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Multi-Feature Extraction and Matching Approach for Image Retrieval

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ABSTRACT: For finding the images has become a great need to developing an efficient technique. Image Retrieval (IR) is a significant and increasingly popular approach that helps in the retrieval of image data from a huge collection. Image representation based on certain features helps in retrieval process. Three important visual features of an image include Color, Texture, Frequency, color histogram is most commonly used color representation color histogram gives better retrieval accuracy. When these features are extracted then various matching techniques are discussed, by using this techniques get the accurate image related to a query image.

KEYWORDS- color, Texture Frequency and Histogram.

I. INTRODUCTION

The IR (image retrieval) is a way to search the images from a huge collection of database. Therefore an important problem that needs to be addressed is fast retrieval of images from large databases. To find images that are similar to a query image, image retrieval systems attempt to search through a database. IR can greatly enhance the accuracy of the information being returned and is an important alternative and complement to traditional text-based image searching. For describing image content, color, texture, and frequency based features have been used(16).

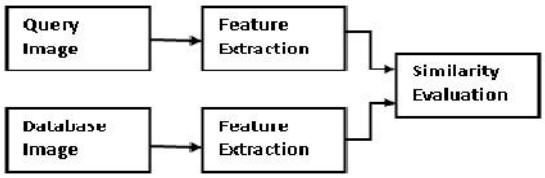

Fig 1. Block diagram of image retrieval.

II. RELATED WORK

[1] K. Hemachandran, S. Mangijao Singh, **present** the Content-Based Image Retrieval using Color Moment and Gabor TextureFeature **(**IJCSI 2012) they proposed an efficient image retrieval method based on color moments and Gabor texture features.

[2] Satish Kumar Singh and Rajat Kumar Singh Shiv Ram Dubey, IEEE transaction (2016)Present the Multichannel Decoded Local Binary Patterns For Content- Based Image Retrieval they proposed two multichannel decoded local binary patterns are introduced namely multichannel adder local binary pattern (ma LBP) and multichannel decoder local binary pattern (md LBP). The proposed methods are evaluated using image retrieval experiments over ten databases having images of color texture and natural scene.

[3] Sara Hbali Mohammed Sadgal Abdelaziz EL Fazziki (IEEE 2015) Present the Multi-features description for an efficient image retrieval they proposed algorithm to video frames for content based image retrieval. Its main novelty

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lies in the usage of different invariants descriptors of local image areas extracted and combined which gives better results.

[4] and G.A.P. NEVES and D.N.M. Cardoso (IEEE LATIN AMERICA TRANSACTION 2015) Present the Integrating Content-Based Image Retrieval into SBIM system they proposed Este trabalho descreve a nova versão do sistema SBIM, a qualinclui um esquema SVM multiclasse para recuperação automatic de imagens enovas interfaces com o usuário para dar support a esta funcionalidade.

[5] V.H Me.Kolkure V.S Prof.Kore S MR .Kondekar.N, Present the ImageRetrieval Techniques based on image features a state of Art approach forCBIR they proposed CBIR at present is still topic of research interest, Image color quadratic distance for image histogram, Image Euclidian distance for image wavelet transform, image Hamming Distance like these different features are used.

[6] Jing-Ming Guo, *Senior Member*, *IEEE*,Heri Prasetyo,and Jen-ho chen present the Content-Based Image Retrieval Using Error Diffusion Block Truncation Coding Features(IEEE Transactions on Circuits and Systems for Video Technology) To study for color image they proposed indexing by exploiting the simplicity of the EDBTC method,the EDBTC encoded data is construct A feature descriptor which is obtained from a color image two representative quantizes and its bitmap image by incorporating the VQ. The CHF effectively represents the color distribution within an image, while the BHF characterizes the image edge and texture.

III. PROPOSED ALGORITHM

3.1 Implementation of Proposed System

The system is implemented in the form of four main modules.

1. Feature extraction based on color, histogram, texture and frequency.
2. Image database creation.
3. Image feature database.
4. Comparison of query image and database image

Module1: Feature extraction based on color, histogram, texture and frequency

1.1feature extraction on the basis of color by using DCD

Working:- first it take the original image and extract the Red ,Green and Blue slices from the original image .then it convert each slice into the 8 parts and calculate the average value of each block (RGB) and it combining (RGB) averages of each par

1.2 Feature extraction on the basis of histogram by calculating intensity of image.

Working:- The operation is very simple. The image is scanned in a single pass and a running count of the number of pixels found at each intensity value is kept. This is then used to construct a suitable histogram.

