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CONTENT BASED IMAGE RETRIEVAL (CBIR)

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Abstract - *The performance of Content-Based Image Retrieval (CBIR) system is depends on efficient feature extraction and accurate retrieval of similar images. Content based image retrieval is the task of retrieving the images from the large collection of database on the basis of their own visual content. This paper depicts the color features using Color Descriptor (CN) to obtain better retrieval efficiency from large database using these feature vectors near about similarly matched images are retrieved. It is observed that color features provides approximately similar results with very less processing time if we compare with individual approach.*

Key Words*: *Content Based Image Retrieval, Colour Descriptor (CN),Canberra distance,LSB descriptor… .

1. INTRODUCTION

Generally there exist two approaches for searching and to retrieving images. The first one is based on textual information done manually by a human. This is called concept-based or text-based image indexing. A human describes and valuate the images according to the image content, the caption, or the background information. However, the representation of an image with text requires significant effort and can be expensive, tedious, time consuming. To overcome the limitations of the text-based approach, the second approach known as Content-Based Image Retrieval (CBIR) techniques are used. In a CBIR system, images are automatically indexed by visualizing their valued features such as color, texture, and shape.

These features are automatically extracted from the images. In this paper, we present an interactive similar image retrieval system and evaluate which color or texture features are the most efficient to represent similarity of color images. Our initial results show that the color histogram descriptors are not effective features because they do not consider spatial information of image pixels. Therefore, different images may have similar color distributions. In addition, our results show that the co-occurrence matrix features retrieve much more relevant images than other color and texture features. Additionally, in order to increase precision, the color based image retrieval should be used in CBIR systems. In content based image retrieval system the color and texture feature is extracted and clustering is done in order to group the similar feature vector and the sample images are extracted from the each group of the image. In CBIR, each image that is stored in the database has its features extracted and compared to the features of the query image. It involves two steps:

- Feature Extraction is the process is extracting image features to a distinguishable extent.
- Matching is the second step involves matching these features to yield a result that is visually similar.

2. EXISTING SYSTEMS

There are number of methods which has been proposed to extract the features of images from very large database.

1. A content-based image retrieval system has been proposed by Yamamoto , which takes account of the spatial information of colours by using multiple histograms. The spatial information of colours is captured by dividing an image into two rectangular sub-images recursively. Using a straight line vertically or horizontally, the given image is divided into two regions, even when each sub image, the division process continues recursively until each region has a homogeneous colour distribution or the size of each region becomes smaller than that a given threshold value. As a result of which the colour distribution of the image is derived with binary tree. The tree structure facilitates the evaluation of similarity among images.

2. G. Pass *et.al* [3] proposed a novel method to describe spatial features in a more precise way. That model is not variant to scaling, rotation and shifting.

3. S. Nandagopalan, *et.al* [4] proposed a novel technique for generalized image retrieval based on semantic contents is offered. The grouping of color, texture, and edge histogram descriptor is performed. There is a necessity to include new for better retrieval efficiency features in future. Using computer vision and image processing algorithms , the image properties are analyzed. Anticipated for color the histogram of images are calculated, for texture co-occurrence matrix based entropy, energy etc are calculated and for edge density it is Edge Histogram Descriptor (EHD) that is found.

4. Heng Chen and Zhicheng Zhao *et.al*[5] Authors described relevance feedback method for image retrieval. Relevance feedback (RF) is an efficient method for content-based image retrieval (CBIR), a The semantic gap between low-level visual feature and high-level perception is minimized by this method. The proposed algorithm is SVM-

based RF algorithm used to advances the performance of image retrieval. To stabilize the proportion of positive samples and negative samples, a model expanding method have adopted in classifier training. Based on adaptive weighting, a fusion method for multiple classifiers is proposed to vote the final query results.

5. Xiang-Yang Wang, *et.al* [6] have proposed a new content-based image retrieval technique using color and texture information, for achieving higher retrieval efficiency. Initially, the image is altered from RGB space to adversary chromaticity space and the individuality of the color contents of an image is space. In next, the texture attributes are extracted using a rotation-invariant and scale- incarcerated by using Zernike chromaticity distribution moments.

