An Efficient System for Image Retrieval

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Abstract— Content based image retrieval is one of the extremely standard and growing research areas of the DIP (Digital Image Processing). Most of the offered image search tools, for instance Google Images and Yahoo! Image search, are centered on textual annotation of digital images. In these search techniques/tools, digital images are manually annotated with keywords and then recovered with the help of text-based search approaches. The performances of these schemes are not acceptable. In this paper, we will suggest a unique and efficient system for the image retrieval which is based on extracting color feature of an image. Suggested system utilizes wavelet transform and K means algorithm for image decomposition & feature extraction, it also uses Euclidian similarity function for the feature comparison. It is proved by the experiment outcomes the efficiency of the suggested image retrieval system is enhanced in comparison with the existing image retrieval systems.

Key words: DIP, CBIR, Image Retrieval System

I. INTRODUCTION

A lot of information from older books, newspapers, journals etc. has been digitized and revealed in computer understandable formats in the past few decades. A huge amount of archives of films, images, music, books, satellite pictures, magazines and newspapers, have been made available for computer users. Human can access this enormous amount of information with the help of internet. A lot of information offered about a specified topic on the internet, so one of the utmost challenges of the WWW (World Wide Web) is to discover accurate and appropriate information from this large amount of information. Most of the users recognize what information they want, but they are unconfident where to discover it. Search engines provide the facility for users to discover such related information. Image retrieval is the process of surfing, examining and retrieving images from a huge database of digital images.

As processors grow into increasingly dominant, and memories become progressively cheaper, the organization of large image databases for a range of applications have now become realizable. Databases of drawing and painting works, medical and satellite imagery have been attracting more and more consumers/users in numerous professional fields for instance- geography, medicine, architecture, fashion, advertising, design, and publishing [1]. Excellently accessing wanted images from large and diverse image databases is now a requirement. Due to development of multimedia technology and increasing vogue of the computer network, the conventional information retrieval systems are not able to overcome the users' current need. There are various areas in which digital images are used such as-crime prevention, commerce, finger print recognition, surveillance, hospitals, engineering, architecture, fashion, graphic design, academics, historical research, and government institutions etc. Because of this widespread demand we need to enhance in retrieval precision and minimized retrieval time. The prior methods were only dependent on text based searching instead of its visual feature. Many times just one keyword is redundantly used with more than one images, therefore it leads to erroneous outcomes. Consequently, Content Based Image Retrieval (CBIR) is evolved to defeat the restriction of text based retrieval [2]. To describe the image through small number of descriptors, feature extraction is one of the most essential steps in the image retrieval system. The fundamental visual features of the images comprise color and texture [3]. The color feature provides user an experience related to visual similarity, however the texture doesn't provide much of visual experience, yet it helps in retrieving depending upon patterns / textures [4]. Second most important feature of images is texture. Whose representation is being utilized for pattern recognition and computer vision. In this paper, we will suggest a unique and efficient system for the image retrieval which is based on extracting color feature of an image.

II. LITERATURE SURVEY

In CBIR scheme the images are retrieved based on their visual features for instance shape, text, and color. There are various CBIR systems at this time are present and also are being frequently extended. Color Selection operated CBIR system [5] enables query-by-color, and such scheme supported by 11 color classes. The repossession of images is also done by means of low frequency DCT coefficients that are altered from YUV color space as feature vectors [6]. It permits users to choice its dominant feature of demand images. But the scheme is enough for performing effective retrieval through familiarizing users' opinions on the demand images.

Summary of some more schemes suggested in past are as follows:

A. Ivan Lee, Paisarn Muneesawang and Ling Guan [7]:

The authors of [7] have offered the examination of the CBIR System with the machine and human organized relevance feedback, over diverse network topologies together with centralized, distributed, and clustered content examination. In this research work authors have introduced semi supervision to the nonlinear Gaussian shaped RBF relevance feedback scheme and they perceive greater retrieval correctness for their interactive relevance feedback system using RBF. The relevance feedback scheme suffers from some vital complications like- user interaction for offering feedback is very time consuming and laborious work.

B. John M. Zachary, Jr. and Sitharama S. Iyengar [8]:

The authors of [8] have offered the concerns from the viewpoint of real world system creation. They were also discoursed some of the most important feature extraction approaches used in present content based image retrieval systems, and analyze some of the most important content based image retrieval system implementations.

C. Ryszard S. Chora´s [9]:

The authors of [9] have contributed their research work for the recognition of the difficulties existing in present Content Based Image Retrieval systems and Biometrics systems depicting image content and image feature retrieval. The authors have suggested a probable methodology for mapping the given image content into the lower level image features. They have also examined the usage of several different color, shape, and texture features for image extraction in Content Based Image Retrieval systems and Biometrics systems.

