

Content Based Image Retrieval with Wavelet and Gabor Transform mixing based on modulation factor

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Abstract— Content-Based Image Retrieval (CBIR), also known as query by image content (QBIC) .Content-based image retrieval (CBIR) system helps users to retrieve relevant images based on their contents .Content based Image retrieval is one of the most exciting and fastest growing research areas. This paper proposes a new content based image retrieval system with wavelet and gabor transform mixing based on modulating factor. It controls the mixing of color and texture effect for retrieval.This method applies a weighted combination of color and texture to the wavelet transform based on spatial-color and second order statistics.The experiments show that the Gabor filters provide promising results and improves the effectiveness of image retrieval.

Index Terms— CBIR, Wavelet transform, color , texture, gabor transform.

1INTRODUCTION

The cost of storing data has decreased considerably in recent times.Due to rapid increases in the size of multimedia collections such as digital libraries, fingerprint imaging and photo archives[3] need for more effective image retrieval techniques is felt and is currently receiving a great deal of attention and hence is one of the fastest and growing areas in computer and multimedia technology[3].

Basically there are two popular techniques for image retrieval : first based on text and second based on content. In this paper we propose a methodology to use Content-Based Image Retrieval (CBIR) on very large collection sizes.Early techniques were not generally based on visual features but on the textual annotation of images. In other words, images were first annotated with text and then searched using a text-based approach from traditional database management systems. Text-based image retrieval uses traditional database techniques to manage images. Through text descriptions, images can be organized by topical or semantic hierarchies to facilitate easy navigation and browsing based on standard Boolean queries. However, since automatically generating descriptive texts for a wide spectrum of images is not feasible, most text-based image retrieval systems require manual annotation of images. Obviously, annotating images manually is a cumbersome and expensive task for large image databases, and is often subjective, context-sensitive and incomplete. As a result, it is difficult for the traditional text-based methods to support a variety of task-dependent queries.

In CBIR each image stored in the database[1], has its features extracted and compared to the features of the query image. It involves two processes

- 1 Feature extraction and
- 2 Feature matching process.

In the first process it will extract the image features to a distinguishable extent and in second process we match the images. In this paper we use the Gabor and wavelet Transform for texture feature are are used and extract their features from the image. In this paper we use K-nearest-neighbor algorithm for finding the Similarity major between input image and data-base.The block diagram of basic CBIR system is shown in Figure 1.

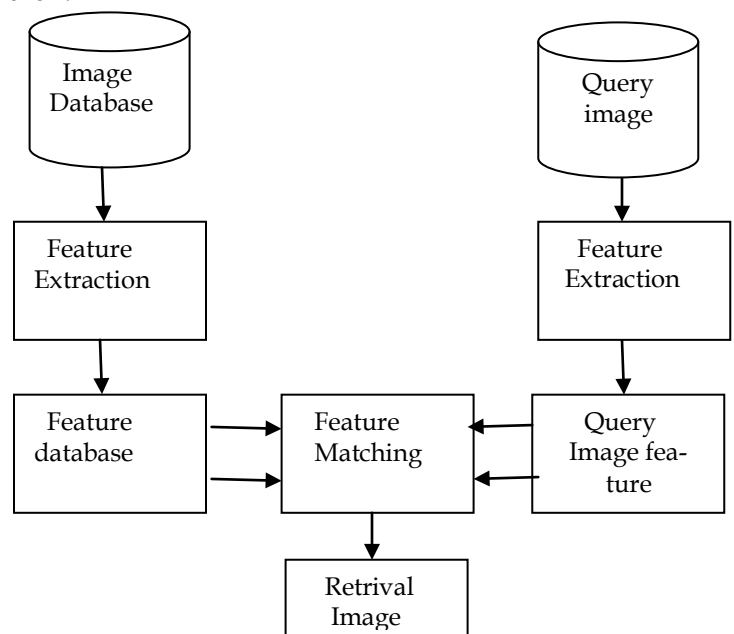


Fig: CBIR System

In this fig, each image are present in the image database, its features are extracted and the obtained feature vector is stored in the feature database. When a input query image comes in, its feature space will be compared in the feature database one by one and the similar images with the smallest feature distance will be display.

This paper is organized as follows: In section1 give the introduction to the CBIR .section 2 explain the visual feature extraction methods like wavelet,gabor transform,colorand texture in section 3 explain the proposed algorithm and also give the flowchart of the proposedmethod Experimental results and discussion are given in section 4. Finally, conclusions are presented in section 5.

