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Enhanced Image Retrieval System Using Relavance Feedback

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ABSTRACT: In this paper a new approach for image retrieval is analyzed using image content by means of wavelet decomposition. Existing content-based image retrieval (CBIR) systems are already in use but they are useful for some particular domains. This new technique provides a efficient approach with the image content using wave let decomposition. Pyramid wavelet transform isused for image decomposition and Daubechies family of filters is employed for noise removal and filtering operations. It is used for finding the similarity measures between the query images in the database. This will be used for sub-image matching. Calculating the low frequency band for the image comprise many advantages to reduce memory space, because all other higher frequency bands are eliminated simulated to show the performance analysis of the new approach.

Keywords: Image retrieval, CBIR, Texture, wavelet.

1 INTRODUCTION

Different kinds of image retrieval methods are useful in image processing applications. It works with whole images and searching of the query. Different techniques are color, texture and shape for image retrieval. These techniques are applied to get an image from the concerned image database. They are not deal with various resolutions of the images, size and spatial color distribution. These methods are not appropriate to the medical image retrieval systems. The content-based image retrieval system is using wavelet decomposition gives images using an effective image retrieval technique.

A hybrid method for image retrieval using relevance feedback that reduces

semantic gap using query alteration by relevance feedback. Hybrid steps of feature extraction, combination and color space transformation are involved in this method. Adaptive learning capability of neural networks is considered primary fascinating factor behind the usage of neural networks in CBIR. The features and attributes of image and queries makes the technique different with conventional techniques for CBIR and efficient performance gain is achieved. Several kinds of image retrieval systems use global features like color, shape and texture. But prior results are too many false positives while using those global features to search for similar images. We give the new approach of content-based image retrieval system using wavelet decomposition. Michael Ortega et al. proposed a relevance feedback based interactive retrieval approach, which induced two characteristics: the gap between low-level and high-level features and subjectivity of human mentalities. Kontis Klaydios et al. explained a method that used lexical chains extracted from text which are related to images for describing the images. This relevance feedback techniques support retrieval by combining visual effetcs and textual features. We seek to improve the face image retrieval through the introduction of automatically detected facial attributes with relevance feedback and this method can be combined with the approach to take benefit of both identity information and facial expressions

2 BASIC ARCHITECTURE

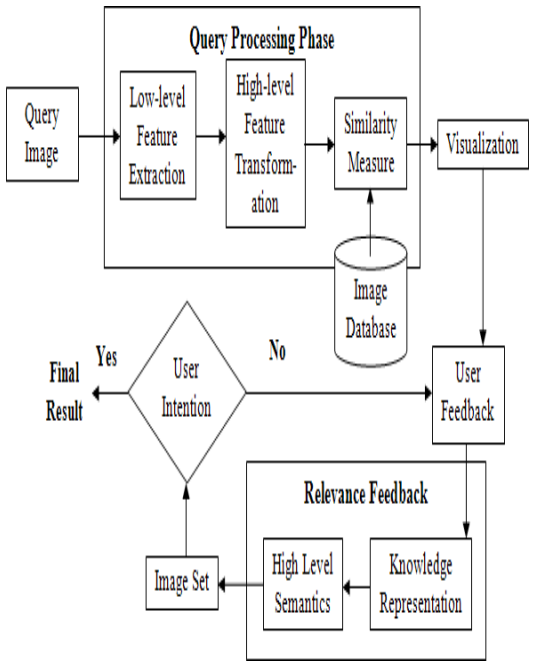


Fig.1: Architecture Diagram

The proposed system has the user interface design to add the images to its database and also to delete images. Moreover proper descriptions of images are stored in the database. This metadata can be used for query by text type of image retrieval system. The novel type of image retrieval system is query by example that uses image content as shown in Figure1.

This method is used to find similar images to retrieve same images. Various collection of metadata can make the user to give their input easier. The content-based search a pyramid wavelet transform that can be used to get the feature vectors of the image. These feature vectors are stored in the database to search for the similar images. The next section will provide the detailed work of relevance feedback approach.

3 WAVELETS

Image enhancement techniques fall into two broad categories - spatial domain methods and frequency domain methods. The spatial domain is defined as image plane itself and techniques is based on direct manipulation of pixels in the image. Frequency domain processing techniques are used to modify the Fourier transform of an image. Hence Fourier transform is widely used previously but now it was replaced by wavelet transforms. The reason is it can be specified in spatial and frequency domains but the Fourier transform can be specified in only frequency domain [2]. Wavelet transforms are also useful in image compression and image reconstruction. In this project a Pyramid wavelet transform is used to get the image content. This wavelet transform uses low pass and high pass filters for separating the low and high frequency contents [4].

4 QUERIES BYTEXT

Every image should be described using its content and characteristics so called metadata. A user interface is designed to get the textual input from the user. This will be converted into proper query to the database that will search for the images. The output of the query is then used to get the images from the database and to show it to the users in the user interface.

