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Assessment of CBIR for Medical Imagesassociated with low level and high level features.

RTamilkodi[1]*, G Roseline Nesa Kumari[2], and SMaruthuperumal[3].

[1]Associate Professor, GIET, Rajahmundry, A.P, India.
[2]Professor, CSE, SSE, Saveetha University, Chennai, T.N, India.
[3]Professor, CSE, NBKR Institutes of Scienceand Technology, AP, India.

ABSTRACT

The method of retrieving medical images from the large image database is called as content based image retrieval (CBIR).CBIR is the popular research area of interest. Image retrieval or the term image search is data search specialization perfect and hasty outcome. The main purpose of CBIR is to get accurate and instant retrieval of the image from large database. There will be of many different techniques exist for CBIR which will be used for retrieval of medical images.Generally,the techniques focus on color, texture and shape based on their similarity measures are calculated and the resultant value is compared with the precision and recall values. Imageretrieval system is very difficult because it mainly focus on the users involvement in picking of the query image on their need to search in large database.CBIR paves the way of user interaction with large database by satisfying their queries in the form of medical images. So CBIR system will be flexible to the users who involved in their retrieval process for getting similarmedical images. This paper discussesthe recital of a CBIR system which is intrinsicallyinhibited by the features adopted to symbolize the medical images in the record and also study the approaches of a variety of methods which deals with the extraction of features based on low and high level features of stored medical images with the query image provided.

Keywords: Content Based Image Retrieval, Feature Extraction.

Corresponding author

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INTRODUCTION

The field of image recovery has been an dynamic research area for numerous decades and becomes further and more fascinating area in recent years.Prof.Sharvari Tamane in the year 2008 suggested a system which is a new one for image recovery by applying high level features which is correlated with extraction of low level features such as color, texture and shape features. Theforemostlead of this predictabletechnique is the view of retrieval using high level semantic feature.

In 2012, Amja Khodaskar discovered an effective technique for content based image retrieval (CBIR)systems whichisprecisedepiction of illustrationin turn. With the advances in computer technologies and increased amount of www there has been explosion in amount of digital data been accessed. To make useof the data efficient and effective techniques of information retrieval based on content needs to be developed. In CBIR query is given in the form of medical image then image database is searched through all images in order to find those with the most similar indices which are returned as the images most alike to the query image. Research in CBIR has focused on medical image preprocessing, feature extraction, similarity measurement etc.Most of the past studies on CBIR has used a single content such as shape or texture or color to describe the image. Based on the research activities taken by the researchers in the field of CBIR are that an image can have many forms and it can be represented in 'n' number of ways. Depending on the use of low level features one cannot show up the final resultant accurately while the user will be looking for some other results which focus on high level features because user's brain is unpredictable they will have some assumption in their mind and expecting final resultant according to their views so definitely there will be some variation while it retrieves some other irrelevant images to the user's expectation. The main drawback of this CBIR system is adequate to portraythe image since an image can have more illustration distinctiveness. So we need a retrieval system which gives good performance and accurate retrieval of images froma large database based on low level and high level features. This paper focuses on various methods employed related to both low and high level features.

The paper is organized as section II describes the interrelated work in CBIR.Section III focuses oncommon methods which are proposed by different researchers contributed their work towards low level features. Section IVdiscusses about different methods carried out for high level features. SectionV shows the analysis part made for low and high level featuresand finally Section VI discussed the conclusion.

INTERRELATED WORK IN CBIR

Due to the limitation of text based image recovery a new approach called content based image recovery has been given more awareness in recent years[1].It is a search methodology for retrieving images based on their visual content. As anoutcome, image features are extracted from these visual contents and used as index or basis of search. Information present in image ismore affluent in information for a proficient retrieval in comparison to text based image retrieval.CBIR System was introduced in 1980's to overcome the problems that are faced in text based structure. In CBIR, contents of image are used to annotate to perform retrieval. The term "content " might refer to low level features such as shape, color ,texture or any other important information derived from the image."Content-Based " means analyzing the image content not the text descriptors such as tags, descriptions or keywords corrected with image. By extracting these features searching, browsing from a database and similarity matching between images is performed. Main advantage of CBIR system is that it uses image features rather than image itself. The overview of basic concepts of CBIR system is as shown in "Fig.1".