2 VISUAL FEATURE EXTRACTION METHODS

2.1Wavele Transform

Wavelet transforms have become one of the most important and powerful tool of signal representation.A wavelet means a small wave and in brief , a wavelet is an oscillation that decays quickly.Nowadays, it has been used in image processing, data compression and signal processing. Wavelet allow complex information such as music ,speech,images and patterns to be decomposed into elementary forms at different positions and scale and subsequently reconstructed with high precision. By applying Wavelet on the color image four sub images will be produced which is: A low resolution copy of original image, and three-band passed filters in specific directions: horizontal, vertical and diagonal respectively. These sub images contain information about texture characteristics. To have a numerical measure of texture, mean and variations of these images will be calculated.

The simplest orthogonal filter bank is Haar filter bank . It applies two channel filter banks namely, from (1) low pass filter and from (2) high pass filter. The low pass filter is:

2.2 Gabor Transform

Gabor transform was propped by Dennis Gabor in 1946.It is a technique to extract the information from an image feature extraction, especially in texture-based image analysis (e.g., classification, segmentation or edge detection) and more practically in face recognition.Gabor is a multi-scale, multi-resolution filter[1]. The two-dimensional Gabor filter can be represented as a complex sinusoidal signal modulated by Gaussian function as $\psi(\xi, \eta; \sigma, \lambda, \theta, \kappa)$.

Gabor filters allow local frequency information to be extracted

from an image. Unlike Fourier analysis that determines a global frequency domain representation of the entire image.

2.3 Color

There are different methods of image retrieval using low level features such as *color, texture, and shape*. In this paper we use two low level features *color* and *texture*[4] are used.Color is the important feature of the content base image retrieval. One of the most important features that make possible the recognition of images by humans is color. Color is not only add the beauty to image and also gives the information about the images Color is a property that depends on the reflection of light to the eye and the processing of that infor ation in the brain. Color is a powerful descriptor that simplifies object identification.To extract the color feature from the content of an image use the color space.The purpose of color space is to facilitate the specification of colors. Each color in the color space is a single point represented in a coordinate system.

2.4 Texture

Texture is another feature of Content based image retrieval.It is important property of images. Various texture representations have been investigated in pattern recognition and computer vision.

Texture analysis is important for classification, segmentation or detection of image based on local spatial patterns of intensity and color[5]. Textures are replication and combination of various basic patterns.

After applying Gabor filters on the image with different orientation at different scale[6], we obtain an array of magnitudes. The main purpose of texture-based retrieval is to find images or regions with similar texture. It is assumed that we are interested in images or regions that have homogenous texture, therefore the following meanµm and standard deviation σ of the magnitude of the transformed coefficients are used to represent the homogenous texture feature of the region.

3 PROPOSED WORK

In proposed work, explain the algorithm. The first part Explain the training and second part explain the classifier
In this algorithm we divided into two parts

1) Training part

2) Classifier part

Now training part is begin

- 1 Load the database.
- 2 Apply the wavelet transform on the image.
- 3 Extract color information from it.
- 4 Apply gabor transform and hence extract color feature.
- 5 Mix the color information and the texture feature based on the modulation.
- 6 Sort the result in the database.

