

Advancement of Image Searching System with Shape and Colour Features

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Abstract - The modern technology providing the sharing of information at very fast rate such as audio, video and images. The sharing of such data also increased as the social networking sites become popular among young generation. Now the online databases of images is so huge having millions of images, and the searching of images we need is crucial task. For such applications various image retrieval methodologies is proposed. In this paper we are proposing very efficient image retrieval technique based on dominant colour features extraction and shape feature extraction. In the simulation results we have found that from around 6745 images proposed algorithm takes only 1.8 seconds to retrieve results. That is why this approach is significant in terms of retrieval speed.

Keywords - Image Retrieval, Colour Features, Binarized shape Features, Retrieval Speed and Correlation.

I. INTRODUCTION

Content Based Image Retrieval is a term used to describe the process of retrieving images from a large collection on the basis of features (such as COLOUR, texture etc) that can be automatically extracted from the images themselves [9]. The retrieval thus depends on the contents of images. CBIR is comparatively a new topic and has turned into a hot research subject in last few years. The features that are used in CBIR should correspond directly to general routine notions of the human vision. For example, COLOUR, texture and shape are general terms used by most of people.

These features are mostly used for CBIR. But it is hard to define precisely how these features are discriminated by humans. Also, such discriminations are different for different people. Thus we need to pre-define the suitable feature representation scheme for each of these features. These features can be applicable over complete image or over a small region of the image. It is found that in most image retrieval systems, COLOUR based features play a prominent role. Indeed, COLOUR is the most important factor in human perception. The majority common representation of COLOUR information is in the form of COLOUR histogram, which statically is the probability of any given pixel having a specific intensity in each of the COLOUR channels. COLOUR anglogram [2], correlogram [1], COLOUR co occurrence matrix (CCM) [2] are some of the other feature representations for COLOUR.

II. SYSTEM MODEL

In content-based image retrieval (CBIR) image databases are indexed with descriptors derived from the visual content of the images. Most CBIR systems are worried with estimated queries where the aim is to find pictures visually similar to a particular target picture. In most cases the goal of CBIR systems is to replicate human perception of image similarity as well as possible. CBIR presents a challenging problem since it has common elements with both the general image understanding problem (which seems to remain unsolvable for computers at least in the near future) and the field of general information retrieval. Humans excel in image understanding when compared with computers. In contrast, in systematic handling of large databases computers have an edge over us. For this reason CBIR is also potentially very rewarding.

Global histogram gives information about the COLOUR contents of image and not the spatial distribution of COLOUR in image. Thus COLOUR feature alone cannot give satisfactory results. Texture can give additional information about the spatial arrangements and shapes of varying intensity available image. Texture is an important element to human vision. Texture has been found to provide cause to scene depth and surface orientation. People also tend to relate texture elements of varying size to a 3-D surface. Even in graphic systems greater realism is achieved when textures are mapped to 3-D surfaces. Gabor filters, Tamura filters, Gray level co occurrence matrix (GLCM) etc are used for the texture representation. Discrete Wavelet Transform (DWT) is found to be an effective tool for signal analysis. Wavelets have properties that are suitable for representation of an image texture. Daubechies wavelets and Haar wavelets are some of the examples of texture representation [9]. Shape information is considered to be one of the most difficult features to extract reliably from images since there are no mathematical definitions of shape similarity which can take into account the various qualities which human assign to shape. While using shape, it is important that the representation should be invariant to basic transformations such as rotation, scale etc. some of the features that are used to represent shape are moment invariants, circularity, area, minimum and maximum axis.

These features of the database images are calculated offline and stored into database. User gives one image as the query image (which may be uploaded or selected from the previous results). Then a system calculates corresponding features for the query image. Similarity measure takes these feature values and those from database and calculate the similarity among query image and each of the database images.

Database images finally are ranked and displayed according to similarity measure.

In general, CBIR can be described in terms of following stages:

a. Identification and utilization of intuitive visual features.

- b. Features representation
- c. Automatic extraction of features.
- d. Efficient indexing over these features.
- e. Online extraction of these features from query image.
- f. Distance measure calculation to rank images.

III. PROPOSED METHODOLOGY

The image retrieval system proposed in this paper is described below with the block diagram and flow charts. In Fig. 3.1 block diagram of feature database preparation is described. In Fig. 3.2 block diagram of image retrieval is proposed. In Fig. 3.3 flow chart of feature database preparation algorithm is explained. In Fig. 3.4 flow chart of image retrieval algorithm is explained.

