

# Feature Extraction Techniques in Image Processing

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**Abstract:** Software Quality Management (SQM) guarantees that the required Content Based Image Retrieval (CBIR) is a mode of Image processing and retrieving information for many applications such as police investigation departments, media, fabric designers, engineering field, art, and medicine. Out of these, this article contributes some of the conceptual issues for many applications in the medical field which gives more benefits from CBIR. Further, it explains different reviews and various image processing techniques like colour, shape, feature and texture with the help of large database. Finally, it can be concluded with different types of diseases in medical imaging.

**Keywords:** Feature Extraction

## I. INTRODUCTION

Medical imaging records are highly increasing and necessity to store large amount of data in the medical field. The Content Based Image Retrieval (CBIR) mode of Image processing and retrieving is applied for many applications such as police and investigation departments, press and media, fabric designers, engineering field, art, and medicine. Out of those mentioned areas, medicinal field gets more benefits from CBIR. A multi-speciality hospital can generate plenty of images on daily basis in way of X-rays, biopsies, MRI and CT scans. These images are utilized in varied domains like medical teaching, medical research and medical diagnostics [1]. Therefore, the doctor can easily analyse large amount of image database to sense the formation of tumours and abnormalities in magnetic resonance images or x-rays. But it may differ based on the image content, and absence of textual data. In order to improve the methods for fast and

effective analysis the researches proposed various techniques, but still there are numerous problems associated with the semantic implication of CBIR and retrieval efficiency in huge databanks. These problems become prominent when the patterns of searching (sub-pattern matching) on medical images having only the gray level matter [2]. These queries need many comparisons and highly consuming the effective time. Hence, methods that reduce the time of computation of comparison and increasing the performance rate are to be developed and implemented in particular in the medical field [3]. One of the proven methods with promising result in content based image retrieval (CBIR) which is when applied to medical diagnostic field is commonly referred as content based medical image retrieval (CBMIR). Further this paper represents the review and feature of image processing based on Content Based Image Retrieval (CBIR).

## II. FEATURES TYPES

### CBIRFeatures

Image feature can be described by the pattern/design which was recognized by user in image processing technique. This information would be changed into vector space by the features in the vision of computers. The features can be divided into two groups namely local and global features [4]. It includes convex/concave parts, branches, number of endpoints, and joints. Also, it describes the number of holes, connectivity and profile of projection. The image extraction plays a vital role as equally as the image selection and segmentation. Further, there are many techniques available for feature extraction which divides into three major clusters of feature extraction involves Global transformation and series expansion features, geometrical and topological features and the statistical features [5].

### Texture feature

A textual description is like the keyword, image description, and text which are specified in case of textual queries. The text-based information is covered under metadata description and the time of image retrieving can be reduced with metadata instead of matching all stored images [6]. The texture feature based on image region i.e., the surface of an image and it is characterized by the direction, contrast and coarseness. On the basis of texture properties, the surface of the image is divided in subdivision and labelling done through the similarity of categorization. Texture synthetic procedures are applied in mapping of textures for making large textures from small one that yields real views of the image. In every image, the surface texture may vary from object to object and make image retrieval a cumbersome one. To organize the MRI brain images that are similar, a self-organization map is use on local texture features. It is highly similar to retrieved image that are matching with the input image by correlating the pixels[7]. TheCBIR was incorporated with

difference in intensity of local neighbourhood for effective description of texture. The middle pixel in 3X3 window of an image was equated with the other neighbours left, only one pixel for one time to generate a pattern of binary bit. The effect of adjacent neighbours of a specific pixel was disregarded in binary encoding [8].

