Content Based Image Retrieval Using Color Quantizes, EDBTC and LBP Features

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Abstract: To describe the image features the Local binary pattern (LBP) is widely used. The LBPs from each channel of the image must be combined to describe the color images. The process of concatenating the LBPs from each channel is nothing but binary combination, but it also improves the dimensionality of the pattern of the images. To observe the effectiveness of the proposed system techniques and comparison with the existing system techniques are performed by using image retrieval experiments. The two color quantizers and its corresponding bitmap image are constructed to describe the image features. The color distribution and image contrast are represented by color histogram feature (CHF) which is derived from two color quantizers. The image edges and textural information are characterized by the bit pattern histogram feature (BHF) which is constructed from the bitmap image. The CHF and BHF values are used to determine the similarity between two images using a specific distance metric computation. Experimental results demonstrate the superiority of the proposed feature descriptor compared to the existing schemes under natural and textural images.

Index Terms- Image retrieval, local binary patterns, (Error diffusion block truncation coding) EDBTC, color quantizers, color, shape and texture.

I. INTRODUCTION

To improve the retrieval accuracy in the content-based image retrieval (CBIR) system many former schemes have been developed. One type of them is to employ the features of image derived from the compressed data stream. As opposite to the classical approach from the original image that extracts the descriptor of an image and without first performing the decoding process this retrieval scheme directly generates image features from the compressed stream. This type of image retrieval extracts and generates image features and reduce the time computation. Since most of the multimedia images are recorded in any storage devices before they are converted to compressed domain. The color similarity and texture similarity both are specific similarity criterion, finally the image retrieval system returns a set of images to the user with this similarity criterion. The image index and retrieval are demanding more and more due to rapid growth of the digital images in many places. Applications of an Image retrieval are object recognition, biomedical, agriculture, etc. Consider database having huge images and to extract the similar images from a given databases by matching a given testing image with the images of the database this is the aim of content Based Image Retrieval (CBIR)

The matching process of two images is done by the matching of its features. It means the image retrieval performance is heavily depends upon the matching of image feature descriptors. Color, shape, texture and gradient etc. these are the basic features to describe the type of image. The purpose of image feature description process is performed by using local pattern based descriptors. There is rapid growth in the local binary pattern due its simplicity and effectiveness in several applications. The concept of the BTC is to replace the original images with the help of simple set of representative vectors. Specifically, the BTC compresses an image into a new domain by diving the original image into multiple non-overlapped image blocks, and each block is then represented with two extreme quantizers (i.e., high and low mean values) and bitmap image. Two sub-images constructed by the two quantizers and the corresponding bitmap image are produced at the end of BTC encoding stage, which are later transmitted into the decoder module through the transmitter. To generate the bitmap image, the BTC scheme performs thresholding operation using the mean value of each image block such that a pixel value greater than the mean value is regarded as 1 (white pixel) and vice versa. The traditional BTC method does not improve the image quality or compression ratio compared with JPEG or JPEG 2000. Compared with these techniques the BTC concept performs much lower computational complexity. Some techniques have been addressed to reduce the time computation of BTC and also improve the reconstructed image quality and compression ratio of BTC.

The BTC suffers from blocking effect and false contour problems when it needs low computational complexity, and it makes less satisfactory to the user. To overcome the two above disadvantages of the BTC the Error Diffusion based BTC (EDBTC) is introduced. EDBTC looks for a new representation (i.e., two quantizers and bitmap image) for reducing the storage requirement similar to the BTC scheme. By considering the quantized error, the EDBTC scheme constructed the bitmap image which diffuses to the nearby pixels to
compensate the overall brightness, and it effectively removes the annoying blocking effect and false contour by error diffusion strategy, while maintaining the low computational complexity.

The reconstructed image quality is accessed by an employing the low-pass nature of human visual system ,when continuous image and its half-tone version are viewed from a distance in which these two images are received similarly by human vision . A given image is divided into multiple non-overlapped image blocks by the method of EDBTC and two extreme quantizers obtained by processing each block is independently . In the literature triggered some applications have been offered by the successfulness of EDBTC, such as inverse halftoning, image watermarking, image security, data hiding and half-tone classification.

The performance of an EDBTC is good than the BTC concept in those areas with promising results, in which EDBTC yields better reconstructed image quality than that of the BTC scheme. In this paper, the concept of the EDBTC compression is catered to the CBIR domain, in which the EDBTC compressed data stream provides image feature descriptor. In this scheme, the database already stores compressed data stream is not necessary to decoded to get an image feature descriptor. In compressed domain the image feature descriptor is directly obtained from EDBTC, color quantizers and bitmap image by involving the vector quantization (VQ) for the indexing.

