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CONTENT BASED IMAGE RETRIEVAL USING CEDD APPROACH

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ABSTRACT:

Due to advancement of technology in many fields like electronics, computer and networking etc, their is huge production of images at very high speed. In fact, anybody can generate and transfer images whether it is individual or any organization. so large amount of image data is available in database. now to search this image data text based image retrieval is inefficient. so we will have to use content based image retrieval techniques to search image in the large image database. In this paper, we explain the basic components of Content-based image retrieval and proposed the CBIR system to enhance the retrieval accuracy of image retrieval and the low computational power. To enhance the accuracy of the image retrieval system we will combine color and texture information in the feature vector. So for this we will use Color and Edge Directivity Descriptor (CEDD) approach to retrieve images from the database.

KEYWORDS:

CBIR, TBIR, RGB, HSV, CEDD.

INTRODUCTION

We all are familiar with text based search technique, in which you simply enter a few keywords or text related to the information which you want to find and then results are returned to you. but when we want to retrieve image from database using text based search technique the results returned are not good enough in terms of accuracy. because text based searching algorithm compare text query with description of the image. If the description is not relevant to the image, then we got wrong images in retrieved results. earlier when images are stored in database are manually annotate, so each image stored in database have its own keywords. These kewords describe the image, using these keywords images are indexed in database. so text based searching algorithm used these keywords to search and retrieve the images from database. but due to advancement of technology, availability of cheapest electronic gadgets with built in camera. generation or creation of image is easy and fast. due to this availability of large collection of image database. so in today's time text based image retrieval is efficient. so two weak points of text based image retrieval are,first, if the assigned annotation can not explain the image, so retrieval accuracy will decrease. Second, if the size of the database increased. so it will be difficult to manually annotate each image of the database. so to overcome these two limitations of text based searching method we will use CBIR technique. CBIR stand for Content Based Image Retrieval. Content based image retrieval, also known as query by image content (QBIC). if you see CBIR is the topic of research since early 1990, since then many image retrieval techniques have been developed. cbir can be defined as retrieving similar image from image database using visual properties of the image. The word 'Content' in Content Based Image Retrieval is refer to the Color, Shape and Texture properties of the image [1]. In fact, searching of image based on the content of image is more effective. Content-Based Image Retrieval (CBIR) is a required technique by which we can extract visual properties of queried image like color, texture and shape and retrieves similar images from a large image database. Image content also include visual and semantic content, Visual content can be general or domain specific. General visual content include color, texture, shape, spatial relationship, etc. Domain specific visual content, like human faces. Semantic content is obtained either by textual annotation or by complex inference procedures based on visual content [2]. During image retrieval process CBIR system extract and analyzes the low level feature of image. Their are two types of features Low level and High level feature. Low level feature is divided into global feature and local feature. Global features describe the whole image where as the local features describe the keypoints of the image.

VISUAL PROPERTIES OF IMAGE:

COLOR: important property of image which helps human being to recognize image is color. Color is a feature which depends on the reflection of light to the eye and the processing of that information by the brain [3]. We use the color to recognise the things and tell the difference between objects. colors are defined in 3d color spaces [3]. most commonly used color spaces are RGB(Red,Green, and Blue) and HSV(Hue,Saturation, and Value). HSV color

space match with the human perception. Most image formats like JPEG , BMP , GIF use RGB color space. The RGB color space consist three Primary colors, red, green and blue. Mixing of Red, green, and blue we will get 0 to 266 colors. When all three Red, Green, and Blue are set to zero then we will get black color . When all three Red, Green, and Blue are set to 1 then we will get white color. so we can extract the color feature of image by calculating color histogram. We can also extract color feature of image by using following methods color coherence vector, color correlogram, and color moments.

TEXTURE: Texture feature is important property of image. Texture is a natural feature of all surfaces that describes visual patterns. It contains important information about the structural arrangement of a surface, such as clouds, leaves, bricks [4]. Texture feature describes the relationship between the surfaces to the surrounding environment [4]. So texture property gives full information of physical composition of a surface. The best method to choose while compairing similar texture is second order statistics estimated from query and stored images. These estimate the relative brightness of picked pair pixels from each image. From these it is possible to measure the image texture such as contrast, coarseness, directionality. Textures are also categorized on the basis of their brightness due to high frequency in their image spectrum. texture representation methods can be categories in two

TYPES: structural and statistical [5]. Structural methods including morphological operator and adjacency graph and Statistical methods including co-occurrence matrices, Tamura feature, Gabor and wavelet transform. Using these structural and statistical methods we can extract texture feature from image.

