

A Study on Image Retrieval Techniques Based On Visual Features

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Abstract- The image retrieval is fascinating and quickest developing methodology altogether fields. Recently, the content-based image retrieval has become the recent topic and therefore the techniques of content-based image retrieval (CBIR) are achieved nice development. Content based Image Retrieval (CBIR) could be a one among the image retrieval technique that uses visual features of a picture like color, shape, and texture feature etc. It allows the end user to present the query image so as to retrieve the saved pictures in database in line with their similarity to the query image. This paper includes different approaches used for Image Retrieval such as Relevance feedback, SVM, BTC, Wavelet transform. The present method provides 100% accuracy and computational complexity is less compare to other methods.

Key words-Image Retrieval, CBIR, EDBTC, Visual Features.

I. INTRODUCTION

Impression is a lot of by a picture instead of thousands of words as stipulated by the statement "A picture is worth a thousand words". Image retrieval systems plan to search through a database to seek out pictures that area unit perceptually almost like a query image. Fig.1 shows the general image retrieval method. In recent years, image databases area unit increasing quick. It's tough to capture helpful pictures from huge image database, and it becomes worse that we regularly get helpful pictures through the net that is wide spreading. The main aim of image retrieval system is to retrieve best matched pictures as attainable from loaded dataset of pictures specified the retrieved resultant pictures meet the user's demand. The requirements of the user will be displayed in terms of similarity thereto of the opposite pictures or in terms of features matching that depend upon what style of CBIR system is employed. Image retrieval systems will be learnt into two types: Text based Image Retrieval and Content based Image Retrieval. Within the text based approach, the pictures are manually annotated by text description and therefore the database management system is employed for the image retrieval. Need great deal of man power for manual image annotation. To beat these limitations image retrieval is administered in keeping with the image contents. In an exceedingly CBIR system, pictures are mechanically indexed by their visual contents through extracted low-level features, like shape, texture, color, size. CBIR has been shown to be far more effective and subjective than the text based approach.

II. CONTENT BASED IMAGE RETRIEVAL (CBIR)

Content-based image retrieval (CBIR) was originated in 1992, by somebody T.Kato. It had been found throughout the time once he was doing the experiments concerning the retrieval of pictures from a little information by exploitation

their visual content. Content based image retrieval (CBIR) is a crucial different and complement to ancient text-based image looking out and may greatly enhance the accuracy of the knowledge being came back. It aims to develop associate degree economical visual-Content-based technique to look, browse and retrieve relevant pictures from large-scale digital image collections. Most planned CBIR techniques mechanically extract low-level features (e.g. color, texture, shapes) to live the similarities among pictures by comparison the feature variations. High retrieval potency and less procedure quality square measure the required characteristics of CBIR system. Content based Image Retrieval has several applications in most fields of life square measure Crime bar, internet looking out, Historical analysis then on.

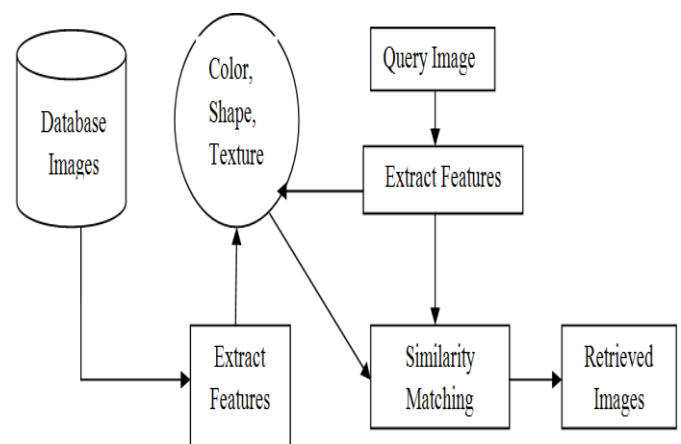


Fig. 1 General image retrieval process

A. Visual feature:

There are 3 varieties of primitive features specifically color, texture and shape.

Color: The first and most simple feature for categorisation and retrieving pictures is color. Color is an at once perceivable visual feature once viewing a picture. Color image could be a digital image that has color info for every component. Sometimes colors square measure outlined in 3 dimensional color areas. These may either be RGB (Red, Green, and Blue), HSV (Hue, Saturation, and Value) or HSB (Hue, Saturation, and Brightness). Color coherence vector (CCV), color bar graph, color correlogram, color moment's square measure unremarkably wont to represent the color descriptions of a picture.

