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## IMAGE RETRIEVAL USING CONTENT OF IMAGE

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## **ABSTRACT**

In this paper, we provide a new image retrieval model which integrates the spatial distributing information of colors, shape and the texture features. We suggest CBIR (Content Based Image Retrieval) method using color, shape and texture information. Using just one feature information may cause inaccuracy compared with using more than two feature information. We use three feature, HSV color model as color information, Fourier descriptor and moment invariant as shape representation, and GLCM(gray-level co-occurrence matrix) and spectral measure as texture representation. Feature vector of all the candidate images are calculated before and stored as a metadata. Here Euclidean Distance is used as proposed methodology for retrieving similar images.

#### **KEYWORDS**

Content based image retrieval, HSV color model, shape and texture and query image.

## **INTRODUCTION**

mage retrieval is achieved according to the similarity of image features. CBIR for general-purpose image databases is a highly challenging problem because of the large size of the database. An image database system aims to help people in this regard and enable them to find their desired images as quickly as possible. In content-based image database system, intrinsic properties of images are captured in some feature vectors which are indexed or compared to one another during query processing to find similar images from the database.

## **OVERVIEW OF FEATURE EXTRACTION**

The Feature extraction is defined as calculating distinctive characteristics of pixels in an image. Generally, any CBIR technique uses visual features of images, such as colour, shape and texture yielding vectors with hundreds or even thousands of features. As many features are correlated to others bring extra knowledge and produces redundancies among them. Using a large number of features leads to the dimensional mismatch problem and is time consuming. This dissertation proposes a new technique to retrieve the query image efficiently with accuracy by using two features namely colour and shape. Collectively all these features were combined to form a single vector which is called as feature vector.

## **HSV COLOR MODEL ANALYSIS**

HSV color model is used to represent the color information of image. In HSV model, H denotes hue, S denotes saturation of color, V denotes intensity value (corresponding to brightness or grey level).

## SHAPE ANALYSIS

In this paper, a Fourier descriptor (FD) and moment invariants are used to overcome the drawbacks of existing shape representation techniques.

## **TEXTURE ANALYSIS**

Another set of features which we used to describe an image is texture feature. Two main approaches concerning with texture analysis are: GLCM measure and spectral measure [9, 13].

## PROPOSED METHODOLOGY

## RETRIEVING SIMILAR IMAGES USING EUCLIDEAN DISTANCE

The efficiency and accuracy of the image retrieval is significantly affected by the ability of the distance calculation techniques. Let  $X = \begin{bmatrix} X1, X2 & \dots & Xn \end{bmatrix}$  be the feature vector of the candidate image and  $Y = \begin{bmatrix} Y1, Y2 & \dots & Yn \end{bmatrix}$  be the feature vector of the query image. Euclidean distance between the candidate image feature vector and the query image feature vector is given by.

$$D = (\sum_{i=1}^{n} |X_{i} - Y_{i}| ^{2})^{\frac{1}{2}}$$
 (23)

The result of the distance calculation is used for retrieving or adding the image from/to database.

## DATABASE PREPARATION

One thousand eight hundred and seventy five (1875) different digital general images of various categories collected from the open source were used. The database is comprises of various categories of general images i.e it contains the image of different animals, flowers, fruits, birds, aquatic animal and insects. The figure shows below some of the example of the database images. The figure (3.2) shows the flow chart of the proposed methodology.

## FIGURE 3.2: THE FLOW CHART FOR RETRIEVAL OF GENERAL IMAGE Query Image Extract shape eature( Momen Extract Colour feature Extract Texture Invarinats & Fourie feature (GLCM Descriptor) Euclidean Create feature Features of Distance ED Images ED = 0 or < YES NO similar image is found, enter new Quen Retrieved Simila

## **RESULT & CONCLUSION**

#### GENERAL IMAGE RETRIEVAL

### **IMAGE DATASET**

The image database is collected from the website **Caltech 101** [8]. The database consists of different images of various kinds such as images of animals, aquatic animals, plants and fruits. There are about 1875 total images.

#### **QUERY IMAGES**

There are about 100 query images presented to the CBIR system.

#### **PRECISION**

For the performance evaluation of retrieval result, Precision -Recall table is used. Precision is defined as the total number of relevant image retrieved to the total number of images retrieved by the system. Retrieved images are considered relevant if it belongs to the same class. Therefore the precision of the retrieval performance is defined as

$$precision = \frac{t_y}{t_y + f_y} = \frac{r}{k}$$
 (24)

Where r the number of total number of relevant image is retrieved and r is the number of total image retrieved.

 $t_p$  is the number of image retrieved relevant to the query,  $f_p$  is the number of image retrieved irrelevant to the query. In this result  $t_p$  is the number of animal images and  $f_p$  is the number of Non – animal images. The query images are presented to the CBIR system and their precision is calculated. The precision is calculated for shape features, colour features and their combined approach. The precision is calculated for the average 100 queries given to the system. The table below shows results.

**TABLE 4.2: PRECISION OF QUERY GENERAL IMAGE RETRIEVAL** 

S.NO	Feature	Precision (%)
1	Shape(Moment invariant, Fourier descriptor)	68.4211
2	Colour(HSV colour space model)	75.8772
3	Combined Approach	79.8772

Images below show the results of proposed CBIR system.

It can be easily seen from the Figure (4.1) and precision-Recall table that when only shape feature is used for retrieval of query image it gives a very poor result. Thus it is concluded that shape features are highly affected if query is incomplete and may result in very low retrieval efficiency. It is clear from figure (4.2) that retrieval efficiency is increased by using colour feature. For increasing the efficiency of the system both colour and shape features were combined together. More weight age is given to the colour feature vectors in the combined approach. Figure (4.3) shows result of retrieval using both colour and shape feature.

FIGURE 4.1: QUERY IMAGE AND SIMILAR IMAGES RETRIEVED BY THE SYSTEM USING SHAPE FEATURE

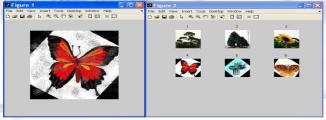
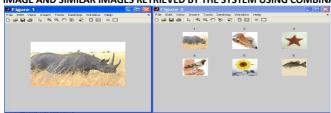


FIGURE 4.2: QUERY IMAGE AND SIMILAR IMAGES RETRIEVED BY THE SYSTEM USING HSV COLOUR SPACE FEATURE



## FIGURE 4.3: QUERY IMAGE AND SIMILAR IMAGES RETRIEVED BY THE SYSTEM USING COMBINATION OF FEATURES



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In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active cooperation of like-minded scholars, we shall be able to serve the society with our humble efforts.