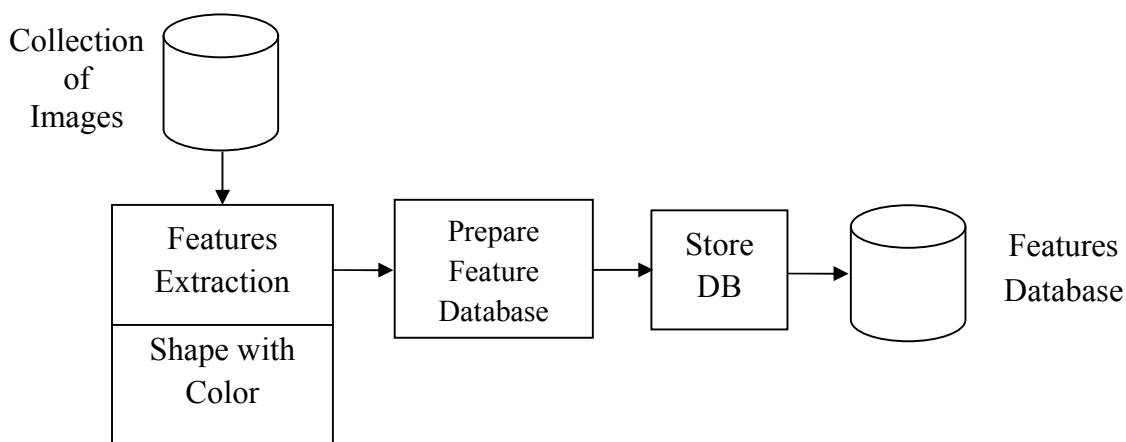


Fig. 3.1 Block Diagram of Feature Database is preparation

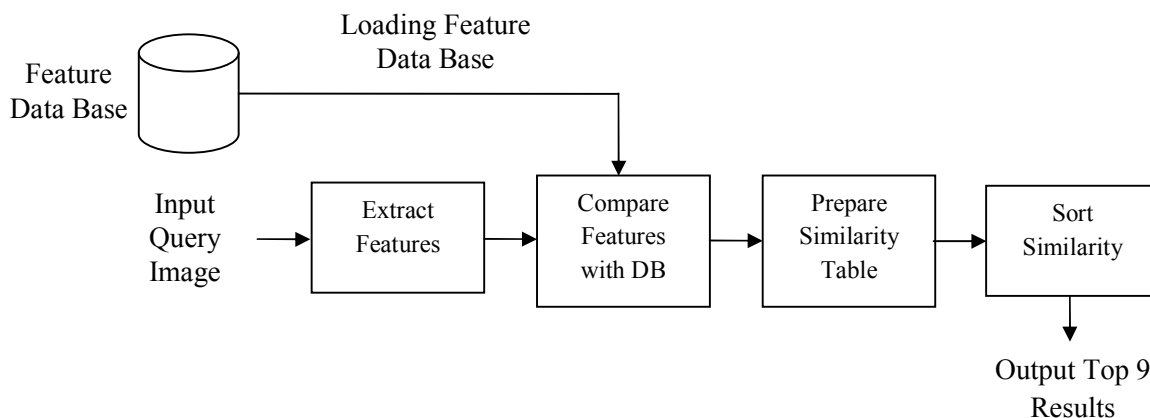


Fig. 3.2 Block Diagram of Image Retrieval

In the block diagrams the proposed methodology is described in first figure the Feature Database is prepared by using the collection of images, features extraction and shape with color so the preparation of database has been done and then after store in Database.

In this figure the Image Retrieval process is described by using the Feature, Extract the Features from image and compare with Feature Data Base then prepare the similarity table at the end 16 Similar results have been carried out.