Texture: Texture is one amongst the foremost vital process features of a picture. Texture is that innate property of all

surfaces that describes visual patterns, every having properties of homogeneity. Image texture offers info regarding the placement of color or intensities in a picture or selected region of a picture. The feel properties embrace Coarseness, Contrast, radial asymmetry, Line-likeness, Regularity and Roughness is employed to extract the feel info within the image. The foremost common measures for capturing the pictures square measure wavelets and Gabor filters.

Shape: Shape features represent the visual characteristics of the image objects and used for similarity matching and image retrieval. Shape is also outlined because the characteristic surface configuration of associate object; a top level view or contour. Shape feature square measure usually outlined in two ways in which – global features defines aspect-ratio, roundness and moment invariants and local features defines cluster of consecutive boundary. Shape representations are typically divided into two categories: Boundary-based and Region-based.

III. DIFFERENT IMAGE RETRIEVAL TECHNIQUES

Image retrieval has been attractive analysis space for many decades. There square measure varied techniques are projected to retrieve the image effectively and with efficiency from the massive set of image knowledge during which a number of the ways square measure represented below:

A. Relevance Feedback

The thought of Relevance feedback could be a powerful technique to reinforce the system search effectively, developed throughout the Nineteen Sixties to enhance document retrieval processes, consists of victimisation user feedback to judge the connection of search results and so improve their quality through unvaried steps. Relevance feedback improves the retrieval accuracy of content-based image retrieval by modifying the query supported the user's feedback during which the user will choose the foremost relevant pictures and supply a weight of preference for every relevant image. The interaction between the system and therefore the user allows the retrieval to approach the user's expectation, and eventually achieves the requests [2-3].

B. Support Vector Machine

Support vector machine could be a supervised learning technique that analyzes knowledge and determine pattern used for classification. It takes a collection of input, reads it and for every input a desired output is created, such style of method is thought as classification, once if output is continuous than regression performed. For constructing most separating hyper planes SVM maps input vector to a better dimension feature space. Feature space refers to associate input space that is reserved for measurement similarity with the assistance of kernel function. It's high dimension space wherever linear separation becomes terribly easier than input space. In this, data is reworked into a set length sample vectors. Here are a unit two terms that area unit utilized in feature space i.e. known as feature values and feature vectors. The features of image is named feature values and these feature values conferred the machine in a very vectors is understood as feature vectors. Kernel function utilized in the kernel methodology activity some operation like classification, clustering upon

completely different classes of knowledge like text document, progression, vectors, cluster of points, image and graphs etc. It maps the input data into a better dimension feature space as a result of during this data can be simply separated or better structured. There are a unit some points within the feature house that area unit separated by far is named support vectors. It is the purpose between origin which point and demonstrates the situation of the extractor. The detachment from the choice surface to the closet datum concludes the margin the classifier [4].

C. Block Truncation coding (BTC)

BTC could be a lossy compression technique that uses moment conserving division methodology for press digital pictures. In block truncation coding (BTC), the first image is split into fixed-size non overlapping blocks of size $M \times N$. The block size chosen is typically little to avoid the sting blurring and block result. Every block is severally coded employing a two level (1-bit) quantizer. Then, the strategy computes the average and also the variance for every block. Next, they generate a two-level bitmap to record whether or not the picture element is larger than the average of the block or not. If the picture element is smaller than the average of the block, the theme used "0" to represent the picture element. Otherwise, the theme used "1" to represent the picture element. The two values preserve the primary and also the moment characteristic of the first block [8-9].

The block truncation coding methodology uses the bitmap, the average and also the variance to represent and recover the image. It's evident that the average and also the variance properties will be wont to state the first color and also the condition of picture element color variation in a picture, severally. Moreover, the bitmap describes the local variation of pixels. These properties depict the characteristics of a picture that may be treated as image features.

D. Wavelet Transform

The discrete wavelet transform (DWT) is one in every of the foremost in style transforms recently applied to several image process applications. Discrete wavelet transform renovate the image in four completely different components higher frequency part (HH), high low frequency part (HL), Low high frequency part(LH), lower part (LL) vertical components is 1-level image decompositions then calculate moments of all frequency part than store and use it as feature to get the images. Texture entropy and distinction, clumsiness ar the largely used properties. The gray Level Co-occurrence Matrix (GLCM) is employed to extract second order statistics from a picture. GLCMs are used terribly productively for texture calculations. From gray Level Co-occurrence Matrix all the features are deliberated and hold on into the info. The employment of gray Level Co-occurrence Matrix provides sensible result however it's in spatial domain thus its additional error pron. CCH (Contrast Context Histogram) to search out the feature of the query image and alternative pictures hold on within the info. CCH is in spatial domain and it presents world distribution. The MPEG Descriptors has been used like Edge histogram Descriptor for texture. The edge histogram differentiates edges consistent with their direction [5].