3. OVERVIEW OF PROPOSED SYSTEM

The overview and functionality of the system is represented in the given block procedure to be followed are:

- User will provide the query formation as input image. Then the visual sable content is described.
- Further then feature vector depicts extracting image features to a distinguishable extent.
- Then similarity matching is done to obtain the result that is similar.
- Similarly from image database proceed the following steps and then compare both the feature vector result of query and image database.
- Finally the comparison of both are indexed and retrieved and provides relevant feedback.

This shows how the query formation and image database are indexed and retrieved. The following

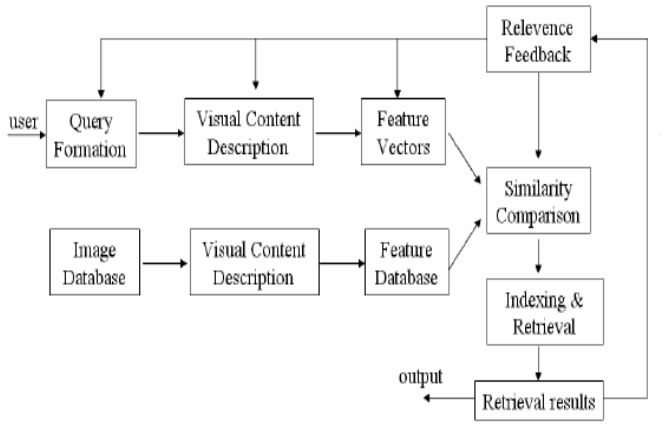

Fig -1: Proposed System Architecture

4. SYSTEM REQUIREMENTS:

The major requirements of CBIR SYSTEM are:

4.1 Technique to obtain the metadata, having primitive features of images:

Metadata contains those primitive features having its own representation like color histograms which are used to present color features.

4.2 User's query demands evaluated by interfaces used :

A query image is used to being the retrieval process and to achieve user's demand.

4.3 Methods to compare the similar or different images

CBIR systems require methods based on primitive features to compare all the images.

4.4 Efficient indexing and metadata storage techniques

For a huge image collection, non-trivial methods are used mostly, so CBIR system provides efficient method to compress the metadata. MPEG-7 standard1 is becoming the most important standard to describe all kinds of metadata for both images and video data's.

BASIC REQUIREMENTS:

SOFTWARE REQUIREMENTS:

- OPERATING SYSTEM: WINDOWDS XP/7
- CODING LANGUAGE: MATLAB
- TOOL : MATLAB R2012

HARDWARE REQUIREMENTS:

- SYSTEM : PENTIUM IV 2.4GHz
- HARD DISK : 40GB or more
- RAM : 4GB or more

5. MODULES

The application is divided into 6 modules

1. Read the query image from user.

2. Convert RGB query image to Grey Scale image.

3. Calculate 4 morphological gradients of edge maps are generated.

4. Calculate seven moment invariants for each edge map, totally 28 features are stored.

5. Compare similarity matching with database image with query image using distance metrics.

6. Retrieve the top ten images based on minimum distance.

5.1 Module 1

Read the query image from user to extract the similar images from the database

Fig -2: query image

5.2 Module 2

Convert RGB color space into HSV color space

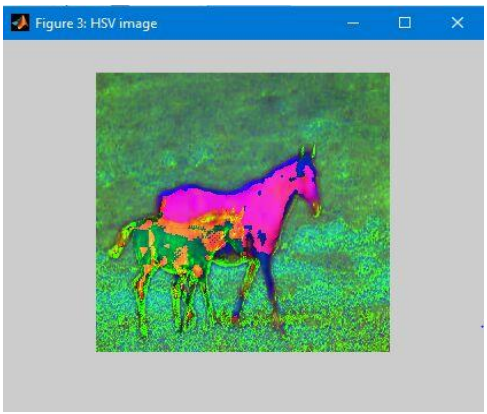

Fig -3: HSV image

5.3 Module 3

Find the descriptor image for the converted HSV image

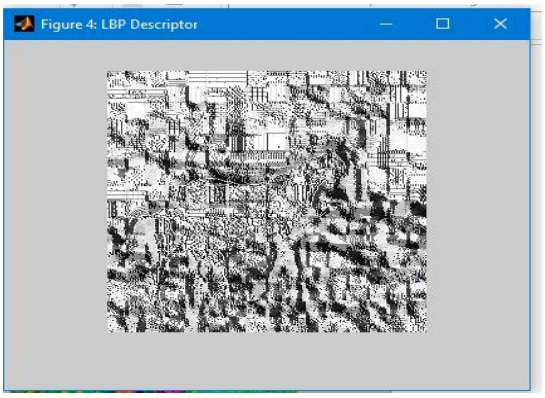

Fig -4: LSB descriptor image

5.4 Module 4

Quantize each pixel in HSV space to 256 histograms.

