

ANALYSIS OF FACE RECOGNITION SYSTEM FOR DIFFERENT CLASSIFIER

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Abstract - Face recognition plays vital role for authenticating system. Human Face recognition is a challenging task in computer vision and pattern recognition. Face recognition has attracted much attention due to its potential value in security and law enforcement applications and its theoretical challenges. Different methods are used for feature extraction and classification. Kernel fisher analysis is used for feature extraction. The performance analysis for Euclidean, support vector machine is evaluated. The whole process is done using MATLAB software. A set of 10 person real time images is taken for our work. The classifier recognizes the similar posture as an output.

Key Words: Euclidean distance and SVM classifier, Kernel Fisher Analysis.

1.INTRODUCTION

Over the past few years, the user authentication is increasingly important because the security control is required everywhere. Traditionally, ID cards and passwords are popular for authentication.

Image processing refers to the processing of an image in digital form. Modern video cameras may directly take the image in digital form but generally images are originated in optical form. They are captured by video cameras and digitalized. The digitalization process includes sampling, quantization.

Applications of face recognition are widespread. Perhaps the most obvious is that of human computer interaction. One could make computers easier to use if when one simply sat down at a computer terminal, the computer could identify the user by name and automatically load personal preferences. This identification could even be useful in enhancing other technologies such as speech recognition, since if the computer can identify the individual who is speaking the

voice patterns being observed can be accurately classified against the known individual's voice.

An image may be defined as a two-dimensional function, $f(x, y)$, where x and y are spatial (plane) coordinates, and the amplitude of at any pair of coordinates (x, y) is called the intensity or gray level of the image at that point.

Kfa(Kernel Fisher Analysis) is proposed for feature extraction. The main idea of this method is to yield a nonlinear discriminate analysis in the higher space. Two different types of classifier are used and performance analysis of both the classifier is evaluated.

The paper is organized as follows. Section II illustrates the related work. Section III employs the proposed work and describes about classifier Section IV describes the experimental results. Section V will provide the performance analysis. Section VI will provide the conclusion and future work.

2.RELATED WORK

In [1] Heterogeneous Face Recognition (HFR) framework which includes prototype random subspace is used. A set of training subjects with an image from each modality can be used as a prototype and depending on the modality of a new image, the image from each prototype subject can be selected from the corresponding modality. Random sampling provides better result. The accuracy of each of the tested HFR is low[1].

In [2] Locality constraints kernel space is used. It includes coupled spectral regression and coupled discriminate analysis. It is an effective subspace learning framework, deducing from the graph embedding view of subspace learning. Difference in appearance from different modalities is reduced. Local structure of the data is not preserved [2].

In [3] Simplified Weber level descriptor is used. It extracts the geometry of a face and distribution of geometric features in an image. It finds the most of

effective low dimensional embedding for the original sample data. Two database results are employed. Accuracy is low [3].

3. PROPOSED WORK

Real time images are given as input to the pre-processing method. Preprocessing is the basic step in an image processing. It is used to remove the unwanted noise that is present in the image. It is used to reduce the complexity for further process. The input image is converted into grey scale image. The histogram of an image is calculated. It is the graphical representation of grey level values in the x-axis and no of pixels in the y axis. Smoothing is the process of reducing sharp transitions. It is also used to reduce noise and blurring that are present in the image.

The main objective of feature extraction is to find meaningful low-dimensional representations of high dimensional patterns such that the inherent data structures and relations are revealed. Feature extraction is an important technique for high-dimensional data, which can avoid the curse of dimensionality and improve computational efficiency in pattern classification.

Kernel Fisher Analysis (KFA) is proposed for feature extraction. The aim of KFA is to achieve a nonlinear discriminate analysis in the higher space. In this project local features such as eye, eyebrow, nose and mouth are extracted.

The classifier used for training and testing is Euclidean and Support Vector machine (SVM) classifier.

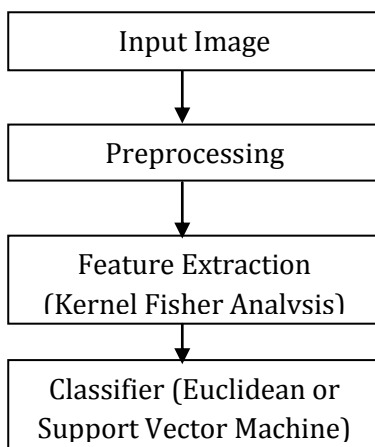


Fig-1: Block Diagram Of Face Recognition

In this paper, real time images are taken and a database is created. The database contains 10 person images in which each person having 10 different postures. For each person 2 images are trained and 8 images are used for testing.

