A Novel Technique for Effective Image Gallery Search using Content Based Image Retrieval System

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***Abstract*— Content-based image retrieval is known as one of the upcoming procedural structure that will apply various techniques of computer vision for penetrating and organizing the huge image anthology in an effective manner. It is largely accepted that with the growth of immense collection of digital images generated by fast progress in electronically storage ability and computing power, there is a rising requirement for devices and upgraded computer systems for the support of effective and efficient browsing, penetrating, and retrieval for various images from the image collections, be it be online or offline. Therefore, the basic idea of this technique is to develop such type of content-based image retrieval system that can put into operation in a large image gallery desktop application to permit competent browsing with the help of two different exploration methods respectively; retrieval by query based on image and retrieval by text or ticket. In this paper, the MPEG-7 and Edge Directivity Descriptor is used to take out the feature vectors of a particular image from the image database. An effective graphical user interface with the essential utility for the purpose of implementation of different images in the form of image gallery discussed.**

Keywords*— *Content-based image retrieval MPEG-7, Component Analysis, Text-based image retrieval, Edge Directivity Descriptor

I. INTRODUCTION

With the increase of internet users in the recent years the collections of digital images - online and offline has also been increased widely. In past few years we have also noticed the increased number of photos and videos have taken a lot of space in our phone, laptop and desktop. This is not only in our personal devices rather we have captured the space on cloud also to keep our memories with us forever. Due to which the online database of digital images has increased a lot. There may be many reasons for these kind of increased usages over the net and in our personal devices; like edification, amusement, business, social circle and many more. In addition to this fact, it also noticeable that many more images are used to communicate a very large quantity of information within the community. Due to the increase of collection of images it is quiet difficult to make the appropriate use of the information to be contained in these images and videos. To manage such huge amount of data it is very much required to have latest techniques rather to follow the earlier techniques for the processing of images in an effective manner. There is also a requirement of searching of images from the database which should be supported by all system and devices for the effective and efficient retrieval of images. With the increase involvement of social media in our life it has become the general tradition to capture number of photos and videos everyday and post them. An assessment conducted by a private organization; a smart phone user captures a regular 150 new pictures every month. Another tedious and time consuming job is to search for our desired image from that large photo gallery where we have to scroll number of times to go on to a particular image. To overcome from all these problems the solution is provided in the form of Content-Based Image Retrieval (CBIR) which is an effective and efficient way to retrieve multiple information, various photos and videos from the large image database. This will also help to search and manage the appropriate image from the image database. In view of the above the majority of CBIR systems are intend to deal with digital images in the offline database where the stored images can only be used as a query rather than to have the choice of query from the user. This method of searching becomes very outmoded when in future also we have to search more images. Therefore in this paper the available picture collections are more structured through establishing a amalgamation of CBIR and TBIR supported methods for making the more expedient and effortless method for searching the offline images with the help of automatic creation of textual metadata by collecting the information given by the user and results from the prior image retrievals.

II. RELATED STUDY

There are number of keywords and various metadata were utilized to manage the images and videos in the large database in early years. With the successful implementation of CBIR system in which it most relies on various features and textual information to retrieve the most wanted information. Thus, the CBIR is considered as an interface for attainment of the image as an input query, a large database

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for the storage of data in indexed form along with distance metrics and efficient system for retrieval the images.

A. *Extraction through Feature Vector*

Few regular feature vectors which comprise of color, texture, outline and other characteristics Color features of various CBIR applications are much more used in many applications because of their constancy and stoutness. Jalab H.A. [4] accomplished a different type of system for retrieval of images which is supported by color layout descriptor (CLD). It is representing the spatial division of colors. Jayamala K.Patil and Raj Kumar [5] has recommended a mechanism through which an illness if any on leaf of the plant can be seen in the form of images. This is also using the concept of color features. Chatzichristofis et al [6] anticipated a special color and edge directivity descriptor (CEDD) which is able to integrate color and texture data in a form of histogram. Various features of texture enclosed with most wanted information on the exterior configuration of substances and their association to the adjoining surroundings. The most used texture features are unevenness, distinction and course ability, all these are already proved in the prior studies in this context. The Steerable Pyramid Model [8] and Gabor wavelet Transform (GWT) [9] are extensively applied features. It is clearly mentioned that all the shape features are only effective if they are used after the image segmentation. Kauppinen et al. [10] have demonstrated about the Fourier descriptors, which are used in the categorization of 2D shapes usually, give better results in contrast to shape descriptors which are based on autoregressive models.

