A Novel Approach for Image Retrieval System Using Shape and Color Feature

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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 are 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, Binaries shape Features, Retrieval Speed and Correlation

I. INTRODUCTION

During the most recent decade there has been a fast increment in volume of picture and video accumulations. A gigantic measure of data is accessible, and day by day gigabytes of new visual data is produced, put away, and transmitted. In any case, it is hard to get to this visual data unless it is sorted out in a way that permits productive perusing, seeking, and recovery. Customary techniques for ordering pictures in databases depend on various graphic catchphrases, related with each picture. In any case, this manual comment approach is subjective and as of late, because of the quickly developing database sizes, it is getting to be noticeably obsolete. To beat these challenges in the mid 1990s, Content-Based Image Retrieval (CBIR) risen as a promising means for portraying and recovering pictures. As per its goal, rather than being physically explained by content based watchwords, pictures are filed by their visual substance, for example, shading, surface, shape, and spatial format.

1.2 Content-based Image Retrieval (CBIR)

1.2.1 The Problem of Content-based Retrieval

The idea behind content-based retrieval is to retrieve, from a database, media items (such as images, video and audio) that are relevant to a given query. Relevancy is judged based on the content of media items. Several steps are needed for this. First, the features from the media items are extracted and their values and indices are saved in the database. Then the index structure is used to ideally filter out all irrelevant items by checking attributes with the user's query. Finally, attributes of the relevant items are compared according to some similarity measure to the attributes of the query and retrieved items are ranked in order of similarity. This chapter provides a short introduction to each of the steps mentioned above, which are also shown in Figure 1.1

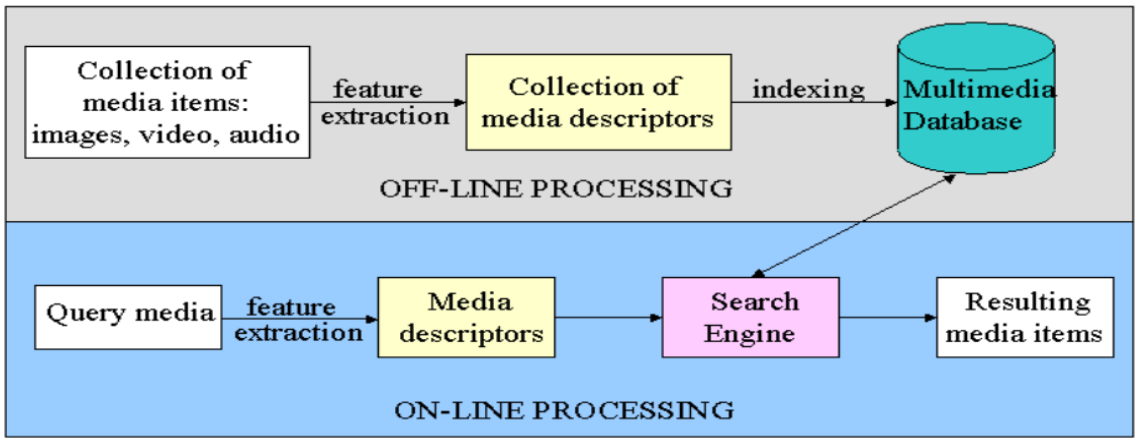


Figure1.1 Block diagram of the content-based retrieval system

1.2.2 Feature Extraction

Feature extraction is one of the most important components in a content-based retrieval system. Since a human is usually judging the results of the query, extracted features should mimic the human visual perception as much as possible. In broad sense, features may be divided into low-level features (such as color, texture, shape, and spatial layout) and high-level semantics (such as concepts and keywords). Use of only low-level features might not always give satisfactory results, and therefore, high-level semantics should be added to improve the query whenever possible. High-level semantics can be either annotated manually or constructed automatically from low-level features. In this chapter the general low-level visual features are described.

1.2.3 Color

Color is one of the most widely used visual attributes in image retrieval. In fact, most existing image retrieval systems such as QBIC, Netra, and Visual SEEK are most efficient in color retrieval. Retrieval by color similarity requires using such models of color stimuli that distances in color space correspond to human perceptual distances between colors. Studies by psychologists and artists have demonstrated that the presence and distribution of colors induce sensations and convey meaning to the observer.

