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Face Recognition by Multi-Dimensional Scaling(MDS)

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Abstract- Now a days Biometric based system is widely used for the identification and authenticate the legitimate user in the system or the various Application. Biometric data reflect the user Physiological and/or Behavior characteristics. Recently Random Projection(RP) has emerged as powerful method for dimensionality reduction. This method transform biometric data using a random matrix were the user privacy information cannot be comprised and the image could identify at the starting point .So used the biometric system that is Face Recognition by Multidimensional Scaling (MDS) which is useful in reducing feature vector size and there Computation time.MDS transform the biometric based data using Gram Matrix which compute linear independent an if and only if the gram determinant (the determinant of gram matrix)is non-zero. Face Recognition rate of Multidimensional Scaling is more than Principal Component Analysis and Random Projection Method. It Also Preserves Privacy of users.

Keywords- Biometric based System, Template, Random Projection, Principal Component Analysis, Multi-Dimensional Scaling algorithm.

I. INTRODUCTION

Authentication and Security of a person is a crucial in the real world. Biometric based system identify an confirm individual user based on the physiological and behavioral characteristics. In Biometric based system there are two system that is Eye Retina and Thumb identification in this Eye Retina can harmful to the eyes and Thumb take lot of time to identify. So we used Face Recognition Technique. Face recognition is an effective means of authenticating a person or the user. Example such application include secure access to buildings, military area, industry, banks, cellular phones. In this system we have maintain Templates database for the legitimate user were images are Store with different features. First we will take one Query Image as input then system will perform the Pre-processing of the Image. After pre-processing then the query image will be compare with Template database images, simultaneously the processing is done with query image and the template database if the match found the legitimate user is Identified.

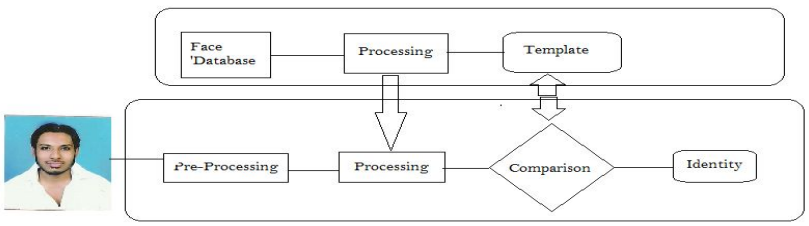

Figure 1 Face Recognition.

II. LITERATURE REVIEW

In this chapter, the key issues involved in content based image retrieval such as, image database selection, low-level features, i.e. color, texture, shape, spatial location representation, image similarity measurement methods, performance evaluation and the spectral approaches used in texture based image retrieval are discussed. From the recent literature, we find the texture features of an image are effective due to their fine discriminatory property. Therefore, we find spectral texture features are more suitable for content based image retrieval. From this discussion, multi resolution approaches are found to be the most effective in texture features representation [1][5]. Though wavelet transform has been widely accepted, it has several problems which results in a poor outcome for content based image retrieval. In 2-D space, wavelets cannot capture highly anisotropic elements like the curves of an image effectively as wavelets are not effective at representing line singularities. Images with a dense composition of highly anisotropic elements such as curves may not be well represented using wavelet texture representation. Images containing a high level of directionality will not be well represented by wavelet spectral domain [3][7].

III. SYSTEM ARCHITECTURE

In this System Architecture we are try to mention the architectural diagram that shows at the time of identification system will take query image as input we provide to curvelet transform and RGB to HSV RGB to HSV transfer image to HSV Histogram than image feature is extract than distance is calculated of the image simultaneously image database provide the image to curvelet transform and RGB to HSV than RGB to HSV transfer image to HSV Histogram than image feature is extract than distance is calculated of the image than image feature are stored in database and than distance is calculated than image is retrieved image or identified image.

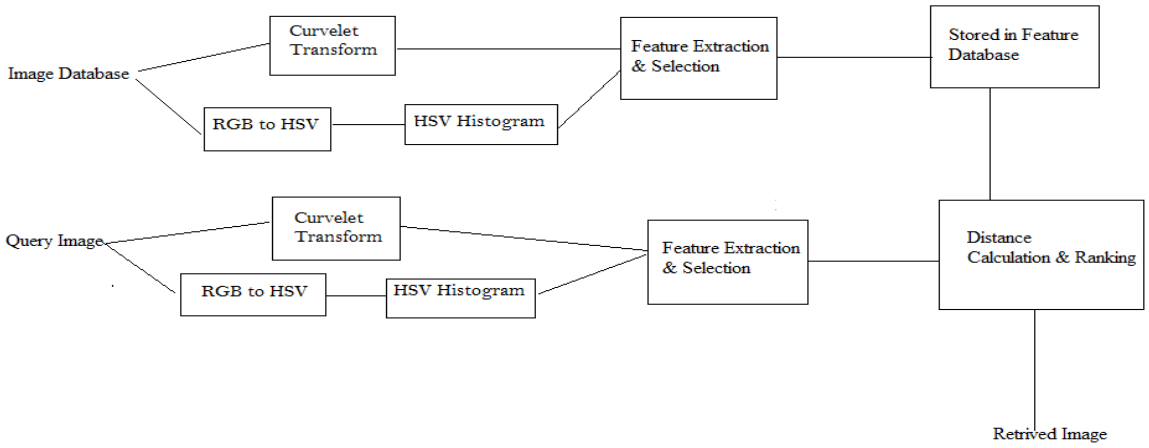

Fig 2 Architecture of Face Recognition using MDS

The System Architecture consist of Following .
1. Curvelet Transform.
2. RGB to HSV.
3. HSV Histogram.
4. Feature Extraction & Selection.
5.Stored in Feature Database.
6.Distance Calculation & Ranking.

3.1. Curvelet Transform

Curvelet Transform can calculated at level of 4,5 and 6.For all the level of curvelet we get different number of sub bands as shown in table 1.In this system we generate curvelet coefficient of the image using 6 level .Total number of sub bands considered for feature calculation are 74.

3.2. RGB to HSV

Convert a given image RGB(Red, Green and Blue) to HSV(Hue, Saturation and Value) for the color coefficient of the image .

3.3. Color Histogram

We find the histogram for HSV image ,we obtain three separate histogram for Hue, Saturation and Value. Each of Histogram has 256 numbers of bins.

3.4. Feature Extraction

Features are extracted from the curvelet coefficient and HSV histogram. From the Curvelet coefficient we have extract standard deviation and texture feature of image. From Histogram out of 256 values ,two minimum ,two maximum and two median value for Hue, Saturation & Value along with bins location are extracts as color feature.

3.5.Store In Feature Database

We Store the Texture and Color Features of the image in the feature Database. The Store texture and color are used for comparing with query image.

3.6.Distance Calculation & Ranking

Distance is calculated from query image feature. Image are ranked is order are retrieved from the image database.

V. RESULT

Table 1 Survey of RP and MDS

Algorithm	Training %	Accuracy
PCA	80	0.9
MDS	80	1.0
PCA	70	0.86
MDS	70	0.96

In this system we have calculated the accuracy according to the training percentage. In result we have found accuracy of MDS is more as compared to PCA. Security is more of MDS because we are providing the Encryption key to the user for the authentication process.

CONCLUSION

We used Face Recognition system based on Multidimensional Scaling(MDS). In this we have high image retrieval accuracy by increasing the level of curvelet transform. Security is high because we are providing the encryption key to the user for the authentication process. It Also Preserves Privacy of users.

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