The Euclidian distance classifier is one of the classification techniques in area where clusters of points representing the different entities to be classified are spaced far apart in feature space. The idea behind the Euclidian distance classifier is that one computes the average of several training vectors for each possible categorization and then classifies a given test vector by determining to which cluster the average is the vector nearest.

SVM (Support Vector Machine) constructs the hyper plane that is used for classification. In this positive support vectors and negative support vectors are used for posture classification.

4. RESULT

The real time image is given input to the pre-processing method. Fig 2 shows the image chosen for face recognition.

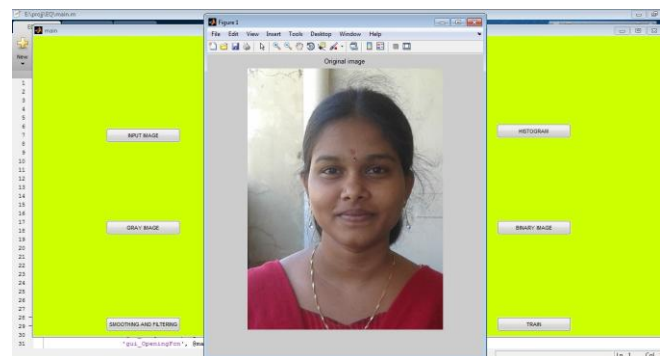


Fig-2: Input selection

Fig 3 shows the grayscale image. RGB image is converted into grayscale for better result.

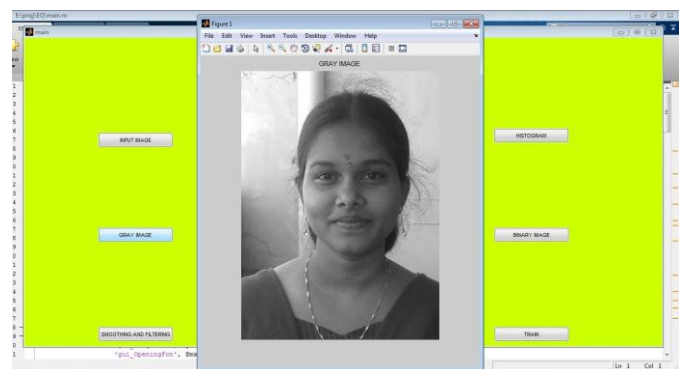


Fig-3: Grayscale image

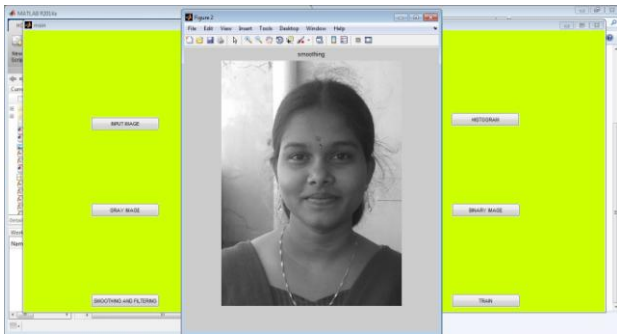


Fig-4: Filter image

The above figure shows the filtered image. Filtering is to improve the image by filtering the unwanted noise.

Local features are extracted in this project using kernel fisher analysis. The extracted feature is shown in fig 5

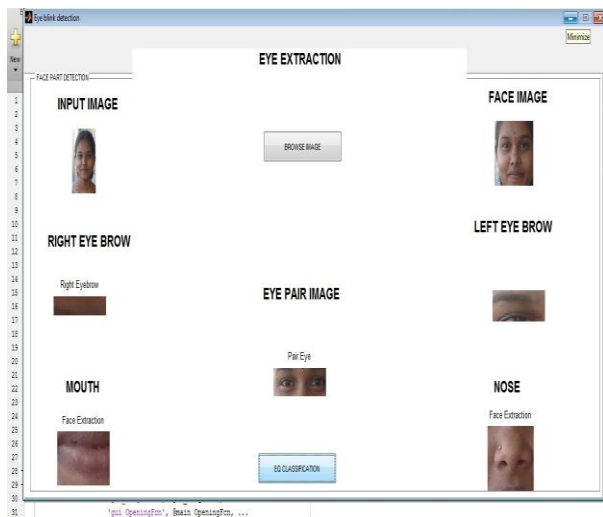


Fig-5: Feature Extraction

Left eyebrow and Right eyebrow are separately extracted and an eye pair image from real time image.