SHAPE: shape features are usually described after images have been segmented into regions or objects [5]. Since accurate image segmentation is difficult to achieve, the use of shape features for image retrieval is limited to special applications where objects or regions are easily available [5]. To extract shape feature from image their are three types of methods boundary-based, Fourier-based, region-based shape descriptors.

ARCHITECTURE OF CBIR SYSTEM:

In content-based image retrieval system many components are used like image processing algorithm's to analyse and extracts the feature from image and database is used to store these features and in last matching algorithm is used to match with the feature vector of images stored in the database and return the closely relevant images. In general CBIR system consist two phases.

1) INDEXING PHASE: In this phase, we will retrieve the low level features of image and create index of these features in database. Indexing part is completed in offline state.

2) RETRIEVAL PHASE: In this phase, features are extracts from query image and match with features stored in database using similarity measure. Retrieval part is processed when system is running.

As per the block diagram of CBIR system, user upload the collection of images in database, then In feature Extaction stage using various image processing algorithm's low level features like color, texture and shape are extracts from these stored images on database.

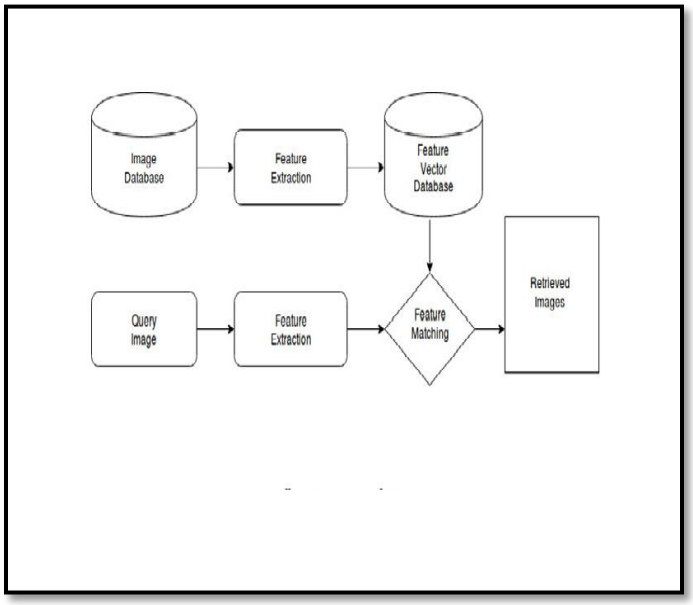

FIGURE 1 ARCHITECTURE OF CBIR SYSTEM

Then feature vector index is created in database. so when user submit the query image in the system, first the features are extracted from the queried image then using Matching Algorithm features vectors stored in the database will Match with feature vector of queried image. And finally system return all the required images.

PROPOSED METHOD:

The purpose of this research is to design a efficient content based image retrieval technique by which we can retrieve similar images from the database based on the content of the image. So our research focus on improving the accuracy of cbir system and low computational complexity. To enhance the accuracy of the image retrieval system we will combine color and texture information in the feature vector. So for this we will use Color and Edge Directivity Descriptor (CEDD) approach to retrieve images from the database. So in our propose system, when the image is uploaded in our cbir system. First, the image is split into preset number of blocks [6]. before generating the CEDD histogram, color information is extracted by color unit. Similarly Texture information is extracted by Texture Unit. Each Image Block is inserted into both the units for processing. CEDD histogram is organized by 6 regions which is determined by the Texture Unit [6]. Each region is organized by 24 individual regions originate from the Color Unit [6], The final histogram includes 6 × 24 = 144 regions [6]. suppose we define a bin that generate from the Texture Unit as N and we define a bin that generate from the Color Unit as N. Then the Image Block is placed in the output histogram as N × 24 + M [6].

In our Proposed CBIR system, their are two Phases.

1) Indexing of Images

2) Searching of Images

Algorithm for indexing of image:

1) Here user upload one or more image file to the database by mention the path of the file.

2) Once the images are uploaded, split the image into preset number of blocks. Then color and texture information is extracted from the image using color unit and texture Unit of CEDD Approach.

3) Then this color and texture information is include in a CEDD histogram.

4) After this CEDD histogram is quantized and create index of these features vector in a database.