IV. PRESENT SYSTEM

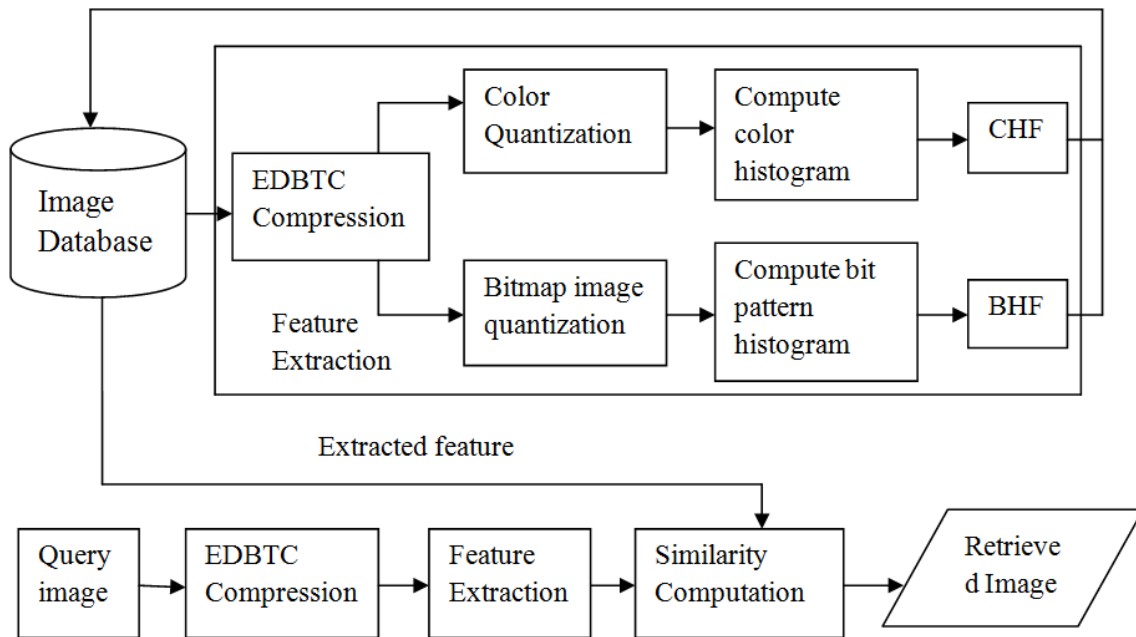


Fig. 2 Schematic diagram of the proposed image retrieval technique

The new approach is introduced to index color pictures victimization the options extracted from the error diffusion block truncation coding (EDBTC) as shown in fig. 2. The EDBTC produces two color quantizers and a bitmap image that is any processed victimization vector quantization (VQ) to get the image feature descriptor. Herein two features are introduced, namely, color histogram feature (CHF) and bit pattern histogram feature (BHF), to live the similarity between a query image and therefore the target image in database. Once the similarity distance computation, the system returns a group of retrieved image ordered in ascending manner supported their similarity distance scores. The CHF effectively represents the colour distribution inside a picture, whereas the BHF characterizes the image edge and texture. Effective color image retrieval theme for combining all the three i.e. color, texture and shape, which achieved higher retrieval potency [1]. The prosperity of the projected EDBTC retrieval system is measured with the precision, recall. A better price in precision and recall exhibits the higher retrieved result.

$$Recall = \frac{\text{Number of relevant images retrieved}}{\text{total relevant images in collection}}$$

$$Precision = \frac{\text{Number of relevant images retrieved}}{\text{total number of images retrieved}}$$

V. CONCLUSION

The features of image retrieval techniques are classified into the low level categories color, texture, and shape. With the increasing demands of multimedia system applications over the web, the importance of image retrieval has conjointly hyperbolic. Compare to existing methods EDBTC provides higher retrieved result. There's not one technique that matches best all told varieties of user's requirements; so, the doors area unit still receptive keep inventing new

methodologies in line with the necessities of image mining and retrieval applications.

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