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Image Retrieval using Hybrid Order Dither Block Truncation Code

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Abstract: A new approach is proposed to index images in database using features generated from the HODBTC compressed data stream. This indexing technique can be extended for CBIR. HODBTC compresses an image into a set of color quantizers and a bitmap image. The proposed image retrieval system generates two image features namely CCF and BPF from the minimum quantizer, maximum quantizer and bitmap image respectively by involving the visual codebook.

I. INTRODUCTION

Image retrieval from the database is based on the matching of the models visual keys with those of the query images. Because extra information has to be stored with the images, traditional approach to QBIC is not efficient in terms of data storage. In paper [1] the Block Truncation Coding (BTC) technique is given which requires simple process on both encoding and decoding stages. Not only is it inefficient, it is also inflexible in the sense [2] that image matching/retrieval can only be based on the pre-computed set of image features. Many image-coding methods developed over the years are essentially based on the extraction and retention of their important information of the image. For example, it has been demonstrated that color is an excellent cue for image indexing [3], however, it is difficult to explicitly exploit color information from the transform coefficients without decoding. BTC is a relatively simple image coding technique developed in the early years of digital imaging more than 20 years ago [4]. Although it is a simple technique, BTC [5] has played an important role in the history of digital image coding. Many advanced coding techniques have been developed based on BTC [6]. For example, recent work on color image coding using vector quantization has demonstrated that color as well as pattern information can be readily available in the compressed image stream (without performing decoding) to be used as image indices for effective and efficient image retrieval [7]. Even though the compression ratios achievable by BTC have long been surpassed by many newer image-coding techniques such as DCT (JPEG) and wavelet [8], the computational simplicity of BTC has made it and BTC-like image coding techniques attractive in applications where real time fast implementation is desirable.

II. PROPOSED SYSTEM

The traditional BTC derives the low and high mean values by preserving the first-order moment and second-order moment over each image block, which requires additional computational time. The HODBTC algorithm is generalized for color images in coping with the CBIR application. Conversely, HODBTC identifies the minimum and maximum values each image block as opposed to the former low and high mean values calculation, which can further reduce the processing time in the encoding stage. The main advantage of the ODBTC image compression is on its low complexity in generating bitmap image by incorporating the Look-Up Table (LUT), and free of mathematical multiplication and division operations on the determination of the two extreme quantizers. In addition, the HODBTC yields better reconstructed image quality by enjoying the extreme-value dithering effect compared to that of the typical BTC method. Half-toning based block truncation is an extended compression technique derived from BTC used for generating halftone images. In which BTC bitmap image is replaced with halftone image. Halftone image, where halftone dots are arranged orderly in rows with space between the lines is constant and size of dots varies to create different shades of grays. Dithering based BTC, HODBTC is an example of HBTC. Dithering creates output image with same number of dots as number of pixels in an image, where pixel value of an image is greater than the value in the matrix, a dot on output image is filled. A new approach is proposed to index images in database using features generated from the HODBTC compressed data stream. This indexing technique can be extended for CBIR.

III. IMPLEMENTATION

- 1) Feature Extraction.
- 2) RGB Decomposing.
- 3) Find Min max Quantizers.
- 4) CCF, BPF Computation.
- 5) Similarity Image Retrieval

A. Feature Extraction

Feature extraction involves reducing the amount of resources required to describe a large set of data. When performing analysis of complex data one of the major problems stems from the number of variables involved. Feature extraction is a general term for methods of constructing combinations of the variables to get around these problems while still describing the data with sufficient accuracy.

B. RGB Decomposing

Color moments for color feature extraction. The basis of color moments lies in the assumption that the distribution of color in an image can be interpreted as a probability distribution. Probability distributions are characterized by a number of unique moments (e.g., normal distributions are differentiated by their mean and variance). Computing color moments is done in the same way as computing moments of a probability distribution.

C. Find MIN-MAX Quantizers, CCF, AND BPF Computation

Color Co-occurrence Feature (CCF) and Bit Pattern Feature (BPF). The CCF is derived from the two color quantizers, and the BPF is from the bitmap image. The color distribution of the pixels in an image contains huge amount of information about the image contents. The attribute of an image can be acquired from the image color distribution by means of color co-occurrence matrix. This matrix calculates the occurrence probability of a pixel along with its adjacent neighbors to construct the specific color information. This matrix also represents the spatial information of an image.

D. Similarity Image

The features for that image, and the distance between the query image features and the database image features is computed using Canberra distance. After adjusting weights, the similar images according to their distance values are displayed. Our experiment results demonstrate that the proposed method has higher retrieval accuracy than the other methods based on single feature extraction.

IV. RESULTS

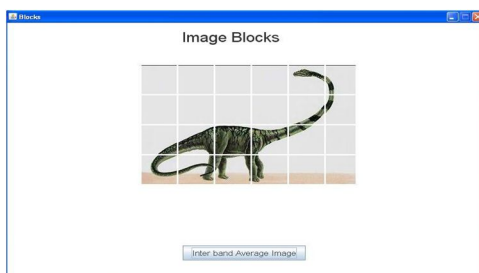


Fig.4.2 Image Blocks

In Figure 4.2, the image is divided into blocks and then click on the inter band average image icon to produce the inter band average image.

