***This paper proposes a lossless data embedding technique for Block Truncation Coding (BTC) packed together images based on prediction and bit shifting techniques. We used BTC is easy to implement, and requires less CPU cost, it has stimulate widely attention in applications where real-time processing is demanded. Advances in computer method for mass data storage and digital processing have cemented the way for implementing advanced data compression techniques to get better the effectiveness of transmission and storage of images. Bit rate is the principal parameter of a compression technique because it measures and improves the efficiency and the low CPU utilization. The picture has to translate with bilateral shifts bitwise operation more bit patterns. The new alteration is like to the sub band decomposition but can be computed with right shift bit and left shift operations. Then calculation the number of bits required to represent the transformed image is kept diminutive through careful compression. The trial results reveal that the proposed system provides good image quality of the compressed implanted image.***

Keywords: Block Truncation Coding, Digital data communication, compression algorithms, Bit Shift Technique.

I. INTRODUCTION

Digital data communication over the Internet has turn out to be more and more accepted due to the rapid and continuous advance of the networking technologies. The ongoing growth of current communication technology, demand for image communication and storage is growing rapidly. Advances in computer method for mass data storage space and digital processing have smooth the way for implementing advanced data compression techniques to get better the effectiveness of transmission of images and storage space. The aim of the image compression is to convert the image to a space well-organized compressed image. Data compression algorithms lead to decrease in transmission time and storage space cost. Image compression techniques used here is loss method.

These facial appearance take in the bit rate, which gives the ordinary number of bits per stored pixel of the image. Bit rate is the main parameter of a compression procedure because it dealings the efficiency of the technique. Their strengths are considerably dissimilar which make them agreeable to unlike applications. BTC compression algorithms are easy and do well when blocks contain edges or regions of large strength variation.

BTC is a category of glossy image compression technique for gray scale images. It divides the unique images into blocks and then uses a quantize to decrease the number of gray levels in each block. An M x N pixel image is divided into blocks of in general 8 x 8 pixels. Block the Mean and Standard Deviation are calculated through the values change from block to block. These two values describe what standards the reconstructed or new block. BTC compressed image will all have the similar mean and standard deviation of the original image. BTC compression technique was first made to order for color cell before DDBTC. Maximum compression for the fast inspection is preferred. More efficient fast check can be obtained with the glossy plus remaining methods. This way the image quality is gradually improved until perfect reconstruction in the progressive resolution transmission scheme an image with reduced resolution to be displayed in a small size is transmitted first.

A. Overview of Block Truncation Coding

Several improvements of the basic method have been recently proposed in the literature. Most image data compression techniques achieve high data compression ratio. In 1979 the block truncation coding scheme [1] was first proposed by Dell and Retell for grayscale image compression. The block truncation coding (BTC) scheme [2]-[4] is a commonly used image coding method for digital images. The BTC scheme has very simple image encoding/decoding procedures and requires little computational complexity. It can be applied to the compression of monochrome images, moving imagery, color imagery [6], and graphics. The main problem of the BTC scheme is that its compression ratio is low. Some multimedia application based on BTC such as hybrid image coding. A high bit rate of one bit per pixel is needed at each stage in BPM. progressive image transmission. The absolute moment block

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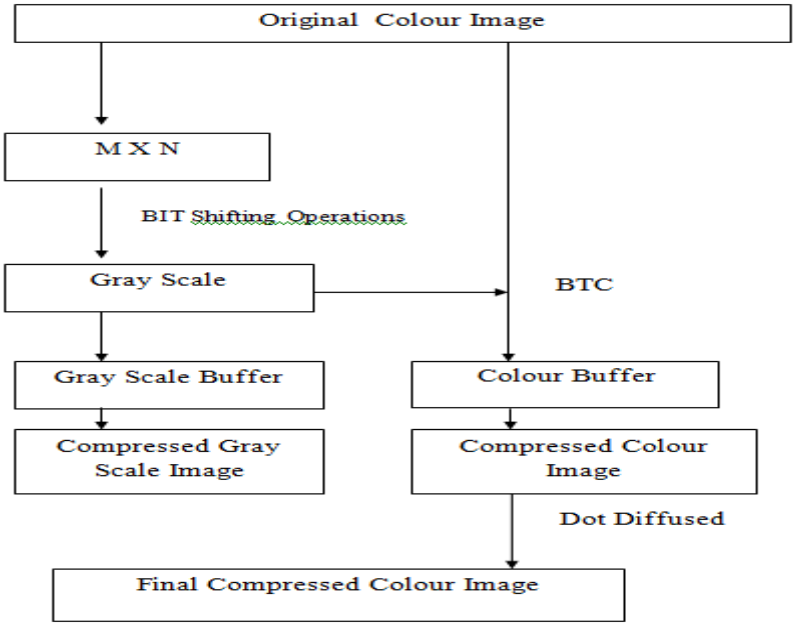
truncation coding (AMBTC) [5] had been proposed to preserve the sample mean and the sample first absolute central moment in 1984. AMBTC can be applied to the compression of the grayscale and color images. It is proved that AMBTC provides better reconstructed image quality than MPBTC. The proposed DDBTC is an improved version of the traditional BTC algorithm and the traditional algorithm will be better introduced for a comprehension. It is also called the moment-preserving block truncation coding (MPBTC) scheme because it preserves the first and second moments of image blocks.