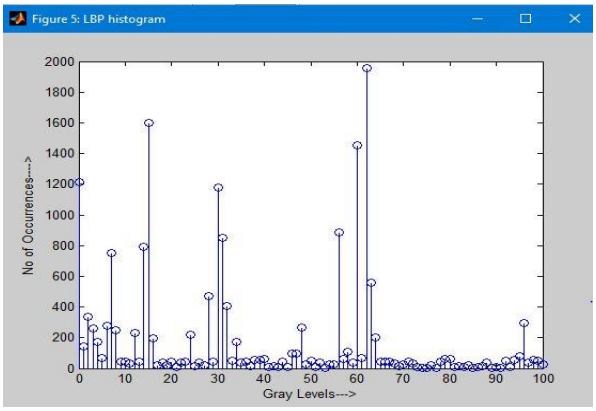

Fig -5: Histogram image

5.5 Module 5

Calculate the similarity measure of query image and the image present in the database using Canberra Distance

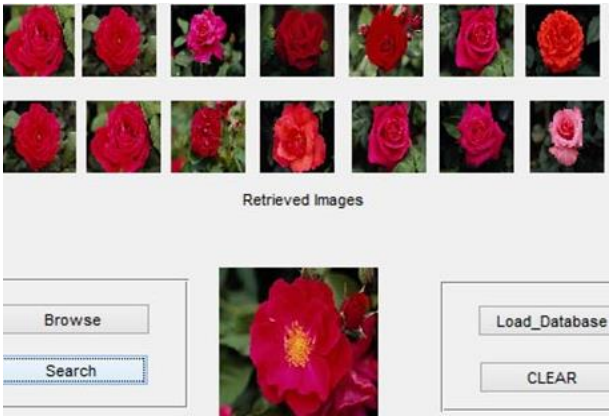

Fig -6: final output

6. WORKFLOW

6.1 COLOR DESCRIPTOR(CN) :

The first and mostly straightforward feature for indexing and retrieving images is color. All other information is computed by image processing algorithms that generally starts with the colour information contained in an image When the image contains especially just the object,color moments have been successfully used in most of retrieval systems. Color moment ,Color Histograms have been proved to be efficient and effective in representing color distributions of images.

The CN descriptor assigns to each pixel a 11-D vector, of which each dimension encodes one of the eleven basic colors: black, blue, brown, grey, green, orange, pink, purple,

red, white and yellow. As with CN, we first compute CN vectors of pixels surrounding the key point, with the area proportional to the scale of the key point.

6.2. SIMILARITY MEASUREMENT:

The Canberra distance measure is used for similarity comparison. It allows us the feature set to be in un normalized form. The Canberra distance measure is given by:

$$\mathbf{CanbDist}(x, y)=\sum_{i=1}^{d}\frac{|x_i-y_i|}{|x_i|+|y_i|}$$

Where x and y are the feature vectors of query and database image respectively, of dimension d.

7. RESULT AND CONCLUSION

RESULT:

When the user give the query image the color feature is extracted and compared with the feature of the images in the database. The six color feature is compared with the six color feature in the color table. Both color and texture feature are compared with the color and texture feature in the database. As stated above the color feature are extracted and stored in the database the feature of the query images is also extracted and the feature of the query is compared with the database image.

CONCLUSION:

This report reviewed the main components of a content based image retrieval system, including image feature representation, indexing, query processing ,and query-image matching and user's interaction, while highlighting the current state of the art and the key-challenges. It has been acknowledged that it remains much room for potential improvement in the development of content based image retrieval system due to semantic gap between image similarity outcome and user's perception .Contributions of soft-computing approaches and natural language processing methods are especially required to narrow this gap.

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