D. Gaurav Jaiswal and Amit Kaul [10]:

The authors of [10] have determined that CBIR (content based image retrieval) system is not a substitute but somewhat it is a supportive constituent of text based image retrieval. Only the combination of the two can effect in acceptable retrieval performance. Authors were studied the main constituents of a CBIR (content based image retrieval) system, together with image feature exemplification, system design and indexing, while clarifying the previous and current technical accomplishments.

E. Pooja Verma and Manish Mahajan [11]:

The authors of [11] have utilized canny and sobel edge detection procedure for mining the shape features of a given image. Subsequently, the categorized images are labeled and indexed to make easy the process of applying extraction scheme in order to mine the related images from given database. The extraction of images from the enormous database as requisite by the user can acquire perfectly with the help of canny edge detection procedure as the results shown by the authors. In this research work authors equate the outcomes based only on the shape feature of images which is mined by utilizing canny and sobel edge detection procedure, but the outcomes have not any enhancement as equated to outcomes created when we take the color feature of given image.

III. PROPOSED SYSTEM

In this paper, we will suggest a unique and efficient system for the image retrieval which is based on extracting color feature of an image. Suggested system utilizes haar wavelet transform and K means algorithm for image decomposition & feature extraction, it also uses Euclidian similarity function for the feature comparison. The suggested image retrieval system is shown in fig. 1.

The suggested image retrieval system works in three stages as displayed in fig. 1. The short description of these stages is as follows-

A. Image Decomposition & Feature Extraction:

In this stage, images of database will decomposed by utilizing wavelet transform. Initially, wavelet transform decompose the images in lower dimension and then the color feature (intensity) data base will be made for all the database images. In this stage, every image of database is transformed in to the matrix form, this matrix consist the intensity values.

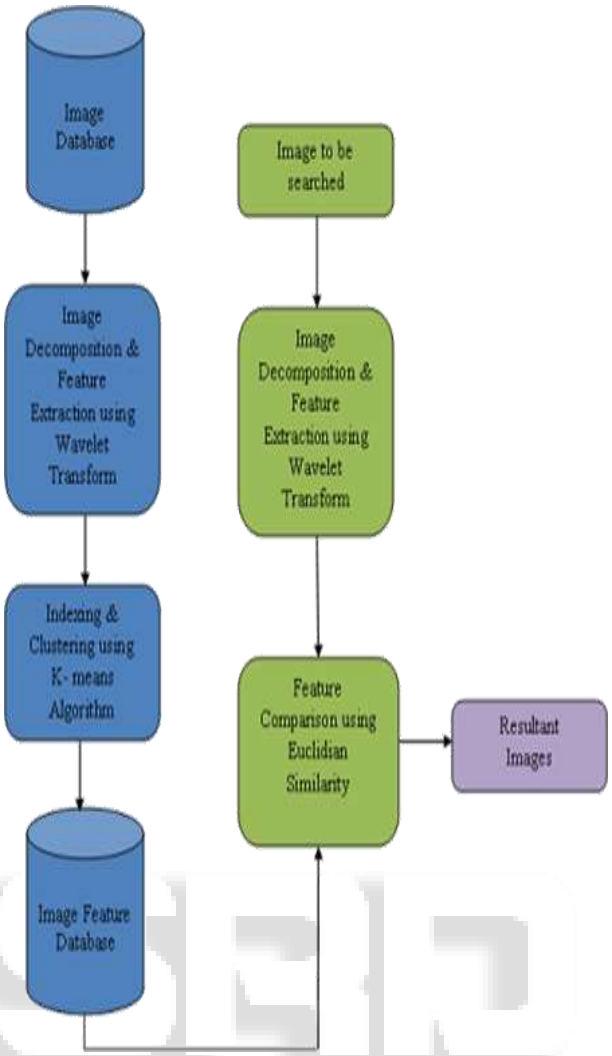

Fig. 1: Proposed Image Retrieval System

B. Image Indexing & Image Clustering:

In this stage, the database images which decomposed and then transformed to color feature database in previous stage are now indexed and clustered by utilizing the k-means clustering method. In this stage, identical images are kept into same group/cluster based on their features. The indexing & clustering of images improve the effect of searching process and also help in handling the large database easily.

C. Image Search & Image Retrieval:

As we provide an image as input to the proposed image retrieval system, it decomposes the image and extracts the color features and makes a matrix for color features, as described above (for database images in which we will search the input image). Now the color features of input image are equated with the color features of the other images (images present in database) with the help of Euclidian similarity function and the proposed system returns the most appropriate images as output.

IV. CONCLUSION

In this paper, we have suggested a unique and efficient system, which is based on content of an image because the content based search is more appropriate for image retrieval then others. There are various CBIR systems at this time are

present and also are being frequently extended. Suggested system utilizes wavelet transform and K means algorithm for image decomposition & feature extraction, it also uses Euclidian similarity function for the feature comparison.

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