By using the EDBTC feature descriptor scheme is easy to measured similarity criterion between the query images and target images . This new CBIR system can also be extended for video indexing and searching with the EDBTC feature descriptor, in which the sequence of images can be processed and viewed as video. The EDBTC feature descriptor can also be used in some additional applications such as object tracking, background subtraction, image annotation, image classification, and segmentation.

The performance of EDBTC feature descriptor compared with the local binary pattern (LBP)-based feature, and thus for image processing and computer vision application, the EDBTC feature can substitute the LBP-based feature with even faster processing efficiency.

A. IMAGE RETRIEVAL

Basically database having collection of images and an image retrieval system is nothing but it returns a set of images from a database to meet user’s demand with similarity estimations such as image content similarity, edge pattern similarity, color similarity, etc. In the real-time applications, an image retrieval system produces an systematic way to retrieve, access and browse a set of similar images. Several approaches have been developed directly for computing the image features from an image for capture the information of image contents.

The main stay of current image retrieval systems is the Content-Based Image Retrieval (CBIR). In general, the color, shape, and texture are the set of low level visual features of an image and with these features the performance of CBIR is to present an image conceptually.

B. IMAGE CONTENT DESCRIPTOR

To describe the content of visual image some concepts have been developed. Most of them are dealing with the MPEG-7 Visual Content Descriptor. To establish the international standard for the CBIR task the MPEG-7 Visual Content Descriptor is used, which includes Color Descriptors (CD), Texture Descriptor (TD) and Shape Descriptor. In the CBIR research field, the shape descriptor offers a great advantage, and that is benchmark database, comparative study between several CBIR tasks, etc, can be easily conducted by sharing the image features descriptor, which is a important aspects and this is possible only by using these standard features. In the distributed system the standard features provides a great benefit, in which user can remotely modify the image content descriptor. In this scenario, there is a modification and recalculation of image descriptor but not necessary to transferred original image over different locations.

II. PROPOSED SYSTEM

In the proposed method an image can be compressed efficiently, and an effective image feature descriptor produced by corresponding compressed data stream, at the same time image retrieval and classification can be performed. Consequently, for real-time image retrieval applications the proposed method can be considered as an effective candidate. The color quantizers, bitmap image and texture descriptor of LBP these are the three modes of techniques for the content based image retrieval process by using these techniques image feature descriptor is directly constructed. The color distribution and image contrast are represented by color histogram feature (CHF) which is derived from two color quantizers. The image edges and textural information are characterizes by the bit pattern histogram feature (BHF) which is constructed from the bitmap image. The CHF and BHF values are used to determine the similarity between two images using a specific distance metric computation. Experimental results demonstrate the superiority of the proposed feature descriptor compared to the existing schemes under natural and textural images.

PROPOSED SYSTEM TECHNIQUE

- Error-Diffusion Block Truncation Coding (EDBTC)
- Color histogram feature
- Bit pattern histogram feature

The Local Binary Pattern (LBP) Algorithm is used for texture based image retrieval. Color quantizers and Error
Diffusion Block Truncation Coding (EDBTC) Algorithms are used for corresponding color based and shape based image retrieval and proposed work can be enhanced by using these methods. To design a selective approach which combines the color, shape and texture features for content based image retrieval (CBIR) method.

![Block Diagram Image]

C. EXISTING SYSTEM DRAWBACKS
- Low accuracy in retrieving the images, i.e., the retrieved images not belong to the query image class. Mismatch occurs.
- Retrieved image quality is low.
- Computational complexity is high.
- The features are extracted directly for the images.

D. PROPOSED SYSTEM ADVANTAGES
- The reconstructed image quality is high.
- This method offers a promising result and outperforms the former existing methods in terms of the natural scene classification.
- This yields a better result in terms of the retrieval accuracy compared to that of the former methods
- Computational complexity is low.

III. SOFTWARE REQUIREMENTS

In this project work we are going to use MATLAB code and MATLAB 2013a software to execute the results.

The MATLAB high-performance language for technical computing integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation.

Data Exploration, Acquisition, Analyzing & Visualization
Engineering drawing and Scientific graphics
Analyzing of algorithmic designing and development
Mathematical functions and Computational functions
Simulating problems prototyping and modeling
Application development programming using GUI building environment.

IV. EXPERIMENTAL RESULTS

Here we are extracting the image feature descriptor by using the three techniques LBP coding is use to extract the image texture and color quantizer for color of an image and EDBTC is used to extract the image shape.

The following experimental results shows the color and texture features of an image.
After using LBP coding will get the following red channel LBP image and green channel LBP image and blue channel LBP image.

Then, after applying color quantizer coding will get minimum and maximum RGB channel image.
Since above experimental results shown only for one image like this output we are getting for lac's of images.

VI. CONCLUSION

In this paper we proposed an approach of extracting the color, and texture features. From the input image color based features such as min and max quantizer is extracted for three channels of an image. And LBP coding is applied to the three channels of the input image and LBP feature is extracted.

REFERENCES


