A NEW MEDICAL IMAGE RETRIEVAL PROCESS AND ITS PARAMETERS EVALUATION

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Abstract: Querying on several thousands of images to find desired images is troublesome and time-consuming. In vast image databases, literary comment of images ends up illogical and wasteful for image depiction and recovery. It is therefore desirable to have an effective and efficient system that is much faster than manual searching and retrieving of images. An evolutionary based algorithm is proposed for medical image recovering from huge database. Three medical images are considered for the process. The required parameters are calculated and verified with standard medical images of size 512*512.

Keyword: Local Binary Patterns, Rotation, Dominant, Features, Image retrieval.

1. INTRODUCTION

Content-based image retrieval system by using color and texture combined features is presented in [1-3]. Low-level features of the image like color and texture are used in this work, to develop a framework for image retrieval. The color feature is removed from the image by using histogram method. These extracted features make a feature vector of color. Texture features are removed from the gray level co-occurrence matrix that forms texture feature vector [4-5]. A combined (color, texture) feature vector is formed by combining the color feature vector and the texture feature vector. This combined feature vector is compiled for the database images that form a database feature vector. The combined feature vector is also calculated for the inquiry image for image retrieval purpose. Euclidian distance is used for figuring the separation between the consolidated element vector (color, texture) of the inquiry image and the joined element vector (color, texture) of database image. The computed Euclidean distances are used to sort four most similar images according to the least distance. Experimental results demonstrated promising results while retrieving the images from a database by providing an inquiry image.

Using the shape feature for content-based satellite cloud image retrieval and estimation of rainfall is presented in [6]. Satellite cloud images provide invaluable information in weather forecasting and rainfall estimates. The shape and size of the cloud images are used for analysis thereby predicting the type of rainfall. In meteorological satellite images, the shape of the cloud is a very important feature. For the rainfall prediction different shapes of clouds need to be analyzed.The contour-based shape descriptors deal with the contour or boundary of an object in an image and the region-based shape descriptor manages the contour and the inside of the boundary.
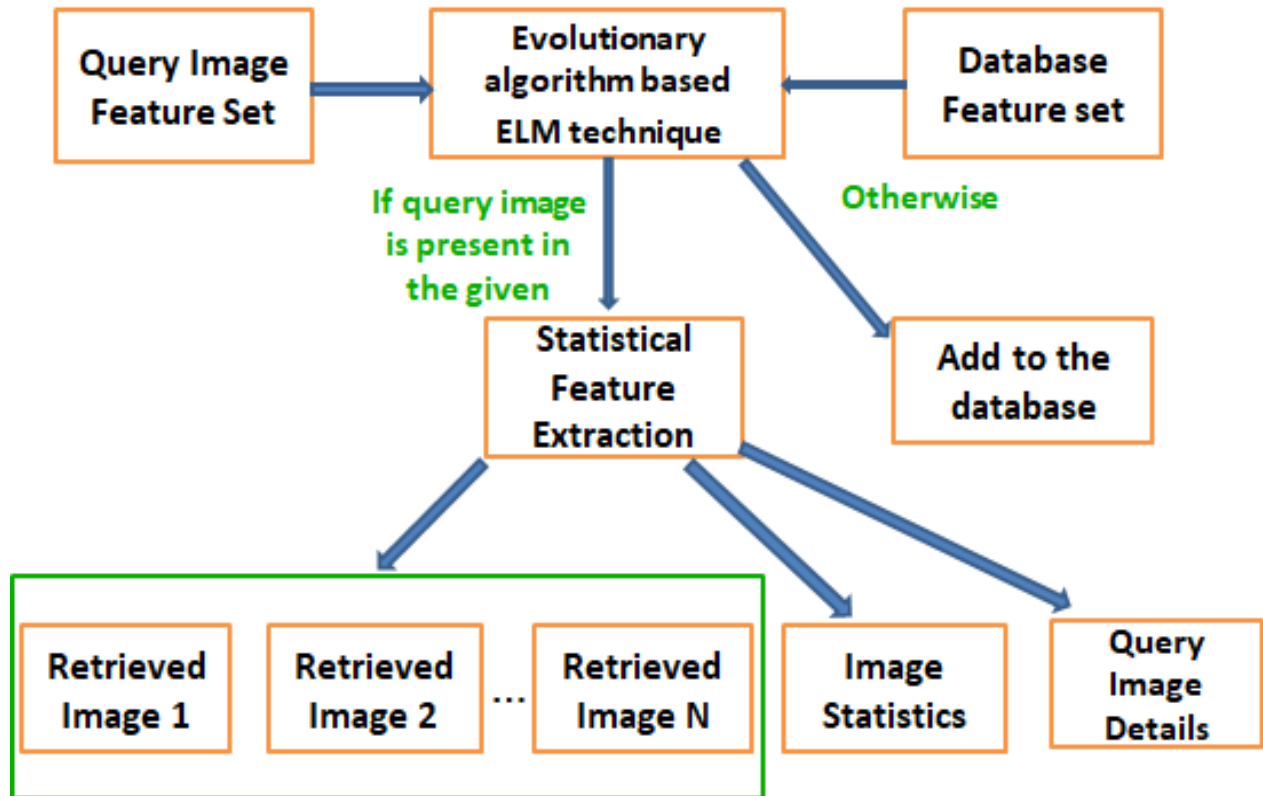
2. PROPOSED METHOD