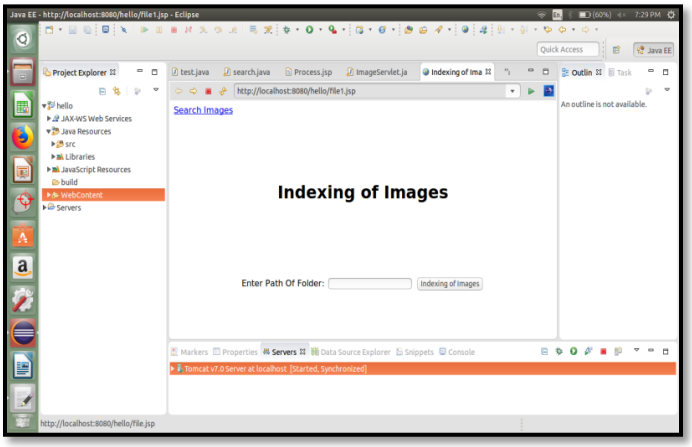

FIGURE 2 INDEXING OF IMAGE

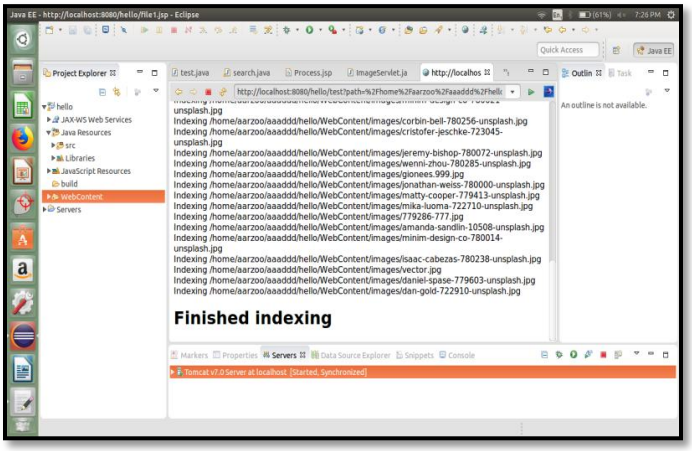

FIGURE 3 FINISHED INDEXING

Algorithm for searching of image:

1) Here user input the query image.

2) Once the image are uploaded, split the image into preset number of blocks. Then color and texture information is extracted from the image using color unit and texture Unit of CEDD Approach.

3) Then this color and texture information is include in a CEDD histogram.

4) After this CEDD feature vector is match with CEDD features stored into index using similarity measure. Here we will use Tanimoto coefficient for similarity measure.

5) And finally system will return all the relevant images.

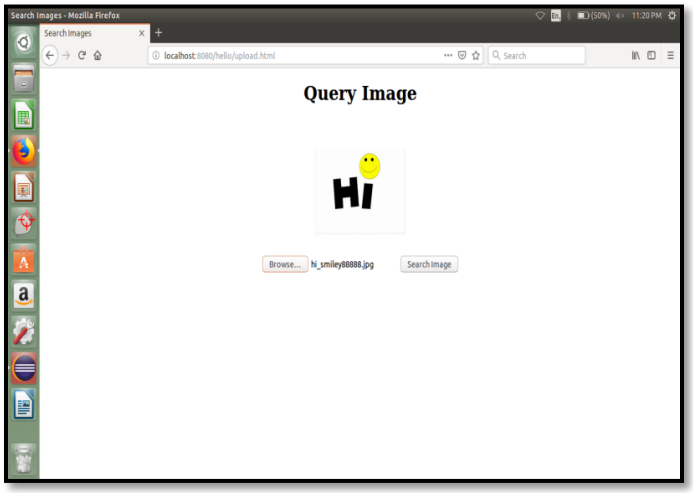

FIGURE 4 QUERY IMAGE

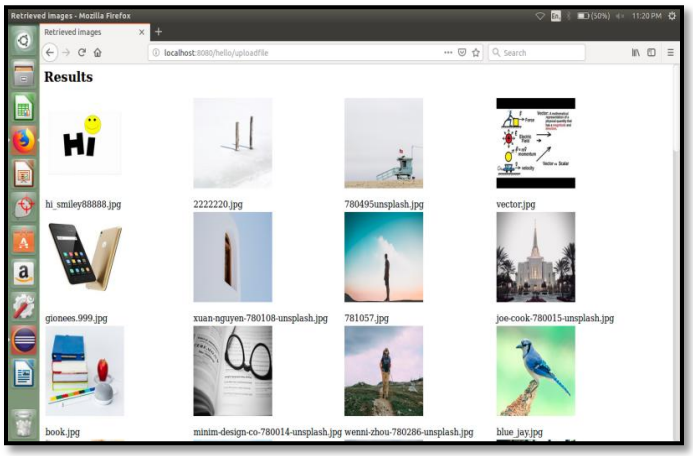

FIGURE 5 SEARCHING OF IMAGE

CONCLUSION:

Here, we design and run the cbir system. In Our system we have two phase uploading and search the image. We also proposed new approach to enhance the accuracy of the system using the "Color and Edge Directivity Descriptor" feature. This CBIR System design using java technology with Mysql database on eclipse platform.

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