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Review on Medical Image Retrieval Based on Wavelet, Bag of Features and Relevance Feedback

Syed Tanzeem Ahmed[1], Dr. Nikhat Raza[2]

[1]Resarch Scholar, Department of CSE, M.P.U Bhopal, Madhya Pradesh, India

[2]Professor, Department of CSE, M P.U Bhopal, Madhya Pradesh, India

ABSTRACT

Technological advances have evolved in all the directions including the biomedical, because of which a record number of lives are saved every day. The advancement has now surpassed the tools level, now the doctors with the help of new tools can also detect diseases, which saves the response time. In this paper, we will work on one such technique which will help in retrieving the similar type of images with the help of their features. In this paper, the features such as Texture features, LBP features, Retrieval feature,which are processed with hash coding and relevance feedback to get the final results. The framework provides the output utilizing a hash coding classifiers which predict the image from the database of the images. The images are classified on a global level with the help of multiple low-level features.

Keywords : - Wavelet, Relevance Feedback, Feature Extraction.

I. INTRODUCTION

The CBIR techniques are based on features of the images or visual which are to be tested, the feature helps in searching similar images from large databases. In this paper, the proposed technique will help in aiding doctors with detecting disease. The techniques not only save time but provide a quick and basic hypothesis to handle the condition of the patients[1]. The feature set includes color, shape, and texture as their generalized set. Initially, with the help of the general features like the shape and color the images were indexed but with the advances in technologies the method faded and now multiple techniques are present for the same[2]. In this paper, we will discuss one such method.

The increasing demands of the space and time triggered the development of new methods. The CIR system is divided into two processes, first is the image detection and feature extraction through which the image uniqueness can be detected which is then followed by finding the similarity of the images. The content and the text-based retrieval differ the basis of human interaction with the system. High-quality features are required to fetch similar images from a dataset likewise in text extraction high-qualitykeywords are required.

The term Content-Based Image Retrieval (CBIR) appears to have begun in 1992, when it was utilized by T. Kato to depict tests which retrieve similar images from an image database, in view of the color and shapes exhibit. From that point, the term has been utilized to portray the way toward recovering fancied images from an extensive dataset on the premise of linguistic image elements.

Feature extraction is the premise of CBIR. To generalize we can say that, components may incorporate both text-based elements (catchphrases, explanations) and visual elements (color, surface, shape, faces). Since there exists rich writing on content based element extraction in the database administration framework, we will keep ourselves to the strategies of visual component extraction[7]. Inside the visual component scope, the elements can be further classified as general elements and domain specific elements.

"Content-based" implies that the hunt makes application of the content of the image themselves, instead of depending on a literary comment or human-input metadata. The visual components utilized for ordering and retrieval are characterized in into three classes: primitive elements that are low-level elements, for example, color, shape and texture, coherent elements that are medium-level elements portraying the picture by a gathering of items and their spatial connections; and the the conceptualelement that are semantic and logical elements[17]. In this paper the following section will explain the proposed system with the implementation, its result and finally the paper is concluded with the conclusion.

II. PROPOSED SYSTEM

This section briefly describes the proposed CBIR technique. The system has four main modules, first is the Feature Extraction Module following with the Hash coding Module, the third module the database from which the data is to be fetched and the final module is the Relevance module. The figure below shows the flow of the proposed system.