1.2.4 Shape

The shape of an object is a binary image representing the extent of the object. Since the human observation and comprehension of items and visual structures depends vigorously on their shape properties, shape highlights assume a critical part in CBIR. When all is said in done the helpful shape elements can be isolated into two classifications, limit based and locale based. where two extra expansions for limit based portrayals, multi-determination approach and closeness assessment in light of ordinal connection, are introduced.

1.2.5 Texture

Although no single formal definition for texture exists, we allude to texture as a zone containing varieties of forces, which shape rehashed designs. Those examples can be created by physical surface properties, for example, unpleasantness, or they could come about because of reflectance contrasts, for example, the shading on a surface. Contrasts seen by visual examination are hard to characterize in quantitative way, which prompts the need of characterizing texture utilizing a few elements. In this postulation textural qualities are isolated into three classes: spatial, recurrence and minute based characteristics.

II. PROPOSED METHODOLOGY

In this proposed model we have to use shape feature extraction and colour feature extraction in which the system will increase the efficiency. Initially the input image is exerted to the shape feature extraction and again the data is passed through the colour feature extraction the output data which is passed through the colour feature extraction is takes the feedback from database and check the current data from colour feature to last data data of Database. If the

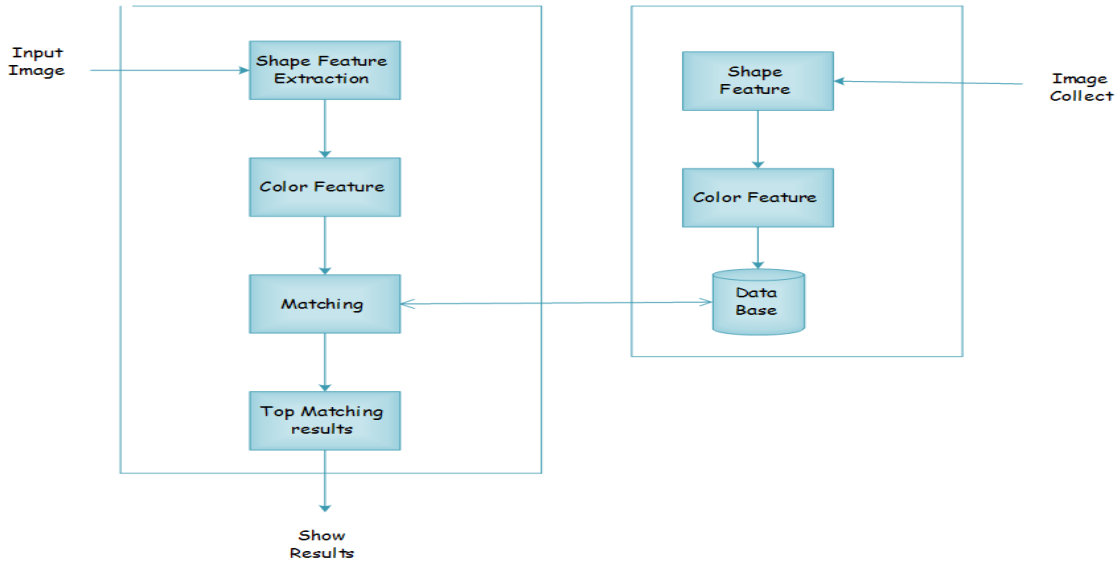


Fig2.1 A Novel Approach for image retrieval system using shape & color features

2.1 FLOW OF PROCESS

The flow of process has illustrated in figure 2.2 the flow of process the process has start with the initialization of parameters and generate random signal which is to be transmitted for the experimental purpose .It generated random signal with prepare feature database & load. Initialize Browse test image as demonstrated in figure 3.1 and start symbol transmission using shape feature and color feature extraction. And compare shape and colour features with database and prepare similarity table. finally display result on screen.