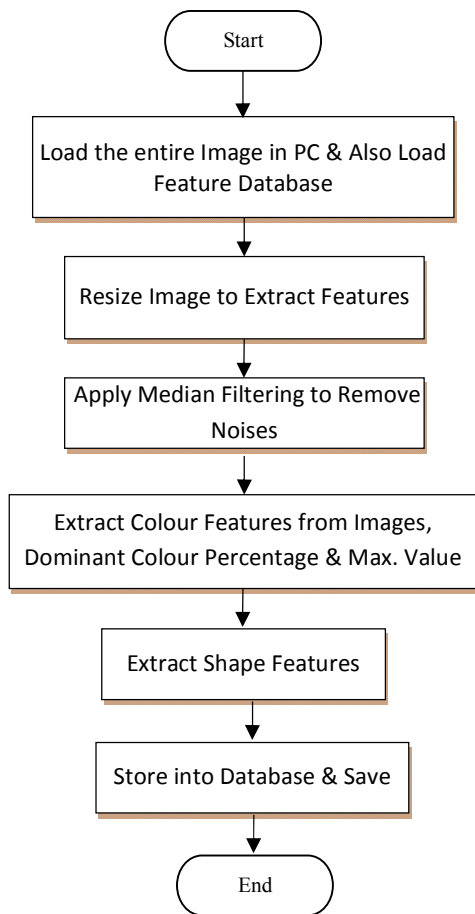


Fig. 3.3 Flow chart of feature database preparation

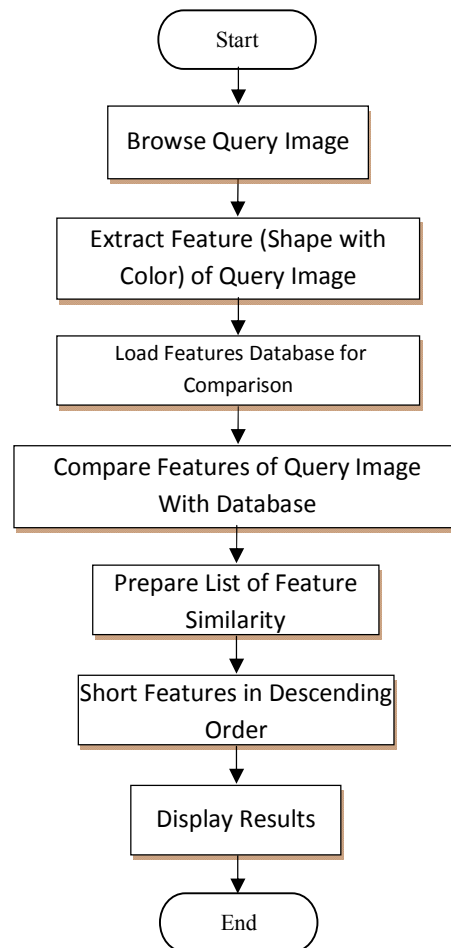


Fig. 3.4 Flow char of image retrieval

Preparing Features Database

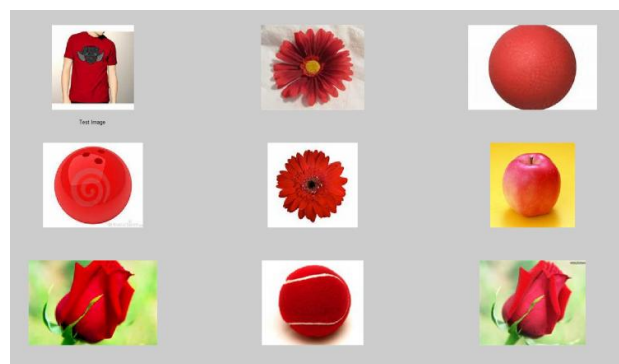
In the first flow graph preparing the features database process is achieved in which all images is loaded in PC and also feature database is loaded then resizing to extract feature is done then after Median Filter is adopted for removing the noise then extraction of colour feature from images is done then find out the dominant colour percentage and maximum value is achieved then extraction of shape feature and store into database.

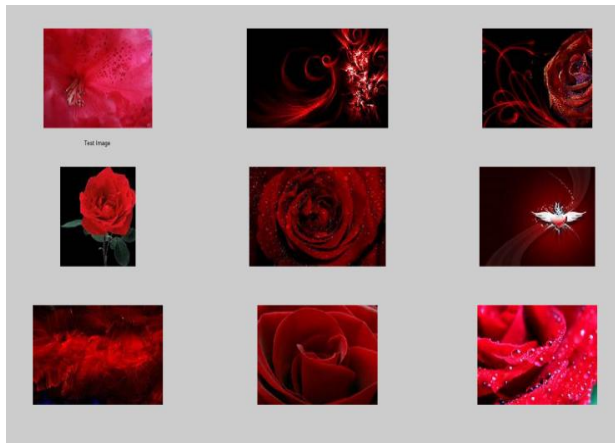
Image Retrievals

In this flow graph the image retrieval process is achieved. First of all browsing the Query Image then extract feature (Shape with Color) of Query Image then Loading of Features Database for Comparison purpose then Comparing Features of Query Image after that list is prepared for Feature Similarity then short features in descending order and finally the results have been displayed.

