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CONTENT BASED IMAGE RETRIEVAL USING TEXTURE

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Abstract—Text based image retrieval is a traditional technique. It has the defects like subjectivity. To reduce these types of defects we are using content based image retrieval which uses the features like texture, color, shape etc. These features are analyzed and extracted automatically by computer to achieve the effective retrieval of desired content. For achieve more efficiency we have two features called high dimensional and low dimensional features where the results are unsatisfactory. Because query efficiency will be reduced by the high dimensional feature, query accuracy will be reduced by the low dimensional feature. Color and texture are most important visual features. In this paper we can extract the images from the database which have the similar texture features. For extracting these similar images based on texture we are using the GLCM (Gray Level Co-occurrence Matrix) method.

*Keywords—**GLCM, Texture***

I. INTRODUCTION

In Image processing we are using the image retrieval applications. Apart from that content based image retrieval is the one of the application. In this CBIR we extract the images from the database by using image properties like texture, color n shape etc. These techniques are applied to get an image from the image database. For this we can also use the multiple features. The effective image retrieval technique can be given by content and metadata based systems. Many of other image retrieval systems are using the global features like color, shape and texture. But the prior results say there are too many false positives while using those global features to search for similar images. Hence both content and metadata can give the new view of image retrieval.

Efficient storage and retrieval of images recognized by managers of large image collections such as picture libraries and design archives for many years was reinforced by a workshop sponsored by the USA's National Science Foundation in 1992 [Jain, 1993]. After examine the features of the CBIR these methods are useful in the electronically mediated communication. In this we are doing browsing, retrieving, comparing and etc. Some Journalists are requesting photographs of a particular type of event, designers looking for some materials with a particular color or texture, and some engineers looking for drawings of a particular type of part, all need some form of access by image content.

1. Content Based Image Retrieval

We already discussed about the Text based image retrieval. Now CBIR technique using the totally different principle, that is retrieving stored images from a collection of images by comparing features automatically and extracted from the images themselves. For this purpose we use the GLCM technique by using this we can extract the image which has the same texture features.

2. Image Retrieval by using Texture feature

Texture feature image retrieval is may not be very difficult. This is useful to distinguishing between the areas of images with similar color (such as sky and sea, or leaves and grass).To measure texture features there are many techniques. Apart from that, best one is on comparing known values of images, as second-order statistics calculated from query and stored images. From this it is possible to calculate measures of image texture such as the degree of *contrast, coarseness,* directionality and regularity. There are some alternative methods like Gabor filter. By using Gabor method also we can extract the similar images which have same texure features. Ma and Manjunath [1998] developed the extension for this technique, which retrieves textured regions in images on the basis of similarity to automatically derived code words representing important classes of texture within the collection.

Another important property is Texture. There are various texture representations. In computer vision and pattern recognition we can use this type of texture features. Basically, texture representation methods can be classified into two

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categories:

1. Statistical and
2. Structural.

Morphological operator and adjacency graph used in the structural method, describes texture by identifying structural primitives and their placement rules. These are most effective when applied to textures that are very regular. Statistical methods, including Fourier power spectra, co-occurrence matrices, shift-invariant principal component analysis (SPCA), Tamura feature, World decomposition, Markov random field, fractal model, and multi-resolution filtering techniques such as Gabor and wavelet transform, characterize texture by the statistical distribution of the image intensity.

Texture feature extraction using GLCM

GLCM which creates the matrix has two parameters directions and distance between the pixels. Which are defined as d and α.
The probability of the matrix is P (m,n|d ,α) is showed by $p_{m,n}$.Elements in the matrix are computed by the equation showed as follows:

$$P(m,n|d,\theta) = \frac{P(m,n|d,\theta)}{\sum_m \sum_n P(m,n|d,\theta)}$$

GLCM have other parameters according the Correlation of the couple pixels gray-level at different positions. It quantificational describes the texture feature.
In this paper GLCM introduces energy, entropy and inverse difference.
Energy which is defined as:

$$\text{Energy} \quad E=\sum_{i,j} p(i,j)$$

Homogeneity changing, reflecting the distribution of image gray-scale uniformity of weight and texture.

$$\text{Contrast} \quad I=\sum \sum p(i-j)^2 p(m,n)$$

These are reflects the image clarity and texture differences. Contrast is large means texture is deeper.

$$\text{Entropy} \quad S= -\sum \sum p(i,j) \log p(i,j)$$

The maximum entropy implied by the image gray Distribution is random.

$$\text{Inverse difference} \quad H=\sum_i \sum_j \frac{1}{1+(i-j)^2} p(i,j)$$

This compares the query image with the database images. Here P (i, j) is the gray level value at coordinate (i,j).