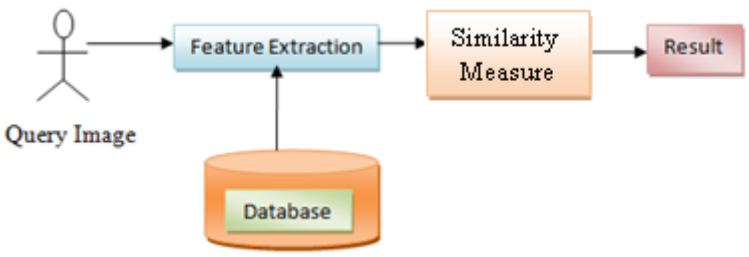

Figure 1.Block Diagram of CBIR

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Content-based image retrieval uses the visual contents of an image such as color, shape, texture, and spatial layout to represent and index the image. Themedical image searched to be considered as the query image and by applying any of the technique based on feature extraction which involved in providing the CBIR system for retrieving of image which is stored in large database. The basic search algorithm will differ from one image to another which relates to the application what we are using, but the final resultant image should have the common features and relates to the query image provided.The"Fig. 2" shows the working principle of traditional methods where a query will be supplied and based on some feature extraction methods their values are stored and it is compared with the large database images if the stored value matches with the database image value then that image is retrieved by using similarity computation method.

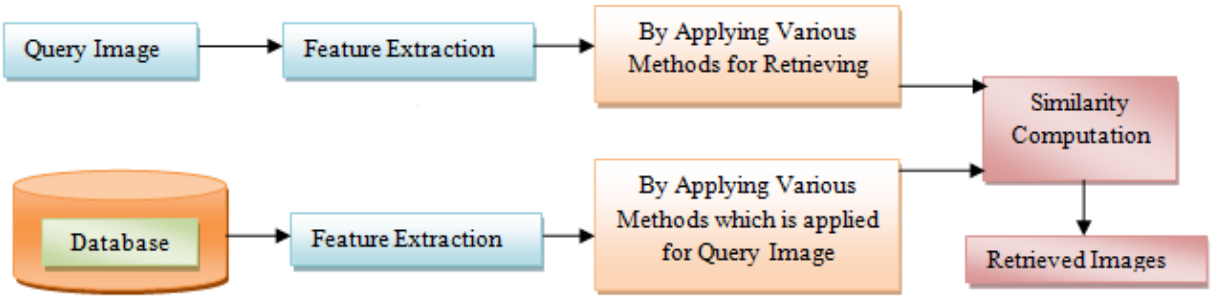

Figure 2.Working Principle of conventional Methods

METHODS EMPLOYED IN LOW LEVEL FEATURES

In compressed images, the low level features are extracted by applying the decoded function to the compressed domain to the pixel domain. Oncethe decoded process has been completed analysis methods will be applied to the processed image which is in pixel domain. As per the assessment made in current years based on low level features Mr.O.A.B Penatti et al.[5] used the combination of color, texture an d shape in his method for large image database. This showed a path for comparison in various ways of universal color and texture features which creates some finest opportunity to show how it works with the assist of low level features. One more researcher named P.S.Hiremath et.al [6] made his contribution towards low level features for giving best retrieval results in content based image retrieval.

Many new techniques were arises to show the retrieval performance will be reasonable in retrieving of image from large database. Consider a technique called Gradient Vector Flow(GVF) in which at initial stage itself the image is divided into non overlapping parts of equal size and then extracting the color and texture features based on the method GVF the way it is designed to perform the computation of extracting color and texture from the segmented image parts. Adjacency matrix and highest priority principles are applied to match the query image with the database image.