### Shape feature

The physical profile of any object is characterized by the shape of the images. The shape can be described by moment, region and border. The shape matching, measurement and object realization are done from the shape description these are the numerous techniques for shape representation. Further, it grouped as one-dimensional, spatial interrelation feature, polygonal approximation, and shape transform domains. The shape is considered as a low-level feature and basic shape-centric retrieval of images comprises the measuring of shape similarity marked by the features (Wang & Wang, 2017). The technique that uses shape as main information for retrieving the images has been the only type through which people can recognise the images. Two methods are prevailing to retrieve the features related to shape, which are boundary dependent shape feature extraction and region based shape extraction. The boundary dependent technique is centred on exterior boundary although the region based procedure is dependent on the whole region. Texture has got no prescribed definition; nonetheless instinctively it delivers a degree of properties such as smoothness, coarseness and regularity. It plays a part in human pictorial insight and understanding. Texture classification and image segmentation are challenging tasks that is based on neighbourhood [9]. It provides necessary data for classifying the images since it describe the constituents of multiple real world images. The texture supports in relating the high level semantics for the retrieval of medical images.

### Colour feature

Colour plays a major role in extracting data from images. It consists of histograms which often utilised in content based retrieval systems. This histogram is applicable for global characterisation but it is not suitable for noise handling process. In order to overcome these limitations, other colour features will be applied for image retrieving [10]. These feature selection depends on the results of image segmentation based on colours, but different colours are provided which will not be suitable for average image retrieval. Most of the content-based image retrieval systems use images that are not pre-processed. The use of colour data by based on the prediction technique has been suggested by Stottinger et al. (2007). The CBIR approach is the combination of colour and texture was carried out by energy measurement of all colours and wavelet sub band along with standard deviation. The image is disintegrated into two sub bands twice with the use of wavelet transform. A feature dataset of 640 VisTex colour images was designed to assess the efficacy of the suggested methods.

### III. CONCEPTUAL ISSUES OF CBMIR

CBIR scheme can be absolutely applied to medical field and used for diagnostic and curative purpose. One of the most imperative characteristics in CBIR is the time taken for execution. Hence, CBIR systems should be interactive to hold the interest of the users by answering the queries within seconds. Not only, it should answer the query as fast as possible but also, the correct answer should be given. The information and commands of the system must be easily accessible with high speed by the provision of Graphical User Interface (GUI). There must be a provision for feedback mechanism to correct and reduce the error of future queries. Also, there must be an internet browser support for the queries (Jyothi et al., 2016).

Building an accurate description of the content of the image is the foremost problem related with image quality. One and only when there is precise and proper representation, similar images could be retrieved with highest insight. Semantic gap is another pertinent issue which restricts the developing algorithms to use only the low-level features. This issue is more severe in medical images as the X-ray and images of magnetic resonance have more specific properties that are to be incorporated during the search. Also, most of the medical images have only gray colour since they only could provide genuine information and even a minute detail will have highest significance in diagnostic analysis (Alzu'bi et al., 2015).

Selective image separation is an imperative subject in medicinal imaging and actual solicitations. A weighted disparity choosy image separation model holding two phases can be used to address the related issues (Wong et al., 2018). The main phase is to gain an even rough calculation allied to Mumford-Shah model to the area of concern of the photograph Nithila and Kumar(2019). Using subjective function, the rough calculation delivers a loftier value for the area of concern and minor values for other areas. In the next phase, this rough estimation is utilized, and an exceptional practice is carried out to get the area of concern. The rough estimation can be attained by the interchanging track scheme of multipliers and the merging investigation of the process can be realized (Liu et al., 2018).

Separation is frequently accomplished on medicinal imageries for recognizing illnesses in medical assessment and hence it stands one among the key regions of investigation (Kalshetti et al., 2017). Conservative imageries separation practises are incapable of yielding reasonable separation outcomes for medicinal metaphors as they comprise of indiscretions (Hu et al., 2019). They must be well administered prior to separation. To have the most appropriate way for medicinal imageries

separation, Medicinal Imageries Separation Tool (MIST) which is a two-step algorithm is used. Firstly, a binary indicator imagery of the contour of importance using carefully worked-out morphology is generated by design. This indicator functions as the cover image for the second step that makes use of GrabCut to offer an effective separated result. This is additionally polished by dealing with the users with the aid of Graphical interfacing tool for User (Wu et al., 2017).

#### IV. CONCLUSION

This paper based on Content Based Image Retrieval (CBIR) with some of the conceptual issues in medical image processing. Further, it explains different reviews and methods of image processing like colour, shape, feature and texture with the help of large database. Finally, various formats of methods are concluded.

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