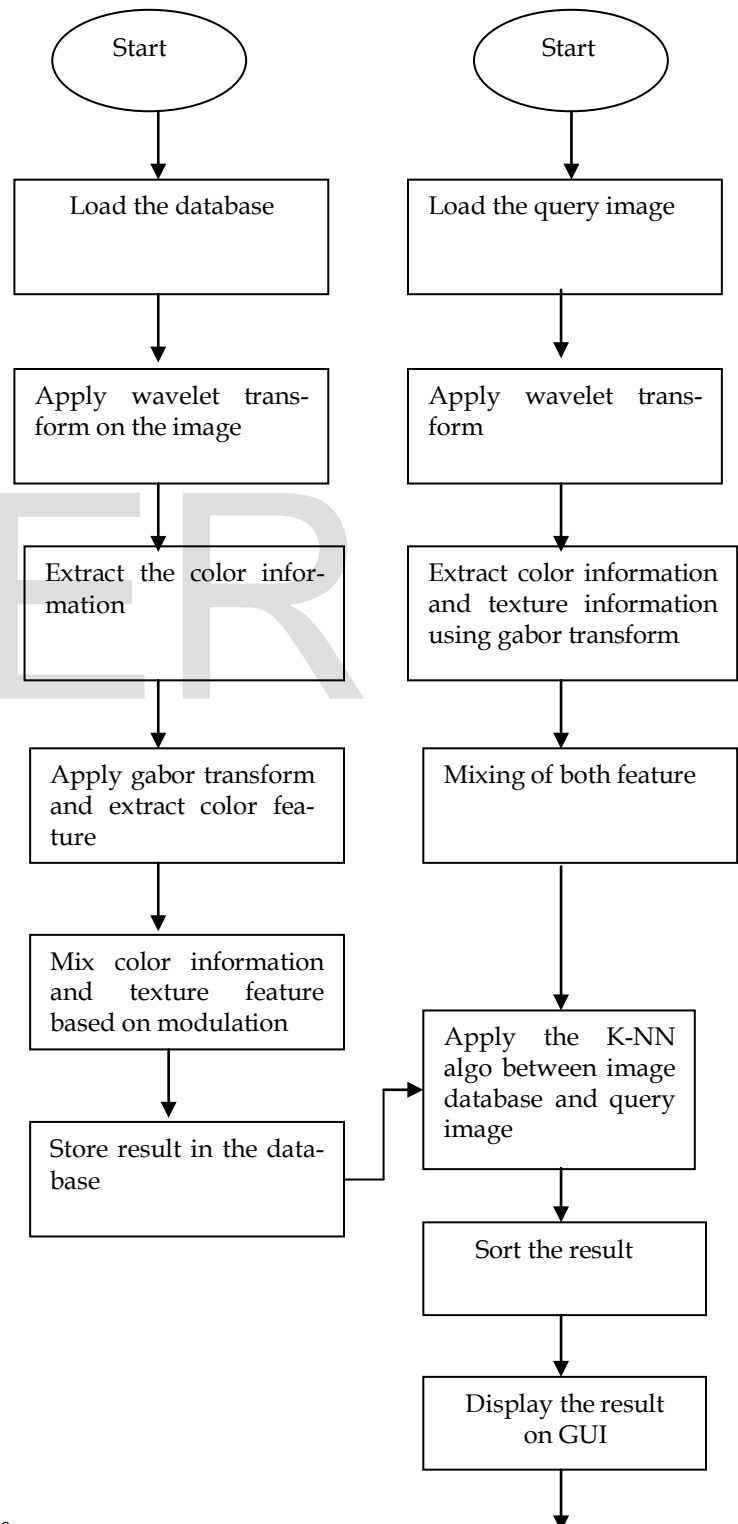
Now classifier part is begin

- 7 Read the query image I as taken.
- 8 Apply the wavelet transformation.
- 9 Extract color information and texture information using gabor transform.
- 10 Mixing of both feature is done based on modulation.
- 11 Apply K-NN algorithm between the query image and image database.
- 12 Sort the result
- 13 Display the result on the GUI.
- 14 Repeat the step 1 to 13 for another query image

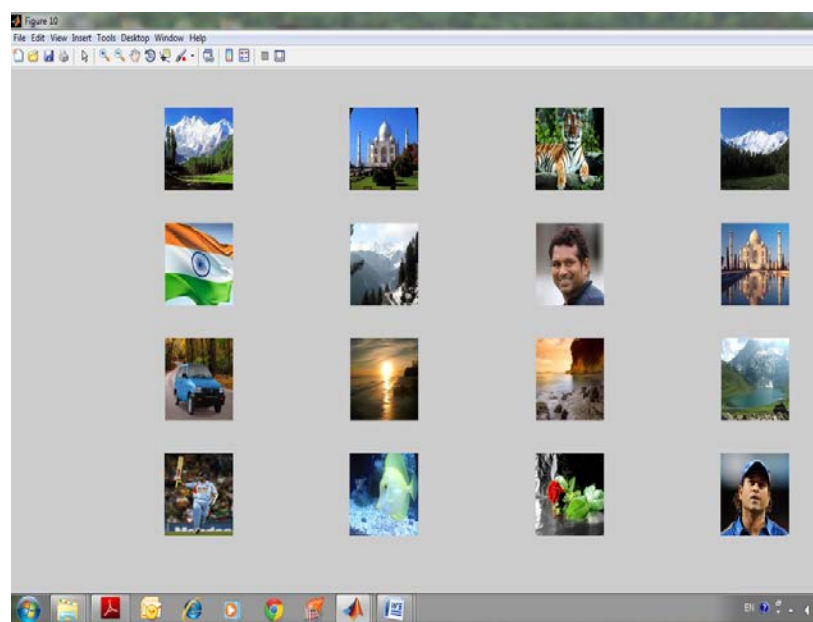
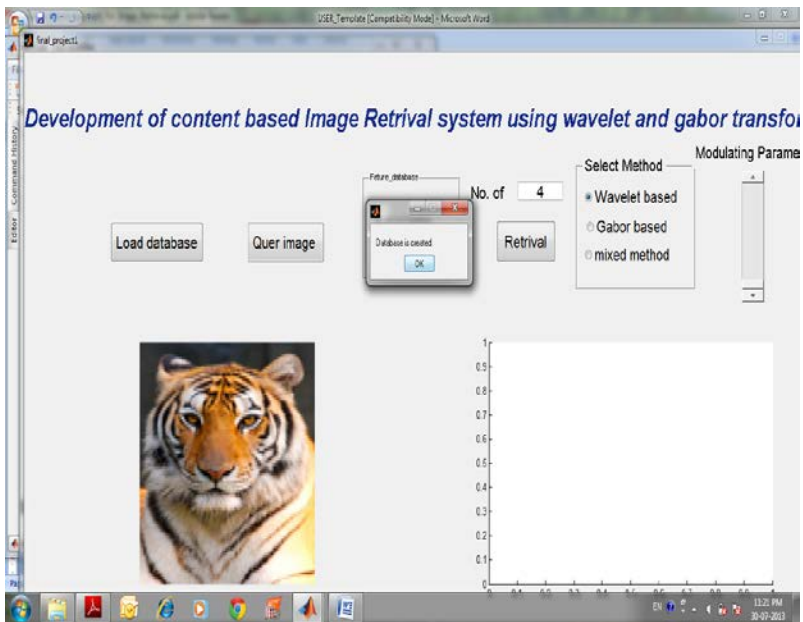
3.1 K-NN ALGORITHM