Mr.B.Tao et al.[8] in his work he contributed for texture detection and image retrieval by adopting the method called gradient indexing. His method used narrow action band for image retrieval and followed sum of minimum distance for comparison of images for matching. Many researches carried their work and contributed several techniques among them S.M.Youssef[2] designed curvelet based image retrieval method which follows region based method and clustering for extraction of color and texture.K.Iqbal extended his research over biometric protection based on the query image supplied it will retrieval the image from the large database having properties like color, texture and shape features for bidden by fuzzy heuristics.

METHODS EMPLOYED IN HIGH LEVEL FEATURES

The information which is present in the image is difficult to understand and also unable to identify the color by using low level features which forces us to go for high level features to represent for the image. By using high level features it can be easily for us to understand the distinctiveness of the image[12].The area of image retrieval have been an most popular in recent years for the researchers to carry out their research work. Several techniques have been developed for image retrieval.Yu.Xiaohong contributed his work in the year 2008 towards content based image retrieval system focus on color, texture and shape with the inclusion of

semantic features. In content based image retrieval low level features extracted which do not justify the user's perspective and his critical thinking properly. This loop holes is called semantic gap so we need to bind the gap where many research techniques are carried over based on high level features. So Xiaohong insisted in his paper to go for semantic based imageretrieval .Similar techniques like relevance feedback and accuracy estimation also discussed.

Prof.Sharvari Tamane in the year 2008 suggested a system which is a new one for image recovery by applying high level features which is correlated with extraction of low level features such as color, texture and shape features. The foremost lead of this predictable technique is the view of retrieval using high level semantic feature.Tamane showed a method which first applied low level features and then applied high level features using fuzzy production rules based on image mining technique. This method takes the advantage of using high level features for the retrieval of images from large database.

Lijun Zhao and Jiakui Tang in 2010, suggested that low level features for CBIR cannot achieve a satisfactory measurement performance, as the user's high level semantics cannot be represented in low level features. To reduce the gap between user query concept and low level features in CBIR ,relevance feedback approach can be applied for both support vector machine (SVM) and similarity measures are applied to meet the user's need. This will leads to improve the performance of retrieval of images.

ANALYSIS OF LOW LEVEL FEATURES AND HIGH LEVEL FEATURES

There is a semantic gap between the low level feature images and the high level feature images. The drawback of the CBIR based on low level feature is that images which are identical in visual content are not semantically identical and this drawback is avoided. When the input image is too large to be processed and it is suspected to be redundant then it can be transformed into a reduced set of features. This process is called feature selection. The selected features are expected to contain the relevant information from the input data. So that the desired task can be performed by using this reduced representation instead of the complete initial data.

In compressed images, the low level features are extracted by applying the decoded function to the compressed domain to the pixel domain. After that image processing and analysis methods are applied to images in the pixel domain. Content of the image is unclear, intricate, intangible, merely by via low -level features to depict image is distant from adequate, high-level semantics are required to illustrate the intangible distinctiveness of the image. In content based image retrieval low level features extracted which do not justify the user's perspective and his critical thinking properly. This loop holes is called semantic gap so we need to bind the gap where many research techniques are carried over based on high level features.

CONCLUSION

Despite of the best retrieval techniques most CBIR systems lag behind in terms of the system performance due to main reasons one is Gap between the high level concepts and low level features and other is Subjectivity of human perception. These difficulties are solved by introducing new techniques to overcome the traditional methods what we are using as the growth and development of various multimedia technologies in the field of CBIR many advanced information retrieval systems have become popular and has brought the new evolution in fast and effective retrieval. From this we can understand that high level features are having extra performance accuracy in retrieving of images from large database based on the query image provided when compared with that of low level features but which is not concluded yet. Researchers are tranquil functioning on the major problem of CBIR which is the diminution of semantic gap. Though a lot of work has been done in this domain, but still a generic approach is not yet developed for image retrieval which uses High Level semantic parameters. As there is no appropriate method obtainable which reduces semantic gap entirely, prospect explore guidelines are recommended.

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