© 2017 IJSRSET | Volume 3 | Issue 8 | Print ISSN: 2395-1990 | Online ISSN : 2394-4099
Themed Section : Engineering and Technology

A Study on Effective CBIR using ODBTC Method

R. P. Ramkumar[1], Empaty Akhila[2]
[1]Professor, Department of Computer Science and Engineering, Malla Reddy Engineering College (Autonomous), Secunderabad, Telangana, India
[2]Department of Computer Science and Engineering, Malla Reddy Engineering College (Autonomous), Secunderabad, Telangana, India

ABSTRACT

The objective of the paper is to present an efficient Content-Based Retrieval (CBIR) using Ordered-Dither Block Truncation Coding Technique (ODBTC). During the encoding stage, ODBTC approach compresses the image block(s) into quantizes and bitmap image, respectively. To index an image, two features are proposed, which are the Color Co-occurrence Feature (CCF), and Bit Pattern Feature (BPF). Experimental results concluded that the proposed method outperformed the Block Truncation Coding (BTC) approach-based image retrieval systems, thus proving that ODBTC scheme is an effective descriptor to index the database images for efficient retrieval in the CBIR system.

Keywords: BPF, CCF, CBIR, ODBTC, Similarity Measure.

I. INTRODUCTION

An image retrieval system retrieves the images from the database based on the user's requirements with the help of content similarity, color similarity and edge pattern similarities. CBIR is also used to access, browse and retrieve the similar images in real-time applications. Several approaches were developed to capture the image contents by directly computing from image features from an image. From the compressed images also CBIR system extracts image descriptor(s) by compromising the processing time. For satisfying the storage space requirement, the images are stored in the compressed format. The feature extractor generates an image feature before the decoding (decompression) process itself. It achieves results with the RGB filters.

II. EXISTING SYSTEM

The former CBIR system extracts image feature descriptors from compressed data streams since most of them are stored in a compressed format, satisfying the storage requirements. Here, the feature extractor simply generates an image feature for the CBIR task from compressed data stream without performing the decoding process. In the BTC scenario, a simple process is followed both in the encoding and decoding stages. It divides the image into several image blocks, and each image block further is represented with two quantities to maintain its mean and standard deviation values original to the image block, namely high and low quantizes, and a bitmap image.

As we know that image data grows day by day, abundant storage and bandwidth are needed to store and transmit images is quite costly. Lossy and Lossless are two most important image compression techniques. Lossless compression has lower compression ratio than the lossy compression with better quality images. JPEG and Block Truncation Coding is a Lossy image compression techniques which involving less computational complexity. BTC technique is used for compression of monochrome

image data. Many standard techniques [6] are available and used in CBIR applications. One promising approach to image database indexing and retrieval is the Query-by Image Content (QBIC) method [1], where the visual contents features are extracted and used for indexing purposes.

In paper [2] the BTC technique was adopted on both the encoding and decoding stages. Due to the appearance variances caused by non-rigidity, background clutter, differences in viewpoint, orientation and scale or lighting conditions. Object recognition is considered as one of the core problem in the computer vision domain. An image consists of different texture regions and these image features associated with these regions can be used for search and retrieval processes. A typical query could be a region of interest provided by the user. The input information is an intensity pattern or texture within a rectangular window. ODBTC algorithm uses the RGB color space, whereas the image indexing scheme employs the YCbCr color space for the generation of the image feature. In, an image with RGB color space is firstly converted into the YCbCr color space. Subsequently, the BTC encoding is performed only for Y color space.

Data hiding is the process of embedding the text message into the various files such as audio, video and image files. The embedded image in the secret data is called cover or stego image. The first stage is extracting the portion from the original cover while the second stage is to compress the features and saves the space for the payloads and the third embeds the messages into the feature sequence and called as the marked cover or stego image. Modern imaging systems not only require efficient coding but also easy manipulation, indexing, and retrieval, the so-called "Fourth Criterion" in image coding, cannot only be used for image coding, but it can also be conveniently and effectively used in CBIR and indexing processes. Even though the decoding process is a challenging task, it the best method for indexing the images [3]. Recent work on color image coding using vector quantization has demonstrated that color parameter can be used for efficient image retrieval [4]. BTC is a very simple image coding technique [5]. Even though the BTC method has better compression ratios than the DCT (JPEG) [6] and wavelet [7], the BTC has very low computational complexity and useful for fast real-time implementation.

III. PROPOSED SYSTEM

The purpose of using the ODBTC method is due to its low complexity in retrieving the similar (color) images using the look-up-table procedure. Here, the ODBTC determines the maximum and minimum values from each block of image, not only diminishes the processing of encoding time but also results in better quality of reconstructed images. Figure 1 shows the steps involved in the proposed method of image retrieval.