B. *Extraction through Text/Tag*

There are many web based galleries i.e. getty images those are involved in selling the high-class accumulation imagery for the utilization of different fields like publicity, promotion, education and a lot of more. These galleries are primarily based on TBIR with the use of collective cataloging where number of human directories will look for new image and give inputs in the form of connected keywords and also use the prior user's queries which are combined together and it forms a new cache for the purpose of searching the images in database. Initially IBM has developed QBIC (Query by Image Content) which was the one of the commercial system of CBIR. It takes input in the form of queries, further based on different drawings supplied by the user. After the images colors and textures supplied by the user are also taken in account. Tamura texture representation [12], and major axis orientation. This system was known one of the fast and efficient system as far performance is concerned. Though there were few demerits included in this system also like no sensitivity of colors and clarification of images. At the present time number of shopping sites are using CBIR technique for the searches of similar products to the query passed by the user and return the output of similar items and further it is associated with big brands like Amazon, Flipkart, Myntra etc. With the help of this technique a user can also select the specific province for a particular item to retrieve the similar colors, contours and prototypes. Further users can decide one of the criteria to get the better results for the searching. Google photo, is an application which is based on cloud from the company Google, is involved in using the facial identification to search for the particular photo of any specific person from the image gallery. In this application user is required to give the label of the photo as input for the purpose of searching the particular image. This can be done online and as well as offline also.

III. METHODOLOGY

In view of the above, the available mechanism will be working on three different segments ; the gallery edge, the query dispensation unit, and the database of images. These three components are further involved in searching of images by three different modes: with the use of any reference image, a name, or any prior mentioned ticket.

A. *Retrieval by Feature Vectors*

In this paper for the purpose of feature vector the use of SIMPLE-CEDD is done. As we know that the size of a CEDD is related to memory and it much more efficient that is the reason only 54 bytes per picture is used, which needs less computational power to extract the desired image from the large image database which is available in the local computer. In addition to this, SIMPLE-CEDD works on the localization of the image features and then matches with the required image which relatively gives the better outcome. The output is more robust and helpful in image transformation, which also gives s the very fast execution.

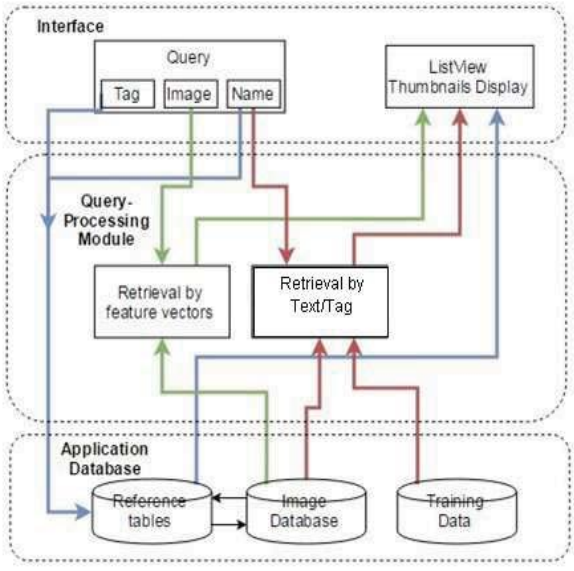

Fig. 1. Block Diagram of the System [14]

B. Retrieval by Text or Ticket

The time used for any computation or calculation can be condensed if we integrate the tickets to the existing CBIR method for the purpose of searching the desired images by tagging the single or numerous images. This process will further in such a way that first query processing module will retrieve the most matching image as per the query passed and then it will be categorized into similar ticket class in the processing of routine ticketing. Further user is required to enter the input on the basis of prior defined ticket which will help the system to recover the a good number of related imagery with that specific ticket without doing the various activities like extraction and matching computations.

Auto-ticketing performs in the same way as feature vector is performing. The ticketing is rather done by the allusion matrix which contains all the information and it is restructured by the system while execution automatically. It does not require managing all the images separately rather it is being done for all images in one go. There are separate matrices for the names and other information. As a result only appropriate images are retrieved which are matched with the user input. In the process of auto-ticketing of the images none of the duplicate image is retrieved. It is the fast, effective and efficient way of getting the much better results in context to retrieve the desired images from the large database.