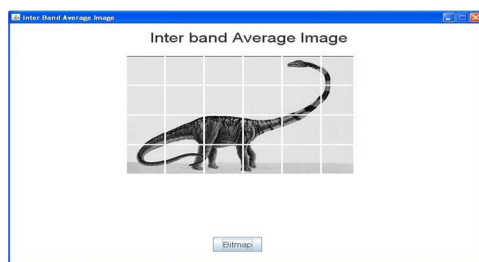


Fig. 4.3 Inter band Average Image

In figure 4.3, the inter band average image is produced. Then click the bitmap icon to produce the bitmap image.

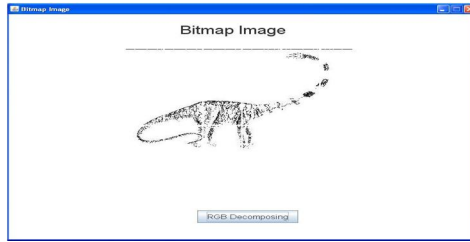


Fig. 4.4 Bitmap Image

In Figure 4.4, the bitmap image is produced. Then, click on the RGB decomposing icon to decompose the image in to three images as red, green blue.



Fig.4.5 RGB Decomposing

In Figure 4.5, the image is decomposed and the three red, green, blue images are produced. Then, click on the find min max quantizers icon to produce min max quantizers.

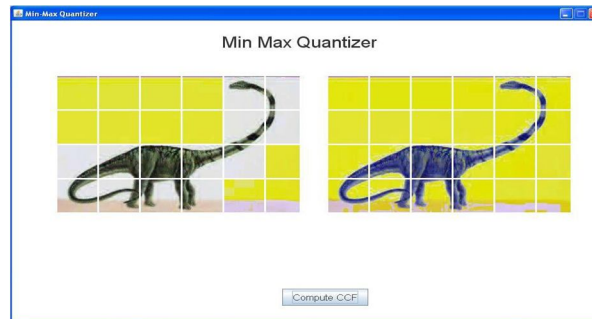


Fig.4.Min Max Quantizer

In Figure 4.6, the min max quantizers are produced. Then, click on the compute CCF icon to compute the CCF values.

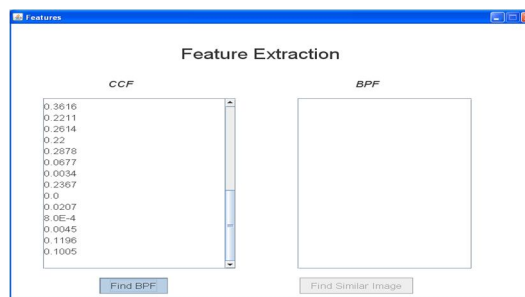


Fig.4.7 CCF

In Figure 4.7, the CCF values are calculated and displayed. Then, click on the find BPF icon to calculate the BPF values

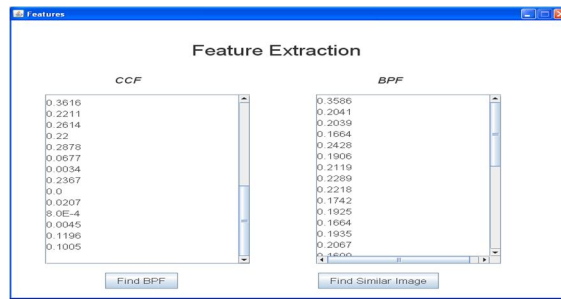


Fig. 4.8 BPF

In Figure 4.8, BPF values are calculated and displayed. Then, click on find similar image icon to calculate the similarity values of similarity measurement and to produce the similar images.

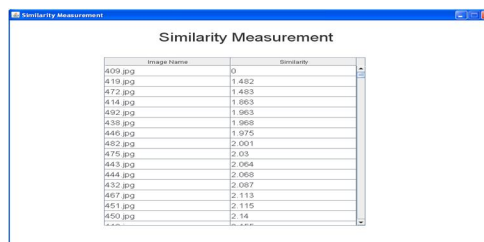


Fig.4.9 similarity Measurement

In Figure 4.9 the similarity measurement which calculates the similarity values between the query image and all the images in the database and displays the similarity values.

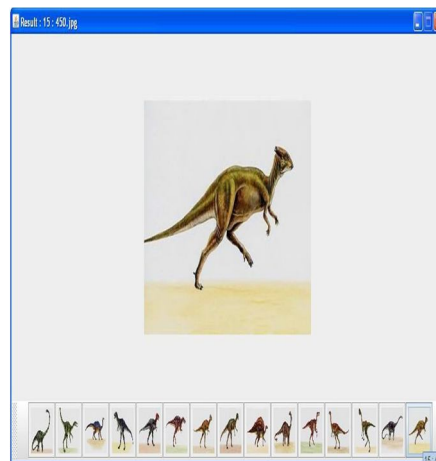


Fig.4.10 Results

In Figure 4.10, the results are the similar images which are the similar to the query image. The top 15 images will be displayed from the list of similar images.