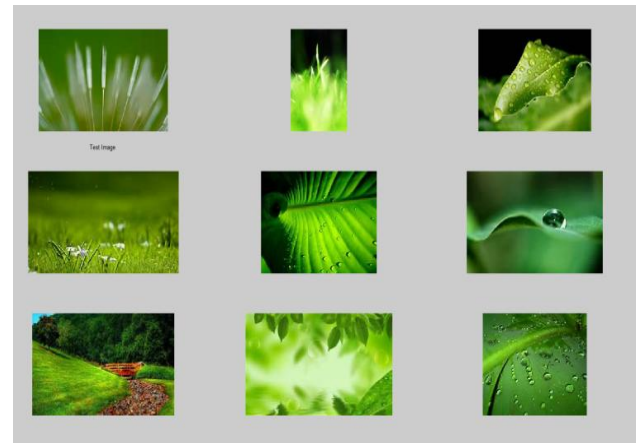
IV. SIMULATION RESULTS

Image retrieval proposed methodology is implemented on simulation tool and various results are found. The main reason is to develop advanced technique is to get the images from the huge collection faster than every other technique with meaningful results. In this section simulation results of proposed method is shown with different color and shapes.

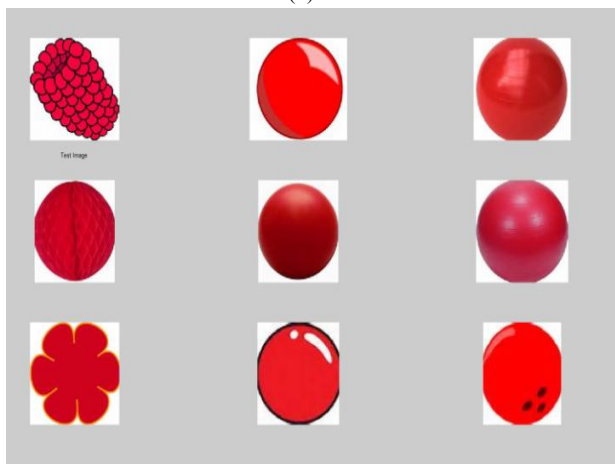




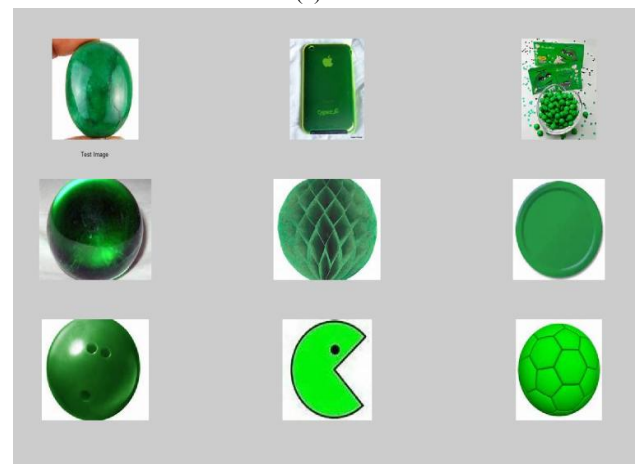
(b)



(b)



(c)



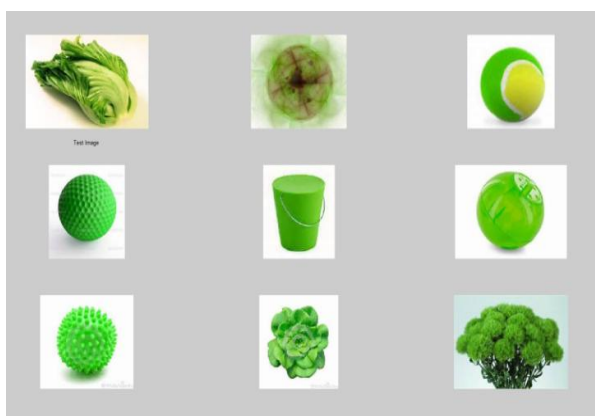
(c)

Fig. 4.1 (a), (b) and (c) Retrieval Results of Red Colour and time taken is 1.8268 seconds

Fig. 4.2 (a), (b) and (c) Retrieval Results of Green Colour and time taken is 1.8207 seconds

In Fig. 4.1 proposed algorithm trying to retrieve images of red colour looking similar to girl and the similar results are displayed in the figure. In the retrieved results algorithm first trying to find out the similar images in descending order that is most similar images appear first in the results. The time taken to get the results is 1.8268 seconds.