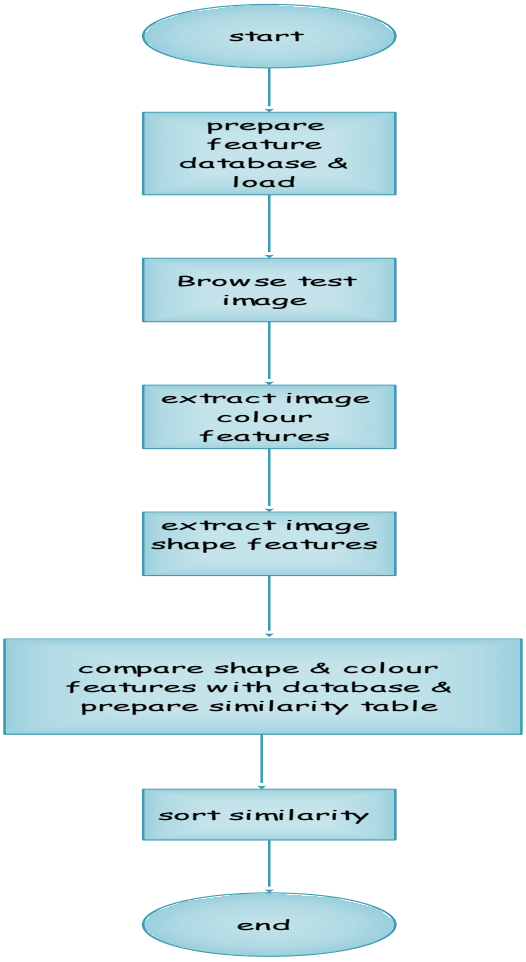


Fig 2.2 Flow of process

2.2 FLOW OF PROCESS OF COLOUR FEATURE EXTRACTION AND SHAPE FEATURE EXTRACTION

The flow of process has illustrated in figure 2.2 the flow of process the process has start with the initialization of parameters and generate random signal which is to be transmitted for the experimental purpose .It generated random signal with input image loading. Initialize Browse test image as demonstrated in figure 2.1 and start symbol transmission using shape feature and color feature extraction. And compare shape and colour features with database and prepare similarity table. finally it separate the layers such as Red, Green and Blue and estimate the percentage of colours and sorting as per as maximum value.

In shape feature extraction after loading the image it convert the image into the grayscale and apply on it and gives the features extraction and show the results on the screen.

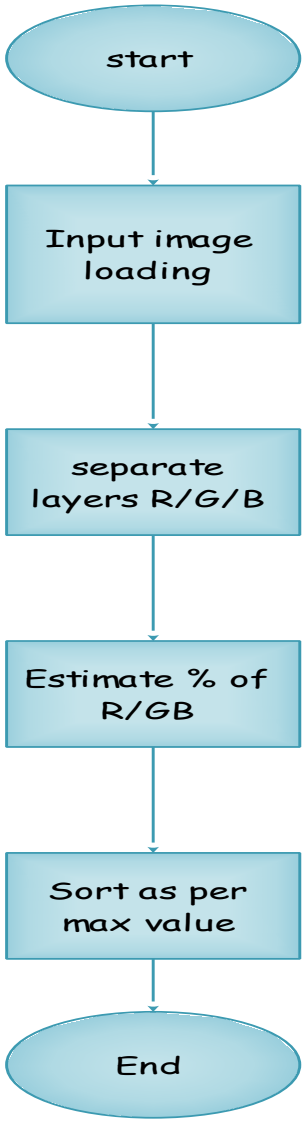


Fig 2.3 Colour Feature Extraction

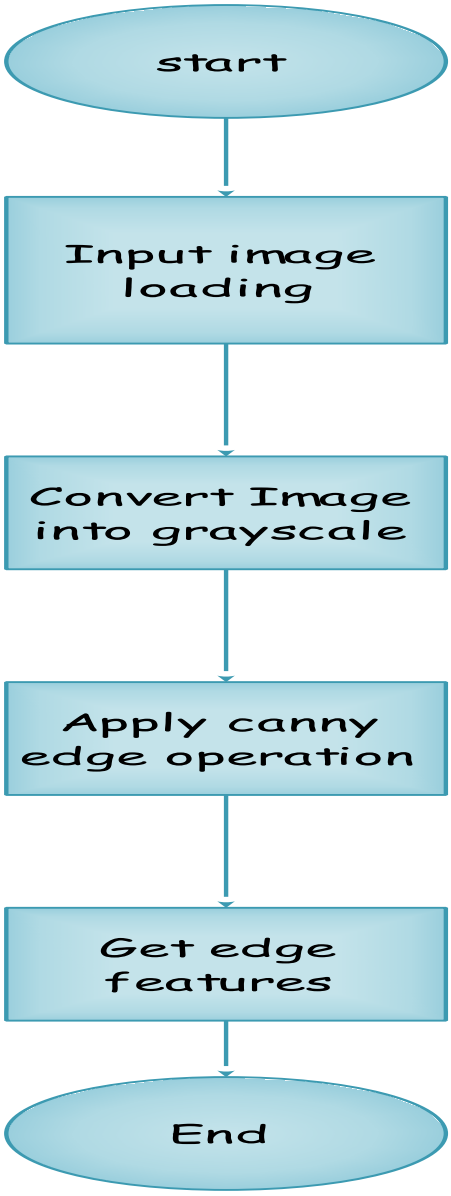
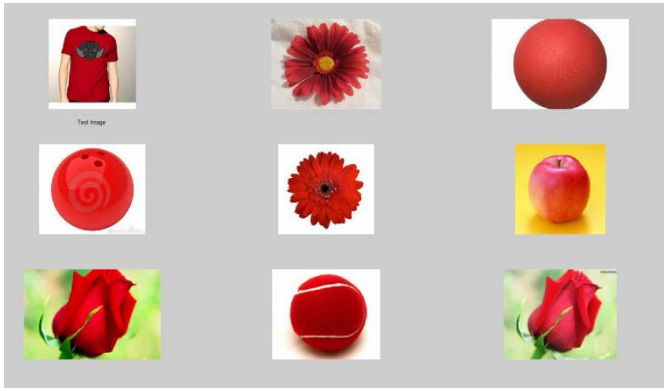