IV. RESULTS

A. CBIR Performance through Feature Vectors

In the available mechanism, UCID dataset is the choice to check the consistency of CBIR scheme for the purpose of eliminates any kind of prejudice of human discernment in the categorization of images. The outcome is acquired with the different perspectives as shown in the following figure of different substances. These objects are preferred from the above-mentioned set of data as a query in the form of image and are selected with the help of their unstable complexity to discriminate series from a- simple to h – complex. This type of dataset is used for the testing and checking the reliability of CBIR system. There are many other datasets are also available for the same purpose. User first gives number of images as an input then checked for their matching images from the dataset. We can use number of images from the dataset. Following images are used in this paper to check the testing and steadfastness of mentioned CBIR system. Fig. 2 shows the query images given by the user and then retrieved from the dataset..

Fig. 2. Query Images given by Users [14]

TABLE I. IMAGE RETRIEVAL RESULT

	A	B	C	D	E	F	G	H
Significant images retrieved	70	70	76	65	55	71	56	65
Accuracy (%)	96.6	91.3	59.9	98	99	65.5	20.7	29.7
Evoke or Compassion (%)	98	95	100	83.1	79.6	100	90.7	89.7
Preciseness (%)	97.9	989	98.5	100	100	96.5	95.5	97.1
Significance (%)	96.6	94.3	64.9	66.1	98	62.5	19.1	34.7
Accuracy (%)	91.9	97.9	96.8	91.1	89.3	98.8	91.6	92.9

B. Performance by Text/Tag

In this paper, an exceptional graphical user interface is mentioned in which images are to be searched based on labels given. This operation will be achieved by using the text or ticket for the particular image, which is further retrieved from the image dataset. The overall function of the GUI has been explained in the Table II.

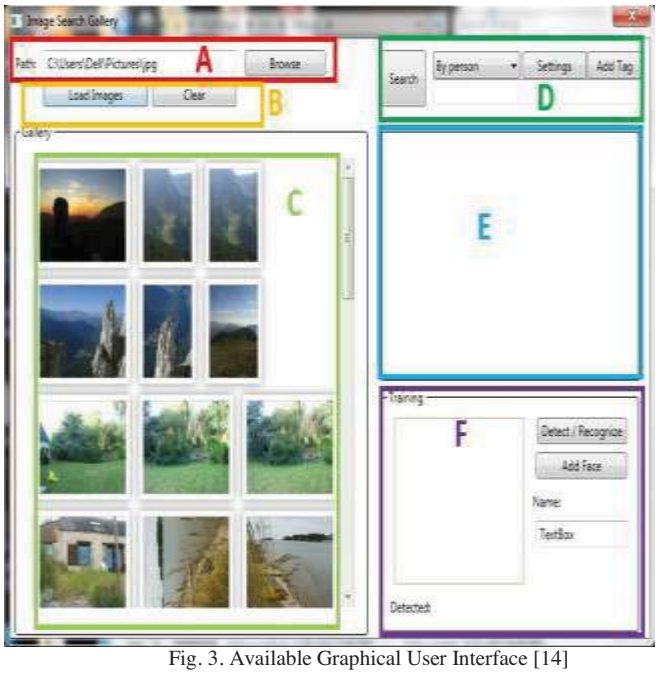

Fig. 3. Available Graphical User Interface [14]

TABLE II. FUNCTIONALITY OF GUI BY TICKETED SECTIONS

Section	Purpose
A	Choose the image database from which images are to be selected.
B	Load the various images without the involvement of CBIR and clear all the previous thumbnails.
C	View all the retrieved images and double click on the thumbnail for the large preview of the selected image.
D	The image can be searched based on name, image, or ticket then add that ticket to chosen image.
E	In this section we can see the preview of the query image when the search mode is image.
F	Lastly, users are allowed in this section to insert appearances and their matching names into the image database and check for the correctness, whether the desired image is retrieved or not.

V. CONCLUSIONS

After getting the above-mentioned results with the used mechanism, it has been observed that the desired objectives can be fulfilled with the implementation of methods explained in the paper. The two methods of searching the images have been effectively executed and implemented in the image database. In the first search mode, query image retrieval the feature vectors are haul out with the use of SIMPLE-CEDD and the results are quite satisfactory. The available system is efficient in making the right choice and sorting the images properly where it is removing the unnecessary images from the search result. Though there is always a scope of improvement in the available system to integrate the cataloguing algorithms. Next search mode, which is more, related to the combination of CBIR and TBIR. In this method the results are linked with tag or ticket with the help of that we are able to retrieve the desired images from the large image database. By implementing this method the computational need of consequent searches are condensed with the shared technique of CBIR and TBIR together. In this method the role of reference tables are also increased the chances of better results and acquire the desired output. However, there is also a scope of improvement in this method also where we can increase the number of sections in the GUI.

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