1) *Stage 1:* Allocating an original image of size M × N and which is divided into many non-overlapped blocks. M × N pixel image is divided into blocks of typically 8 × 8 pixels. If needed, it can be divided the blocks in × b size pixels. The array of compressed blocks that constitute the image is stored in a drastically reduced buffered space as a gray scale image. From the gray scaled buffered blocks which will be compressed blocks that constitute the image is stored to reduced buffered space.

$$\bar{X} = \frac{1}{k}\sum_{i=1}^{k} x_i \qquad (1)$$

Each image block is sequentially processed in the order of left-to-right and top-to-down. The employ is to address the arranged positions of low mean (a) and high mean (b). The concept of the BTC is to preserve the first and second-moments of a block when the original value is substituted by its high or low means. Where m = M×N, and q denotes the number of pixels greater than $\bar{x}$. The high and low means can be evaluate as follows.



$$\bar{X} = \frac{1}{M \times N}\sum_{i=1}^{M}\sum_{j=1}^{N} Xi, j, \qquad (2)$$

$$\bar{X}^2 = \frac{1}{M \times N}\sum_{i=1}^{M}\sum_{j=1}^{N} X^2 i, j, \qquad (3)$$

$$\sigma^2 = \bar{x}^2 - (\bar{x})^2 \qquad (4)$$

The corresponding maximum and minimum are obtained value.

Xmax = max(A),

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Xmin = min(A),

2) Algorithm

Step 1: Input the original image.
Step 2: Divided image blocks one by one M × N pixels.
Step 3: Divided M × N pixels blocks in 8 × 8 pixels .
Step 4: Compute the mean of the block using Eq.(1)- Eq.(4).
Step 5: Find the Max and Min pixel value.
Step 6: if Sum >= threshold value,
Arrange the Xmax and Xmin value in each pixel positions coordinate.
Step 6: end.

3) Stage 2: The following is a general overview of the image processed. Find the height and width of the image. Process the pixels from (0,0) coordinate using M/G/1 queuing [ ] up to the end pixels of the image.

Stage 1 convert the color image to gray scale image for better compression technique using shift operations. The bits are shifted Right nd then Left shift with αRGB

Right Shift of Bit

S : (a1,a2,a3,…..ak) |→ (0,a2,a3,…..)

When ou shift Right by k bits then, ai + k = bi. If i + k < N.

Left Shift of Bit

When you shift left by k bits then, ai + k = bi. If i + k > N.

S* : (a1,a2,a3,…..ak) |→ (a2,a3,a4,…..)

α = RGB >> 24 bit & 0XFF (Decimal Value 255)

R = RGB >> 16 bit & 0XFF (Decimal Value 255)

G = RGB >> 8 bit & 0XFF (Decimal Value 255)