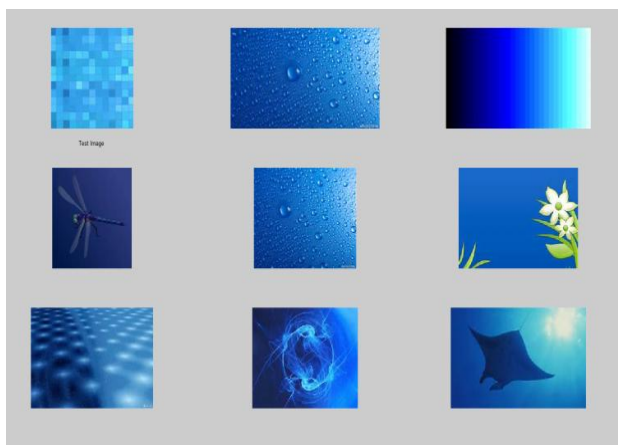
In Fig. 4.2 proposed algorithm trying to retrieve images of green colour looking similar to cup and the similar results are displayed in the figure. In the retrieved results algorithm first trying to find out the similar images from images collection and arrange in descending order i.e. most similar images appear first in the results. The time taken to get the results is 1.8207 seconds.



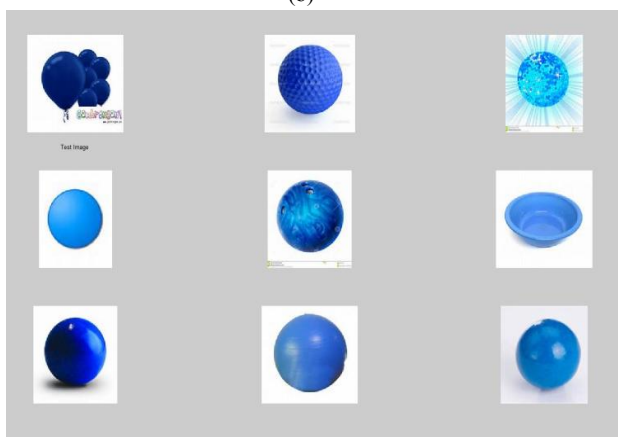
(a)



(a)



(b)



(c)

Fig. 4.3 (a), (b) and (c) Retrieval Results of Blue Colour and time taken is 1.8406 seconds

In Fig. 4.3 proposed algorithm trying to retrieve images of blue/purple colour looking similar to circle or sphere and the similar results are displayed in the figure. In the retrieved results algorithm first trying to find out the similar images from images collection and arrange in descending order i.e. most similar images appear first in the results. The time taken to get the results is 1.8406 seconds.

As we were tried for other shapes and colours the results algorithm takes on an average 1.8 seconds to retrieve each images for each query.

V. CONCLUSION AND FUTURE SCOPE

Image retrieval is growing and in demand technique used in wide area of application like search engines, social networking sites, surveillance systems etc. The need of image searching is either colour based or shapes. In the proposed methodology of this paper we have adopted method for colour based retrieval as well as shape based retrieval and we have tried to make is faster like 1.8 seconds to get results.

In the upcoming time hybrid form of multiple techniques definitely improve the accuracy as well as retrieval time.

Table 5.1 Comparison With Other Methodologies

Technique	Methodology	Outcomes
Our Approach	Color and Shape Based Image Retrieval where shape of the images are compared with the feature extraction and color features are compared with intensity and RGB layer percentages	The proposed methodology shows better accuracy in terms of multiple features, shapes and color combinely. The simulation results we have found that from around 6745 images proposed algorithm takes only 1.8 seconds to retrieve results.
[1]	Sketch Based Image Retrieval. Two essential modules were distinguished: salient edge extraction to establish a database and edge description and matching.	Retrieved Results are similar with shape only. Achieved greater accuracy than a state-of-the-art sketch-based retrieval
[2]	Sketch based Manga retrieval method with fine multi-scale edge orientation histogram (FMEOH)	Retrieved Results are similar with shape only
[3]	Content based image retrieval by using sketches. The system strives for of CBIR is to abstract obvious sphere of an image unavoidably, texture, or shape.	The system intuitively interact the SURF using to find out the clear image from your database with standard deviation. not deals with the color based similarity.

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