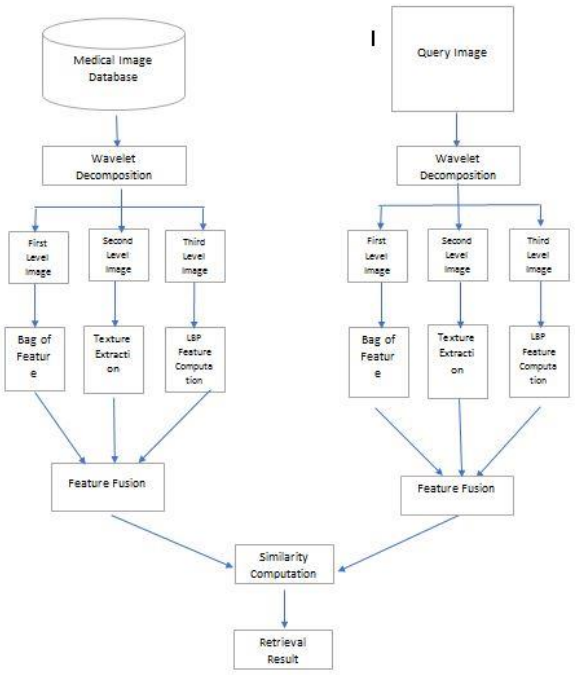

Figure 1: Medical Image Retrieval System [1].

The retrieval framework of the proposed method is shown as in Figure.1

From Figure 1, we can see that this method will be Implemented by seven steps:

1. Different resolution images are obtained by using
1. Wavelet decomposition.
2. 2.Gray-based bag-of-features are computed according to first-level resolution image.
3. Texture features are extracted from second-level
4. resolution image.
5. LBP features are computed by utilizing third-level resolution image.
6. Retrieval feature is obtained by fusing bag-of-features, texture feature, and LBP feature.
7. Comparing retrieval features in between query
8. image and image of medical database.
9. 7. Retrieval results are output by the orderof similarity.CEDD

Feature selection by hash coding:

In order to increase the reliability of medical image Retrieval, more image features should be extracted. However, the medical image is generally large so that more time will be expended for computing these features on the original image. For this reason, wavelet decomposition was introduced to obtain multi-level resolution expression of the original image[15]. Then, different features would be obtained on different level resolution image[16].

In order to get more reliable features of medical image retrieval, a certain number of images are randomly selected from the database as training images for feature extraction[11]. The extracted features include color features, bag-of-features, texture features, shape features, LBP local features, and so on. The featurevectors of different dimensions are formed, and hash coding is generated by using these vectors as the input of hash algorithm. And then the Hammingdistance is compared to determine the effectiveness of various features[3].

Edge Histogram Descriptor (EHD) uses Histogram and Edges to get the picture. It represents the global feature composition of an image and histogram is useful for indexing the image and also retrieving the image from the index. The edge content is one of the features to retrieve the image. One of the important ways to use edge detection is using it with the histogram of the image space, which represents the frequency and directionality of brightness changes. The image hense is called as Edge Histogram[4].
The design of FCTH is created as follows: The histogram is constituted by 8 areas, as these are controlled by the fuzzy framework that suggests decisions based on its texture condition[18]. Every locale is constituted by 24 singular areas, as these outcomes from the second fuzzy framework. In general, the yield that outcomes incorporate $8 \times 24 =$ 192 bins. In light of the content of the containers, the respecting last histogram is created [5].

Relevance feedback is used to reduce the gap between the two levels of features (high and low) and this is why it is considered as an important algorithm. Relevance feedback was developed in order to improve the effectiveness of the information retrieval system[1].The relevance feedback makes the retrieval system to understand the information needed by the user. The initial result given by the retrieval system for any query is based on the pre-defined similarity metrics. Further, the positive samples are identified by the user. The user then labels the positive examples that are relevant to the query. The system then returns with the refined results after analyzing the feedback given by the user with the help of learning algorithm. There are mainly two components present in a relevance feedback, they are the learning component and dispensing component. The target of the user is estimated by the learning component by using the feedback data. The key to the relevance feedback is the approach taken to learn the feedback data[17]. The global features are also extracted in addition to the visual concept feature.

III. CONCLUSION

Since a single feature can bring on false retrieval results, much more reliable feature should be used formedical image retrieval. However, retrieval time willincrease evidently when many features were computedduring retrieval. In this paper, a multi-featurefusion method was proposed for medical imageretrieval[3]. Inthis paper we present a content based image retrieval system which uses SVM classification to find out irrelevant imagesand to manage the feature weights in a linear combination of similarity matching and Relevance feedback which is used to update the feature weights based on positive repose of user. The texture, color and shape features added robustness to the feature extraction

phase also enhancing the efficiency of the proposed system.

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