The general drawback of this type of image retrieval is that all the users are not able to give the appropriate query because specifying an image differs from each one to other. Moreover there is no proper method for classifying the metadata of the image. Hence the user is given with another option to give the query that is query by example.

5 QUERIES BYEXAMPLE

This method takes the image content as a query to find the similar images. The general flow of this work is as follows.

The steps involved in the process flow.

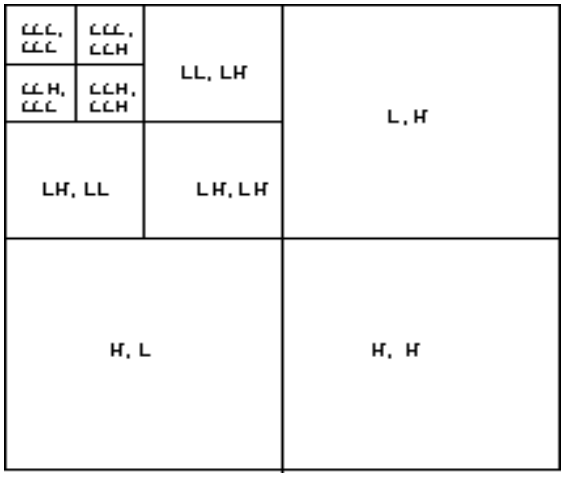
1. Specifying the user input image as a query.
2. Pre computing of feature vector for each image in the database.
3. Storing the feature vectors in database.
4. Search procedure based on Euclidean distance measurement between the query image and the images in the database.
5. Output the results.
6. 

Fig.2: Pyramid Wavelet Transform

The Pyramid Wavelet Transform is shown in the Figure 2. The first process is to modify the image size into 256X256 in a matrix format. In second process, pyramid wavelet transform is applied to get the sub bands of the image. Daubechies filter is applied to find the energy measures of the image. The decomposition is applied to 6 levels to get the low frequency contents in the LL sub band and other frequencies in LH, HL and HH bands separately. In final stage we will get the 4X4-sizedimage.

If the wavelet coefficients of an image are accessible, features are computed from each sub-band, resulting in 19 features for each image. The mean μ is the energy measure used to compute the features and then the feature vector f,for a particular image is calculated and energy measure for decomposition level and in the sub bands. We can obtain the energy coefficients and stored in the database. When the user implements the query image then it will be converted into the same

given operations and finally gives the energy measure coefficients. The distance between the these two images is calculated using Euclidean distance classifier[1].

Thus the related images can be retrieved using the above-described method and they are optimized using K- nearest neighbor algorithm [1]. This paper is efficiently analyzed using these feedback methods and the results were shown.

6 EXPERIMENTAL RESULTS

We describe the results of three major type of approach on image retrieval system, an approximate time measurement of system performance has been conducted. Content-based image retrieval averages 2.36 seconds. Metadata based image retrieval averages 1.2 seconds and for texture based retrieval averages 16.140 seconds for retrieval. These timing results were measured for 200 images on a computer with a 1 GHz Pentium IV CPU. The initial image size is about 256x256 pixels width and height. The resulting image size is an average of 4x4 pixels. Every and every timing does not consider into account any image upload/download time.

Fig.3: Search results for CBIR

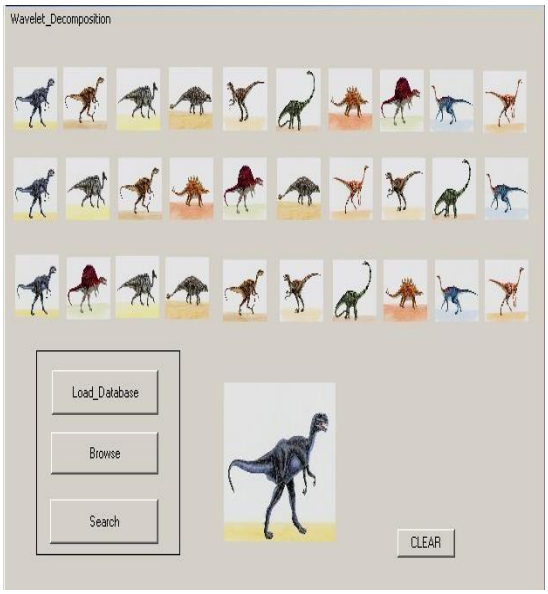


Fig.4: Search results for texture

Fig.5: Search results for Relevance feedback system

7 CONCLUSIONS

In this paper we have analyzed a new approach of content-based image retrieval system for pathology studies. This proposed algorithm provides an effective approach for query based image retrieval system. The timing results for the new approach is less and accurate, this can be improved by integrating other spatial

relationship. In future work, we will integrate other efficient methods such as spatial relationship or texture, for searching the object from the image directly, professionally and efficiently.

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