The K-nearest-neighbor (KNN) algorithm measures the distance between a query scenario and a set of scenarios in the data set. In k-nearest-neighbor the entire dataset is stored in the system's memory[7]. We can compute the distance between two scenarios using some distance function $d(x,y)$, where x,y are scenarios composed of N features, such that $x=\{x_1,-----x_N\}$ $y=\{y_1-----y_N\}$. One of the most common method for measuring distance is Euclidean.

3.1 Flowchart of Proposed Algorithm



Stop



4.RESULT

Fig1:Load the database

Fig3: Result images after apply wavelet transform

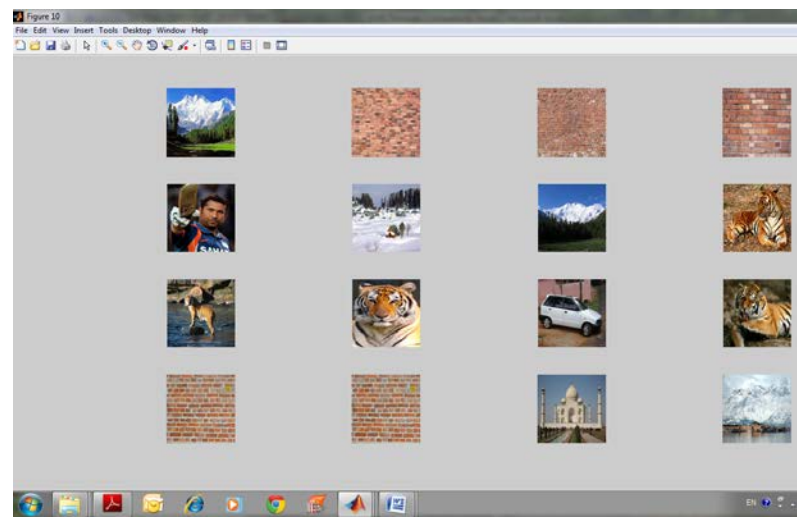
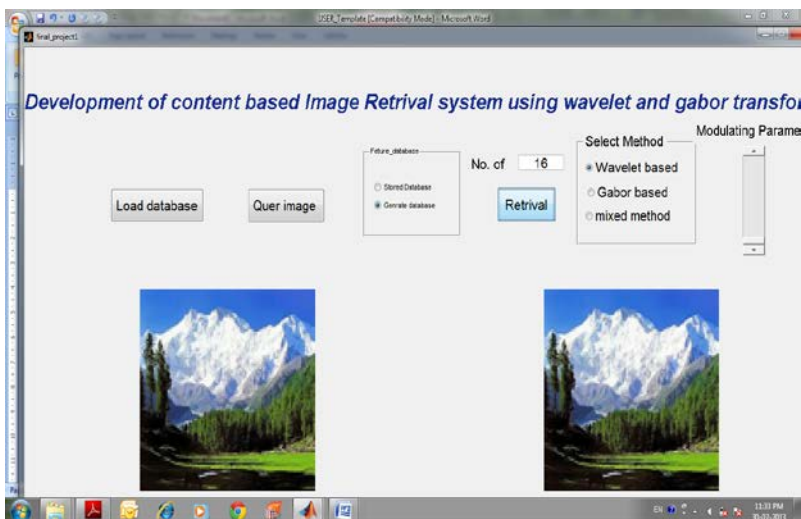