1.3 feature extraction from texture by using GLCM algorithm

Working:- According to GLCM algorithm first convert the color image into grey scale image then grey scale image is calculated GLCM (8*8 matrix) by using this matrix calculate the Energy , Correlation ,Contrast , Homogeneity.

1.4 Feature extraction on the basis of frequency by using DWT and DFT

Working:- 1. Decomposing the signal using DWT into N levels using filtering and decimation to obtain the approximation and detailed coefficients.

2. Extracting the features from the DWT coefficients The features extracted from the Discrete wavelet transform (DWT) coefficients of ultrasonic test signals are considered useful features for input into classifiers due to their effective time–frequency representation of nonstationary signals.

$$\text{Feature (Coefficient)} = \frac{\text{Add all pixels}}{\text{Size of sub-band}}$$

- Input one of the images of dataset and calculate width and height.

w h

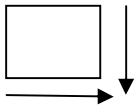

Fig 2. One ofdataset images

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- Convert this image into binary image

0	1	1	0	0
1	0	1	1	0

Fig 3. binary image

- Apply 2D wavelet transform for decomposition until we get 19 sub-bands

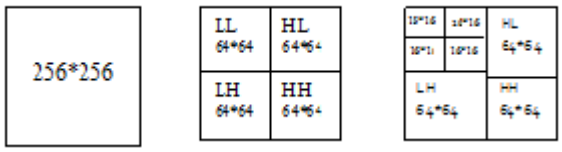

Fig.4. Image decomposition to get 19 sub-bands

- Calculate features (energy) of all sub-bands

0	1	1	0
1	0	1	1

Fig.5. One of the 19 sub-bands

Module 2:Image database creation.

An organized collection of digital images aimed at the efficient management and the processing of queries on this image collection

Module 3: **Image feature database**

The extraction task transforms rich content of images into various content features. Feature extraction is the process of generating features to be used in the selection and classification tasks.

Module 4:Comparison of query image and database image

1 .Euclidean Distance

It is used for fast retrieval of target images from the database. The Euclidean distance is the straight-line distance between two pixels. Euclidean distance here is used to match extracted features of query image with the feature database, the euclidean distance between two points a = (ax, ay) and b = (bx, by) is defined as:

$$d(a,b) = \sqrt{(bx - ax)^2 + (by - ay)^2}$$

2.Neural Network approach

In neural network we have both inputs and outputs given and we have to train the neurons to get the exact outputs we required. The work flow for the neural network design process has six primary steps:collect data,create the network, configure the network, initialize the weights and biases, train the network, validate the network and use the network.

IV. EXPERIMENTAL RESULTS

Sample 1: Input original image taken from data base folder.

Fig 5: Input image

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Sample2: the feature extraction on the basis of color.

Fig 6: color based extraction

Sample 3: the feature extraction on the basis of histogram.

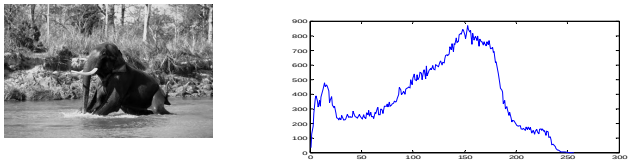


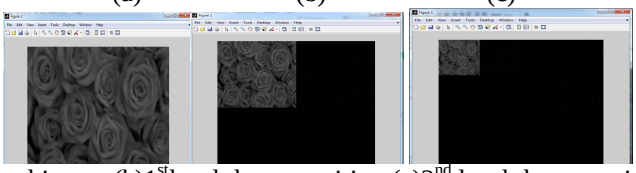
Fig.7 histogram based extraction

Sample 4: the feature extraction on the basis of texture.

Fig 8. Texture based extraction

Sample 5:the feature extraction on the basis of frequency.

(a) (b) (c)



Original image (b)1st level decomposition (c)2nd level decomposition)

Figure 9. Frequency based extraction

Sample 6**:** Comparison of query image and database image

1. EUCLIDEAN DISTANCE

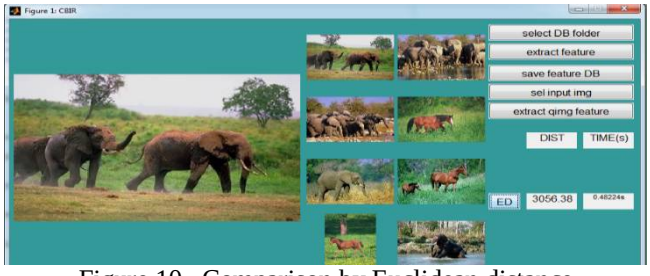


Figure 10. Comparison by Euclidean distance

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2.Neural Network approach

Fig 11. Comparison by Neural Network

Table 4.1: Images uses from the user calculate time rate distance and accuracy percentage by using Euclidean distance.