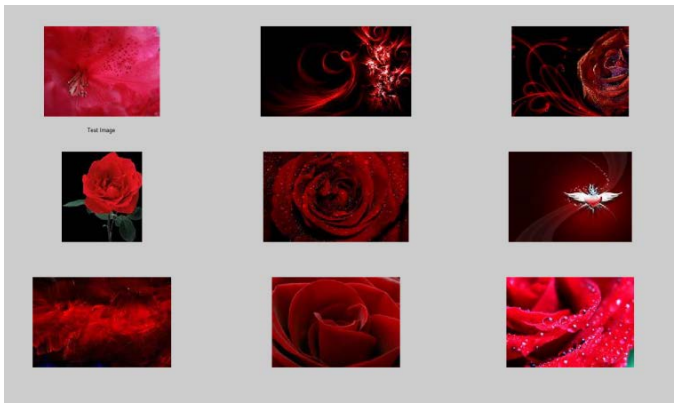
Fig 2.4 Shape Feature Extraction

III. SIMULATION RESULTS

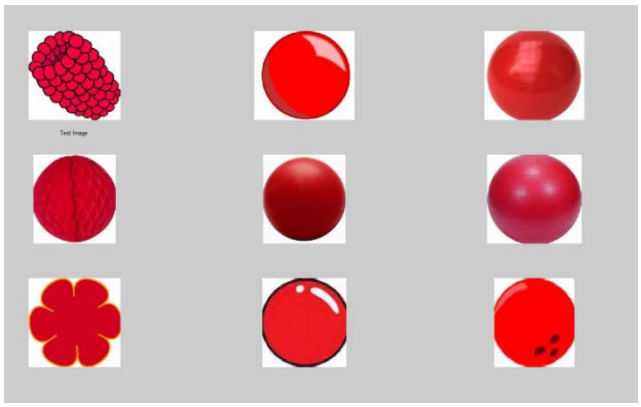
Image retrieval proposed methodology is implemented on simulation tool and various results are found. The main reason is to develop advanced technique is to get the images from the huge collection faster than every other technique with meaningful results. In these section simulation results of proposed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



(a)



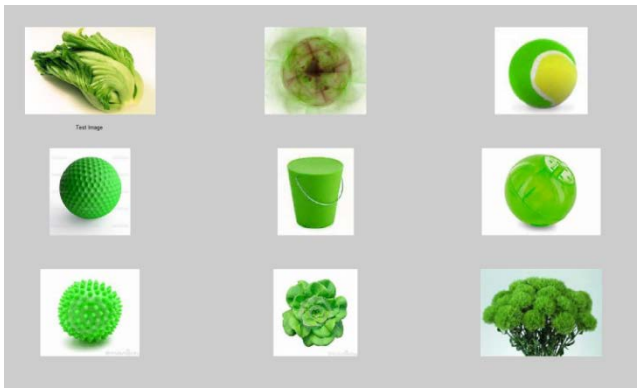
(b)



(C)