Fig: Result images after apply gabor transform

Fig2 Take the input and apply the wavelet based

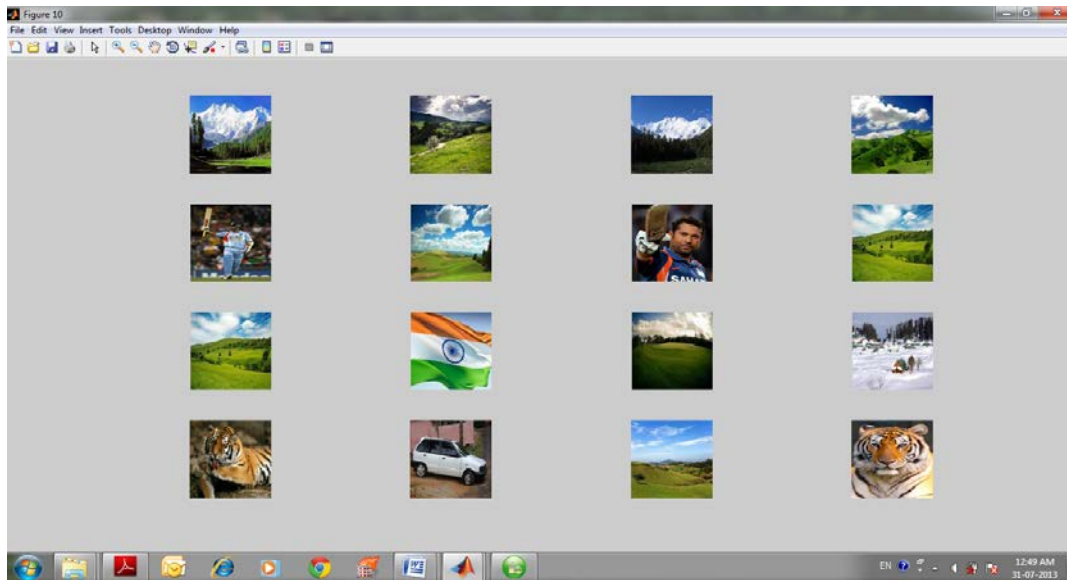


Fig5:Final result after apply mixing (wavelet+gabor)

5 CONCLUSION

This paper proposed Content based image retrieval based wavelet and gabor transform mixing based on modulation factor. For color retrieval, wavelet transform is used and for texture retrieval, gabor transform is used. For finding distance we have used the K-NN algorithm also query image submitted apply to the wavelet transform, gabor transform consequently and got the result. After that apply mixing method into the query images, it is based on the modulating factor, get the more similar images into the database. Applying this method get the more similar images from the database. The future work is, doing the feature extraction of the image with another technique and with different distance measure to give the better result. Therefore to provide better performance of retrieving more images are needed on the basis of these techniques.

REFERENCE

- [1] D. Ashok Kumar, J. Esther "Comparative Study on CBIR based by Color Histogram, Gabor and Wavelet transform", March 2011.
- [2] Pengyu Liu, Kebin Jia, Zhuozheng Wang, ZhuoyiLv 2007, "A New and Effective Image Retrieval Method Based on Combined Features", IEEE.
- [3] Sang-Burm Rhee, Yong-Hwan Lee and, Bonam Kim 2012, "Content-based image Retrieval Using Wavelet Spatial-Color and Gabor Normalized", IEEE.
- [4] Gauri Deshpande¹, Megha Borse², "Image Retrieval with the use of Color and Texture Feature", 2011 International Conference on Software and Computer Applications
- [5] Megha Pandey, Gaurav Boob, "Application Presentation Content Based Image Retrieval Using Wavelets"
- [6] NARENDRA GALI B.VENKATESHWAR RAO, ABDUL SUBHANI

SHAIK," Color and Texture Features for Image Indexing and Retrieval", International Journal of Electronics Communication and Computer Engineering Volume 3, Issue (1), 2012.

- [7] Kalyanasundaram. K., Sanoj. C.S." Content based Image Retrieval using Wavelet based Multi-resolution Analysis", International Journal of Computer Applications Volume 40-No.6, February 2012.