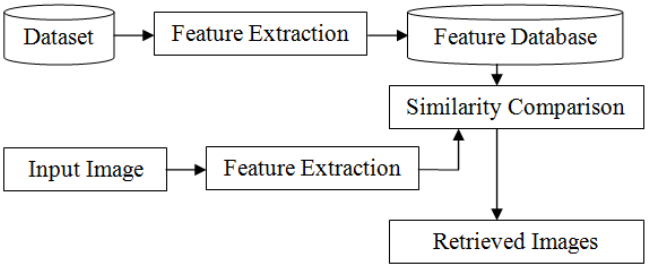

Figure 1. Proposed Image Retrieval Method

Initially, the dominant features are extracted from the images in the dataset and stored in the feature database. When the input image is presented for finding the similar images in the database, the features from the input image is extracted and compared with the already stored features in the feature database. When the similarity measure is less than the predetermined threshold value, then there exist the similar images, else there is no match in the database images.

Feature extraction involves minimizing the number of features required to represent a data. When analyzing complex data, more number of variables are required. Analysis of numerous variables requires

huge memory and computation power or a classification algorithm which overfits the training sample and generalizes new samples. Color moments are used for color feature extraction. The basis of color moments extraction and unique representation is carried out using probability distribution function. Computing color moments is also done in the same way as computing moments of a probability distribution. Once the RGB decomposition is done, the maximum and minimum pixel values are calculated for each color (R, G, and B, respectively) blocks. Later, by combining the derived values, the maximum and minimum quantizer values are determined.

The features for that image and the distance between the query image features and the database image features are computed using Euclidean 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 AND DISCUSSION

Content images features or content relevant images are available in database or dataset. Those corresponding images can be extracted and are provided to users as image retrieval content or features based extraction. There are around 900 images categorized into nine different categories stored in the database using three tables, namely, (1) To store data related to the RGB decomposition, (2) to store the collection of all the images which are to be retrieved by the user, and (3) To store the credentials of the admin and the user. Figure 2 shows the sample images used for evaluating the proposed method. These are certain examples which depict the pictures stored in the database. Image features or content relevant images are available in database or dataset; those relevant images features can be extracted and provided to users.

Figure 2. Sample images used for evaluation

The proposed method is evaluated using JDK platform with MySQL for backend processing installed on Intel Pentium I3 processor with 2GB RAM. The proposed method is evaluated with sensitivity and specificity parameters. The sensitivity and specificity parameters are defined as the probability of positive and false retrievals, respectively. The proposed method outperformed the existing method [8] regarding average retrieval efficiency, that is, the average retrieval efficiencies are 0.73 and 0.79, respectively.

V. CONCLUSION

In this paper, an efficient image retrieval system is presented by using the ODBTC image features, namely Color Co-occurrence and Bit Pattern features. As the experimental results depicted that the proposed method provides the best average precision and recall rates compared to the former schemes. That is, when compared to the existing method, the experimentation concluded that the proposed method has better retrieval rate. Authors are working on refining the retrieval performance of the proposed method. Further, as a future enhancement, the proposed method has to be evaluated with huge dataset with live images.

VI. REFERENCES

[1]. E. J. Delp and O. R. Mitchell, "Image compression using block truncation coding," IEEE Trans. Commun., vol. 27, no. 9, pp. 1335-1342, Sep. 1979.

[2]. V. Udpikar and J. Raina, "BTC image coding using vector quantization," IEEE Trans. Commun., vol. 35, no. 3, pp. 352-356, Mar. 1987.

[3]. Y. Wu and D. C. Coll, "BTC-VQ-DCT hybrid coding of digital images," IEEE Trans. Commun., Vol. 39, No. 9, pp. 1283-1287, Sep. 1991.

[4]. C. S. Huang and Y. Lin, "Hybrid block truncation coding," IEEE Signal Process. Lett., Vol. 4, No. 12, pp. 328–330, Dec. 1997.

[5]. Y.-G. Wu and S.-C. Tai, "An efficient BTC image compression technique," IEEE Trans. Consum. Electron., Vol. 44, No. 2, pp. 317-325, 1998.

[6]. M. Lema and O. R. Mitchell, "Absolute moment block truncation coding and its application to color images," IEEE Trans. Commun., Vol. 32, No. 10, pp. 1148-1157, Oct. 1984.

[7]. J.-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, Jan. 2009.

[8]. Shivkanya J. Jadhav and Nilesh G. Bhojane, Customized Halftoning-Based Block Truncation Coding for Content-Based Image Retrieval using Hierarchical Clustering Algorithm, International Journal of Innovative Research in Computer and Communication Engineering, Vol. 4, Issue 7, pp. 13287-13295, 2016.