Figure 1: Flow chart of the overall Process

In thismethod as shown in figure 1,statistical, geometrical, tamura, histogram and other featureshave been evaluated for the taken medical images. Rotated Local Binary Patterns and dominant Rotated Local Binary Patterns also have been measured for comparing the query image with data base features. The best suited values image can be taken as retrieved image from the given data base. The image types like X-ray image, magnetic resonance image, computed tomography scan image, ultrasound image, mammograms, etc.can be displayed and features or parameters of the taken or retrieved image along with details of the retrieved image, if any saved can be displayed.

The evolutionary based method restricts the number of iterations to be performed or minimum error to be reached. Learning machine is major important part of the process. The features are calculated and compared of both testing and training set. Based on the relevance of the database images with query, the numbering is given as shown figure 2. Ranking is assigned to the database images based on relevance to the test image. All the retrieved images are displayed as per the value N, i.e. required number of matched images. The statistical report will be calculated and displayed as the query image given as input. The query image details like patient name, contact number, address, doctor name, history of image, etc are displayed. If the query is not there in the taken database, it has to ask the user to add the query image into database.
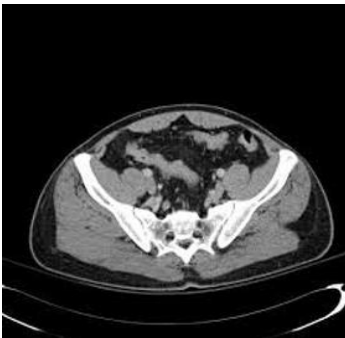
3. RESULTS AND DISCUSSION

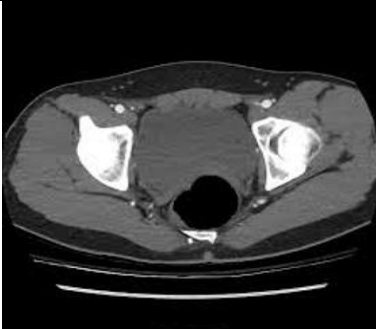| Medical Query Image	First Retrieved Image	Second Retrieved Image
Third Retrieved Image	Fourth Retrieved Image	Fifth Retrieved Image
Sixth Retrieving Image	Seventh Retrieving Image	Eighth Retrieving Image
Ninth Retrieving Image	Tenth Retrieving Image	

Figure 2: Query image and its ten retrieved images

Table 1: Confusion matrix of medical images

		PREDICTED			
	CLASS	A	B	C	Total
ACTUAL	A	97	0	3	100
	B	2	98	0	100
	C	0	1	99	100
	Total	99	99	102	300

Table 2: Accuracy values of confusion matrix

Class	Reference Pixels	Classified Pixels	Matching	Accuracy type	
				Producer	User
A	99	100	97	97.98%	97.00%
B	99	100	98	98.99%	98.00%
C	102	100	99	97.06%	99.00%
Total	300	300	294	98.00%	
Overall Classification Accuracy					

Table 3: Quality values of confusion matrix

	Accuracy	Precision	Recall	Specificity	F1 score
A	0.9800	0.9798	0.9700	0.9900	0.9749
B		0.9899	0.9800	0.9950	0.9849
C		0.9706	0.9900	0.9850	0.9802
Over all		0.9801	0.9800	0.9900	0.9800

Three classes of medical images are considered for retrieving process. Those classes are shown as A, B and C classes. The retrieving procedure gives confusion matrix of 300 medical images as tabulated in table 1. The accuracy values are calculated as per the confusion matrix table values and are given in table 2. The important parameters are measured from the matrix and are tabulated table 3. The same process is done for different methods and compared. It is observed that the taken method gives better results. Accuracy of 98% is obtained. The error rate value and normalised average retrieving index are measured.

4. CONCLUSION

The Proposed method produces reasonable good values in their area of retrieving. It has been verified for different varieties of medical images like X-ray image, magnetic resonance image, etc. Ranking based retrieving is observed in the process. It has given the best ten images which are very much nearer to the original image. It is very much useful to a doctor to take decision based all the histories of the best suited images to query image.

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