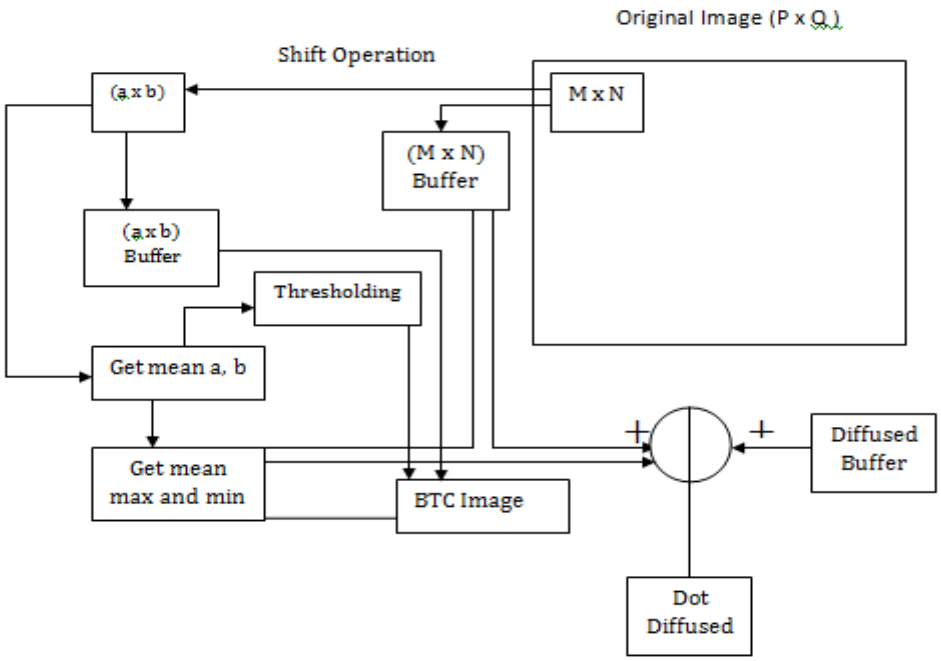
B = RGB >> 0XFF (Decimal Value 255)

New _Value = (R * 0.299) + (G * 0.587)+(B*0.114)

Gray_Value = (α << 24 bit) | (New _Value <<16 bit) | (New _Value << 8 bit) | (New _Value)

(α ¦ W ¦ X ¦ Y) get the grayscale image

Repeat the process up to the end pixels.



Dot-Diffused Block Truncation Coding

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B. Dot-diffused block truncation coding

The structure of the proposed DDBTC algorithm is similar to the traditional BTC algorithm [9]. DDBTC was an improved version of the traditional BTC algorithm, thus the traditional algorithm will be firstly introduced for a better comprehension. Block can be processed independently and eventually represented by two values. For the current stage, DDBTC cannot provide better image quality than that of EDBTC for the following two reasons: 1) The class matrix and the diffused matrix employed in traditional dot diffusion [7], [8] are designed for two-tone output, while the DDBTC generates multi-tone output when the bitmap is replaced with the maximum and minimum values of the block 2) The threshold employed in the traditional dot diffusion is a fixed [10]. The independent processing property yields the additional excellent parallelism advantage. The first and, second-moment, and the corresponding variance are obtained. The current input grayscale value, and the variable denotes the diffused error accumulated from neighboring processed pixels. And variable values denote the modified grayscale output and the binary output. The error can only diffuse to neighboring pixels. That associates to the numbers in the class matrix with a greater value than its own associated value. These are the pixels that have yet to be threshold.

II. EXPERIMENTAL RESULTS

In this paper a spatial domain technique for image data compression, namely, the block truncation coding (BTC) has been considered. This technique is based on dividing the image into (8×8) non overlapping blocks and uses a two-level quantize. The performance of the proposed BTC technique is analyzed and discussed. The optimized class matrix and diffused matrix as exhibited in are used for evaluation. The proposed method offers high image quality and high processing efficiency.

Original Image

Compressed Colour Image

Gray Scale Image

Compressed Gray Scale Image Image

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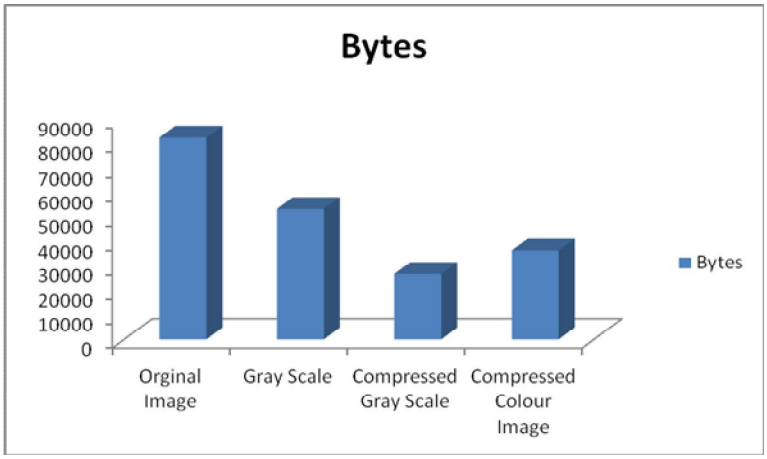

III. CONCLUSIONS

This paper presented a dot-diffused-based BTC image compression technique which can yield excellent image quality. Providing an effective way to combine the complimentary strengths of BTC. As documented in the experimental results. The proposed DDBTC is superior to EDBTC in terms of image quality and processing efficiency. Although the Proposed method provides high image quality with high speed, future work can be put to develop better algorithm.