The face image is extracted at first with a fixed size. In this paper 100 real time images feature extraction is done. In this paper all the local features are extracted, due to this the classifier will analyzed the face efficiently.

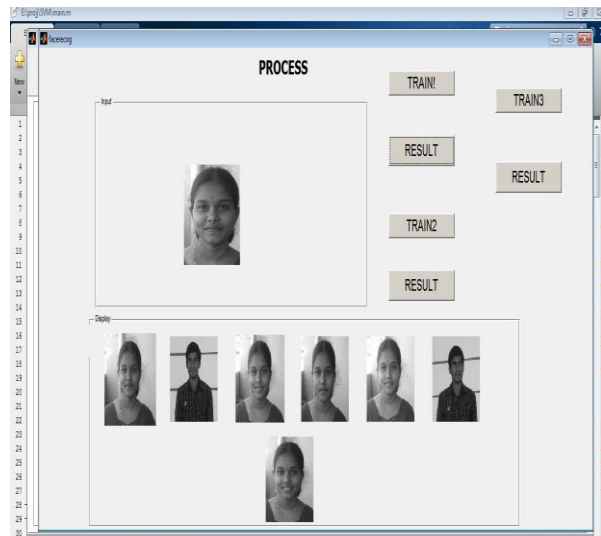


Fig-6: Face recognition using Euclidean classifier

The above figure shows the result obtained by using Euclidean classifier. One of the trained images is given as input and the above posture is obtained for single person input. Similarly for all the 10 persons, output is obtained by giving trained image as an input.

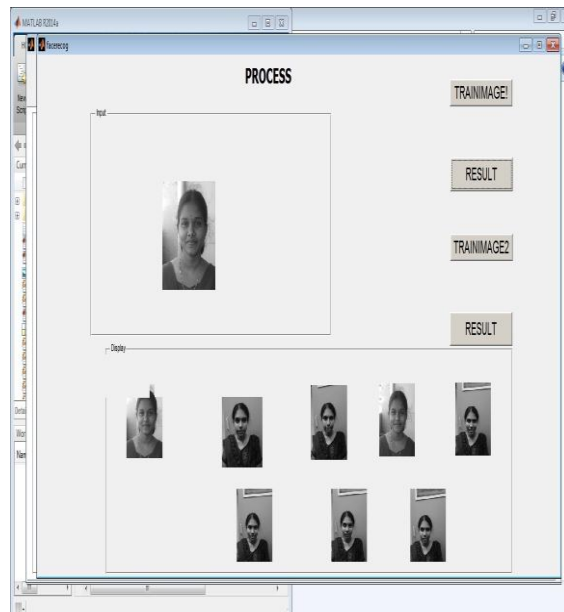


Fig-7: Face recognition using SVM classifier

Fig 7 shows the result obtained using SVM classifier. The trained image is given as an input and the classifier checks the database and provides the similar posture to the input.

5. PERFORMACE ANALYSIS

The overall recognition rate is evaluated for both the classifier. In this project Total number of real time person we took is 10.For each person 10 different posture is taken. For training 2 images and for testing 8 images is taken for each person.

$$\text{RECOGNITION RATE} = \frac{\text{No. of. Recognized images/}}{\text{No. of. Testing images}}$$

Table-1: Recognition rate percentage

CLASSIFIER	RECOGNITION RATE PERCENTAGE
EUCLIDEAN DISTANCE	35
SVM	58

6.CONCLUSION AND FUTURE WORK

Face recognition analysis for different classifier is evaluated. The real time images are preprocessed and feature is extracted using kernel fisher analysis algorithm. For classification, two different classifier is used.SVM classifier provides better result (i.e.) 23% higher than Euclidean distance classifier.

The future work includes using of alternate algorithm for feature extraction and using of various databases. The testing can be done by many classifiers for recognizing purposes.

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BIOGRAPHIES



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