Image No	Type of image	Image size	Distance	Time	Accuracy percentage
1	Jpg	24.3 kb	4243.95	0.020627	25.00
2	Jpg	37.2 kb	4468.01	0.020631	87.5
3	Jpg	41.2 kb	3289.4	0.010414	62.5
4	Jpg	14.5 kb	2077.78	0.017131	25.00
5	Jpg	10.4 kb	2699.88	0.019557	50
6	Jpg	11.6 kb	1295.73	0.022998	37.5
7	Jpg	16.4 kb	1043.59	0.033846	50.00
8	pngi	71.3 kb	3876.28	0.015436	50.00
9	Jpg	10.2 kb	1367.00	0.018281	12.5
10	jpg	41.8 kb	2401.53	0.020239	87.5

GRAPHICALREPRESENTATION OF IMAGES USING ACCURACY PERCENTAGE BY EUCLIDEAN DISTANCE

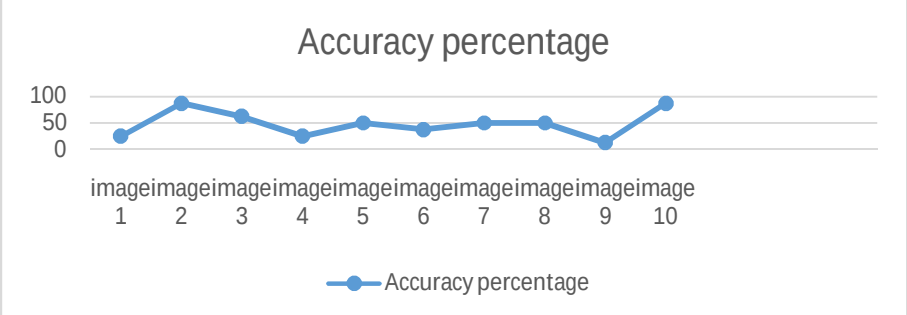

Fig 11.ACCURACY PERCENTAGE BY EUCLIDEAN DISTANCES.

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Table 4.2: Imageuses from the user calculate time rate distance and accuracy percentage by using Neural Network.

Image No	Type of image	Image size	Distance	Time	Percentage of accuracy
1	Jpg	24.3 kb	4171.34	0.0052627	40.9
2	Jpg	37.2 kb	4280.28	0.0052243	90
3	Jpg	41.2 kb	3275.44	0.0052373	65
4	Jpg	14.5 kb	2067.78	0.0054001	40.5
5	Jpg	10.4 kb	2689.78	0.017782	60
6	Jpg	11.6 kb	1285.73	0.005184	42.5
7	Jpg	16.4 kb	1033.59	0.0051944	55.3
8	pngi	71.3 kb	3825.36	0.0053421	60.5
9	Jpg	10.2 kb	1357	0.0052083	44.5
10	jpg	41.8 kb	2391.53	0.0052498	44.5

GRAPHICAL REPRESENTATION OF IMAGES USING ACCURACY PERCENTAGE BY NEURAL NETWORK

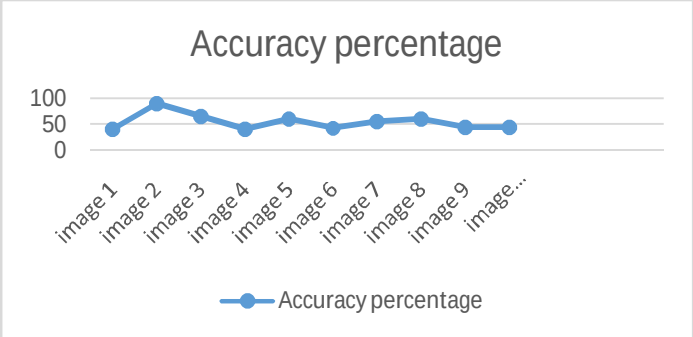

Fig 12.ACCURACY PERCENTAGE BY NEURAL NETWORK.

V. CONCLUSION

The Purpose of this system is to provide an overview in the functionality of image retrieval. There are various methods are used to retrieve the images like colour texture and Frequency feature, To improve the performance of the system and achieve better results in different applications IR method is widely used in various areas. This review paper compare a various techniques and find out which technique is better to our image retrieval process.

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