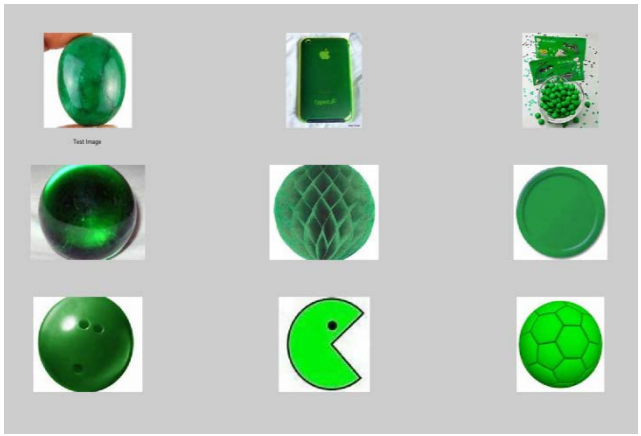
Fig. 3.1 (a), (b) and (c) Retrieval Results of Red Colour and time taken is 1.8268 seconds

In Fig. 3.1 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.



(a)

(b)

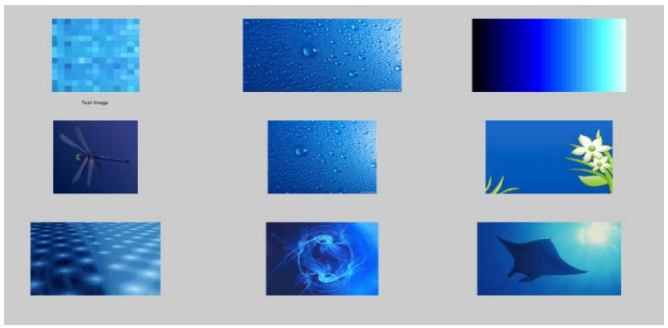


(C)

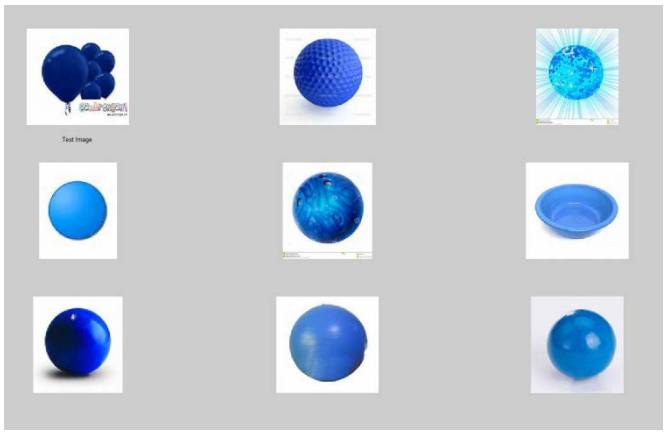
Fig. 3.2 (a), (b) and (c) Retrieval Results of Green Colour and time taken is 1.8207 seconds

In Fig. 3.2 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)



(b)



(c)

Fig. 3.3 (a), (b) and (c) Retrieval Results of Blue Colour and time taken is 1.8406 seconds

In Fig. 3.3 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.

Table 4.1 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 combinable. 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

IV. CONCLUSION AND FUTURE SCOPE

Picture recovery is developing and popular method utilized as a part of wide zone of use like web indexes, person to person communication locales, reconnaissance frameworks and so forth. The need of picture looking is either shading based or shapes. In the proposed philosophy of this paper we have received technique for shading based recovery and also shape based recovery and we have attempted to make is quicker similar to 1.8 seconds to get comes about.

In the up and coming time half and half type of various methods certainly enhances the precision and also recovery time.

In this research work, efforts have been focused on establishing multi-image query content- based image retrieval system. The achievements can be divided into four main sections:

• Database Establishment

With the aim of collecting many image samples, an image database for image retrieval was developed during the period of this research. All the images in the database are ’real-world” images collected from several sources, such as the Internet, companies and standard image databases. According to the perceived meaning of each image, the database is further sub-divided into 22 categories, such as flower, car, tree, waterfall, sunset, animal, landscape, etc.

•Feature Selection

The feature employed in any content-based retrieval system is critical in achieving a respectable performance. During this study, the Colour Layout Descriptor (LCD), Colour Structure Descriptor (CSD), Scalable Colour Descriptor (SCD), HSV Histogram Descriptor (HHD), Edge Histogram Descriptor (EHD) and Homogeneous Texture Descriptor (HTD) are extracted and compared. It was found that the combination of the Colour Structure Descriptor and Edge Histogram Descriptor can generate a better retrieval performance than other kinds of combinations.

•Performance Improvement

The methods outlined below are developed and evaluated in terms of increasing the performance of the content-based image retrieval system.

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