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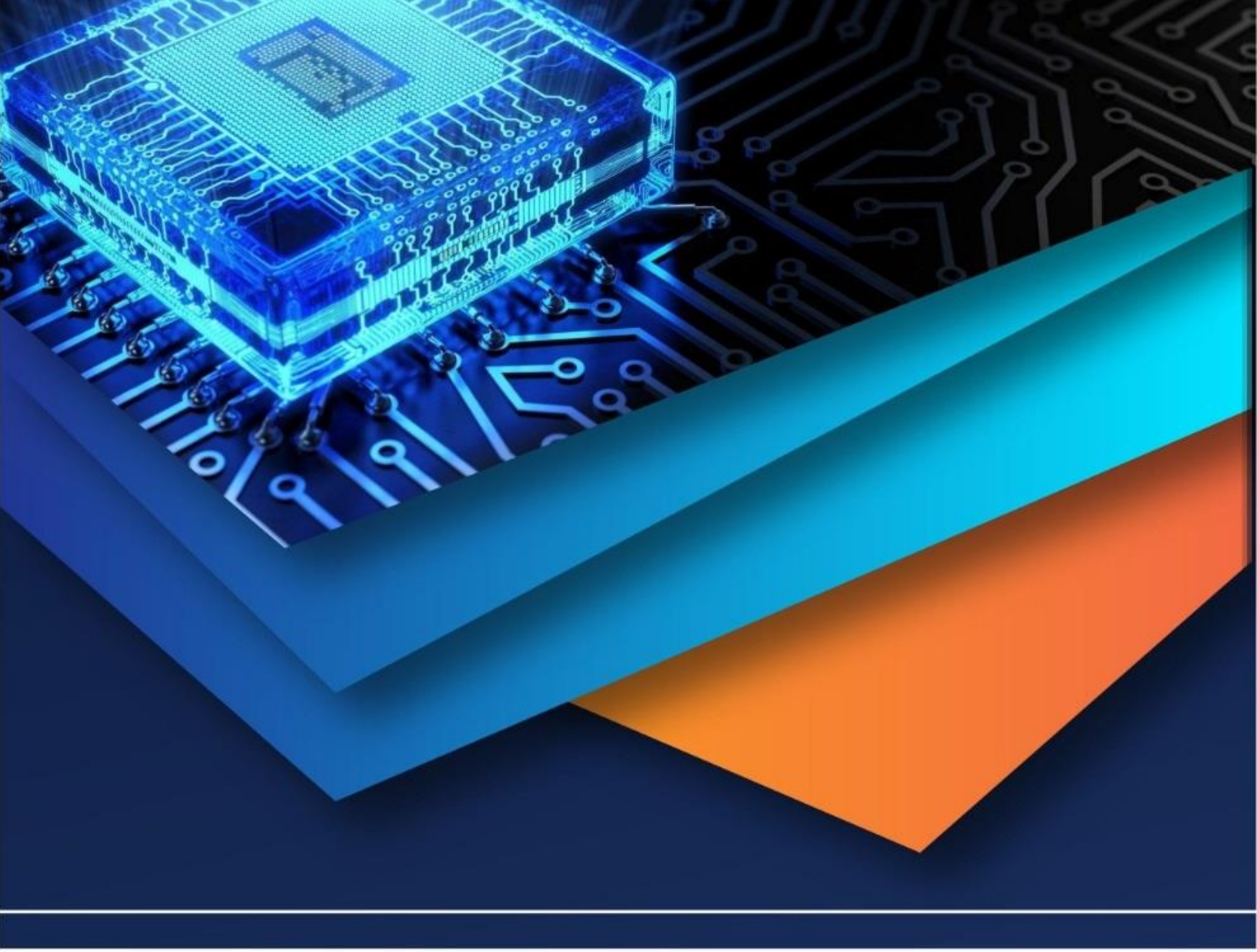

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