II. Experiment Results

In this paper database contains the 60 images which contains three categories rose flowers, elephant and Godzilla. From fig 1we browse the image and then we load the image. After that the database will be loaded. The query image which checks the texture similarities with the database images by using the GLCM method and similarity methods from the formulas which are given below. After checking it will display the similar images from the database. It is mainly used in the Google for the image search.

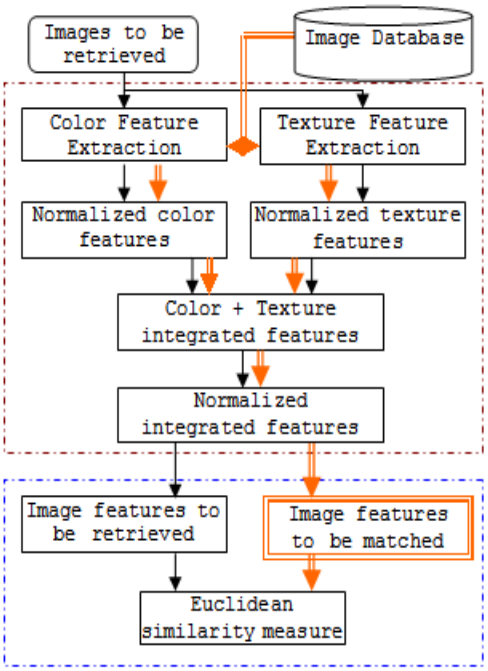

Fig. 1. Algorithm

As shown in the figure 1, the similarity measure from two types of characteristic features, including color features and texture features. Two types of characteristics of images represent different aspects of property. So during the Euclidean similarity measure when necessary the appropriate weights to combine them to consider this end. Therefore, in carrying out Euclidean similarity measure we should consider necessary appropriate weights to combine them. We construct the Euclidean calculation model as follows:

$$D(S,T)=\beta 1 D(F_{EA,}F_{EB})+ \beta 2 D(F_{GA,}F_{GB})$$

Normalized form as follows:

$$D(S,T)=\beta 1 \frac{\sqrt{2}D(F_{EA},F_{EB})}{\sqrt{2}} + \beta 2 \frac{\sqrt{2}D(F_{GA},F_{GB})}{\sqrt{2}}$$

Here the weights are β1 ,$\beta 2$.$F_{EA}$and F_{EB}represents the 72-dimensional color features for image.$F_{GA}$and F_{GB} on behalf of 16-dimensional texture features.

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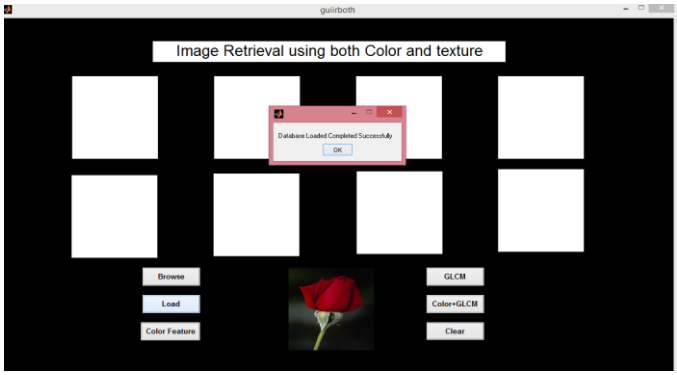

Fig 1.Browsing images from database.

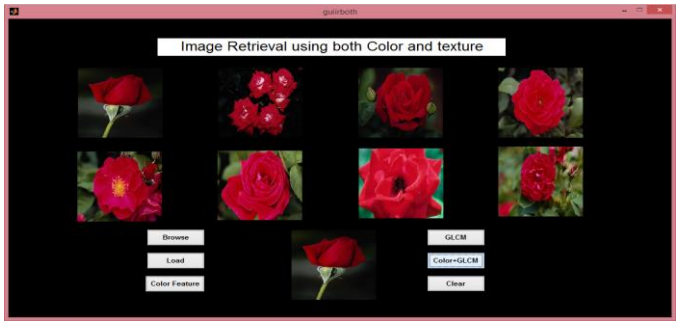

Fig. 2.Retrieval result based on color + GLCM

Table -1 Experiment Result

Retrieval mode	Recall (%)	Precision (%)
Color	20.5	35.1z
Color + GLCM	25.6	36.2

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III. CONCLUSION

This paper concludes that we can retrieve the images by using color and textures. This paper gives the maximum results based on the color and text features. From the existing methods also we retrieve the images. The main advantage of the image is we can retrieve the images using color and texture at a time.

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