V. PERFORMANCE EVALUATION

The performance evaluation is measured based on the efficiency and effectiveness of the image retrieval systems. Efficiency of the system is evaluated by calculating precision and recall values of the results. Measures of the image retrieval systems can be defined in terms of precision and recall. Precision is a measure of exactness or quality and how useful the search results are whereas Recall is a measure of completeness or quantity and how complete the results are.

VI. RESULTS OF PROPOSED WORK

TABLE3: Calculation Values For Class Dinosaurs.

No. of Images	No. of Relevant Images	No. of Irrelevant Images	Precision Calculations	Recall Calculations
10	9	1	9/10=0.9	9/100=0.09
20	10	0	19/20=0.9	19/100=0.18
30	10	0	29/30=0.9	29/100=0.26
40	9	1	38/40=0.9	38/100=0.31
50	6	4	44/50=0.8	44/100=0.34
60	7	3	51/60=0.8	51/100=0.41
70	5	5	56/70=0.8	56/100=0.46
80	5	5	61/80=0.7	61/100=0.52
90	4	6	65/90=0.7	65/100=0.61
100	6	4	71/100=0.7	71/100=0.64

In table3, the precision and recall values are calculated. The category dinosaurs is considered as example2. From the size of 1000 image database consists of 10 classes. Each class containing 100 images. When the query image is given to the system, the top relevant images to the query image are retrieved from the database.

A. Dinosaurs

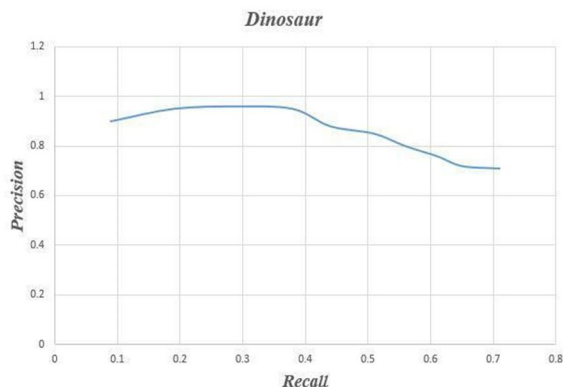


Fig. 5 Precision Recall Graph For Dinosaur Class

In Figure 5, below the graph is drawn for the class Dinosaurs by taking the precision and recall values which are calculated in the above table are considered. Recall values are taken as X-axis and Precision values are taken as Y-axis.

VII. CONCLUSION AND FUTURE ENHANCEMENT

In this study, an image retrieval system is presented by exploiting the HODBTC encoded data stream to construct the image features, namely Color Co-occurrence and Bit Pattern features. As documented in the experimental results, the proposed scheme can provide the best average precision rate compared to various former schemes in the literature. As a result, the proposed scheme can be considered as a very competitive candidate in color image retrieval application. For the further studies, the proposed image retrieval scheme can be applied to video retrieval. The video can be treated as sequence of image in which the proposed HODBTC indexing can be applied directly in this image sequence. The ODBTC indexing scheme can also be extended to another color space as opposed to the RGB triple space. Another feature can be added by extracting the HODBTC data stream, not only CCF and BPF, to enhance the retrieval performance. In the future possibilities, the system shall be able to bridge the gap between explicit knowledge semantic, image content, and also the subjective criteria in a framework for human-oriented testing and assessment.



REFERENCES

- [1] Jing-Ming Guo, and Heri Prasetyo, "Content-Based Image Retrieval Using Features"Extracted From Halftoning- BasedBlock Truncation Coding" iee transactions on image processing, vol. 24, no. 3, march 2015
- [2] M. Guo and M.F. Wu, "Improved block truncation coding based on the void-and-cluster dithering approach", *IEEE Trans. Image Process.*, vol. 18, no. 1, pp. 211-213, 2009.
- [3] J.M. Guo, "High efficiency ordered dither block truncation with dither array LUT and its scalable coding application", *Digital Signal Process.*, vol. 20, no. 1, pp. 97-110, 2010.
- [4] Z. M. Lu and S. H. Sun, "Equal-average equal-variance equal-norm nearest neighbor search algorithm for vector' quantization", *IEICE Trans. Inf. Syst.*, vol. E86-D, no. 3, pp. 660-663, 2003.
- [5] Satpathy, X. Jiang, and H.-L. Eng, "LBP-based edge-texture features for object recognition," *IEEE Trans. Image Process.*, vol. 23, no. 5, pp. 1953-1964, May 2014.
- [6] Arup Kumar Pal. An efficient codebook initialization approach for LBG algorithm, *International Journal of omputer Science, Engineering and Applications (IJCSEA)*, Vol.1, No.4, August 2011
- [7] J. M. Guo, H. Prasetyo and H. S. Su, "Image indexing using the color and bit pattern feature fusion", *J. Visual Commun. Image Represen.*, vol. 24, no. 8, pp. 1360-1379.
- [8] S.Vimala, P.Uma, B. Abidha. "Improved Adaptive Block Truncation Coding for Image Compression" *International Journal of Computer Applications*, 19(7):975-988, April 2011.



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