Automatic Facial Recognition in Image Processing: A Review

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ABSTRACT: The Face recognition technique is used to detect the face in controlled environment. This technique provides the security to computer systems or to networks. This technique is based on computer application that is automatically identifying a person. It is a real time application which uses algorithms like PCA, LDA and PCA with Eigen face. This paper represents the review of face recognition algorithms and their advantages and disadvantages. PCA basically work on the two factors like improvement pictorial information for human interpretation and processing of images data for storage. This paper provides a review of above mention algorithms used for face recognition.

Keyword: Pattern recognition; facial recognition and future enhancement.

INTRODUCTION: Facial recognition is used to find the difference between actually and social reception and balance security and privacy. It is an important part to find the capability of human perception and content are based on the image database management. There are number of system that are available for still facial recognition .By using the face recognition technique new database has been created .it's become the one of the security system for analysis and understanding the image. Face recognition is a problem in the field and discipline and having practical applications such as bankcard identification access control and security monitoring. The development of face recognition is due to combination of factors .face recognition problem can be formulated can be still and movable image of a scene. It can identify the one or more persons in the scene by comparing with face stored in a database.

When comparing person verification to face recognition. There are several aspects. First, a client an authorized user of a personal identification system could. Computationally means that it is not necessary to consult the complete set of database image in order to verify a claim. An incoming image is thus compared to a small number of person whose identify is claimed or not. Second, an automatic authentication system must operate in near -real time to be acceptable to user. Finally, in recognition experiment, only images of people from the training database are presented to the system, whereas the case of an important for authentication.

FACIAL RECOGNITION: Face recognition is a biometric approach that employs automatic methods to verify the identity of a living person based on his/her physiological character. Face recognition has the benefit of being a passive non-intrusive system to verify personal identity in a natural and friendly way. Face recognition starts with the detection of face patterns in sometimes cluttered sense. Produced by the face image to account for geometrical changes. The application for face recognition technique can cauterized into two main parts first is law enforcement application and commercial application.Face recognition system consists of two major Parts. 1) Face detection and normalization. 2) Face identification. The algorithms used in face recognition consist of both the parts to become the algorithm fully automatic and that consists of only the second part i.e. called partially automatic algorithm. In this two Algorithm used partially automatic and fully automatic. In partially automatic algorithms are given a facial image and they are related to the center of eyes. In some special domain face recognition research still face challenge. There are number of problems arise and time solve those problems numerous methods has been used and they have demonstrate significant promises and the difficulty still remains.

In face recognition matching performance is poor compared in case of current automatic that achieved in the finger prints. This current system works very well when the test image to be recognized is captured in under condition similar to those of the training images and changes in head pose, facial expressions, hair style with facial hair cosmetics and age. They confound the best system today. In face recognition, we may categories approaches used to cope with variations divided into three parts. First is invariant and they approach to utilize the feature i.e. used to study the changes in face. In Second i.e. canonical forms they have to attempts to normalize away the variations by clever image or by given test image in some canonical and prototype form. In this recognition has been a performed using canonical form. The third approach variations modeling are self-explanatory. The idea to learn some suitable subspace, the extended the variations in that space. They leads to some parameteriza-

tion of the subspace and the recognition is then performed by choosing the subspace closest to the test image and after the latter has been appropriately mapped.

LITERATURE REVIEW TECHANIQUE OF FACE RECOGNITION: In this we read about the different algorithms used in face recognition and given the overview about the major facial expressions techniques used that applies in the different methods that are used and also includes advantages and disadvantages of each method that are used in face recognition. Different algorithms are used in facial recognition like PCA, LDA, and PCA with Eigen face.

Principle component analysis (PCA): PCA in face recognition technique and various approaches are based on PCA and properly they are called Eigen face and they have the excellent performance. PCA based approach typical including two phases: Training and classification. In training phase, an Eigen space is established from the training samples using the principal component Analysis method.

In classification phase, the input phase image is projected to the same Eigen space and classified by appropriate methods. PCA is often is used for projection of an image into Lower dimensional space or so called face space. PCA performance has been enhanced by minimizing the eigenvector which consequently decrease the computational time without greatly affect the recognition accuracy. PCA is mainly used for feature selection and dimensional reduction. PCA approach is applied to reduce the dimension of the data by means of data comparison and reveals the most effective low dimensional structure of facial patterns. The following steps summarize the process.

Let a face image x (a, b) be a two dimensional c x d array of intensity values. An image may also become considering the vector of dimension Cd, so that typical image of size 112x92 become a vector of dimension 10304.

Linear Dimension Analysis (LDA): LDA is a data desperation technique. The objective of LDA is to find the direction that can have the different separate classes of data once projected upon the data of the human face is represented in a matrix and mat lab is used in matrix process i.e. X. Two dimensional LDA computes directly the direction which will separate the classes without matrix to vector conversion.

Direct LDA Algorithm for Face Recognition: Remove the null space from So and diagonalizable Sb. Do an Eigen analysis of FTb Fb (an M _ M matrix).Sort eigenvectors in decreasing order of the corresponding eigenvalues. Map each eigenvector x of FT b Fb onto v = Fax, which is the eigenvector of Sb.Normalize the v's and write them down side by side to get V , such

that V TSbV = L; (7) where V TV = I, L is diagonal matrix sorted in decreasing order. Discard those with eigenvalues sufficient close to 0

Since the objective is to maximize the ratio of between scatter against within scatter,

Those eigenvectors corresponding to the smallest Eigen values .We can optionally pick only the most discriminative several. In fact, we can sort the diagonal elements of DW in a decreasing order and discard some

Eigen Face: Eigen face is principal component of a distribution of faces. The Eigen value and Eigen vector, face image representation and Eigen face space are used in the Eigen face algorithm.

Eigen vector: In Eigen vector of a linear operator are non-zero vector which, when operated by the operator, results in a scalar multiple of them. Scale is than called Eigen value (λ) associated with the Eigen vector of (X). Eigen vector is a vector that is scaled by Linea transformation. It is a property of matrix. When a matrix acts, the vector magnitude not changed the directions.

AX=A, where A is vector function.

(A-I) X=0, where I is the identity matrix

Face Image Representation: In case of face image representation N images size MxM are represented by vector of size.

Each face represents by the T1, T2, T3, and TN

Feature vector of a face is stored in a MxM matrix. Now, this two dimensional vector is changed to one dimensional vector.

Eigen face space Eigen vector of the covariance matrix AA^T are AX^i which is denoted by U^i: Resemble facial images which look ghostly and are called Eigen face. Eigen vector correspond to each Eigen face in the face.

PROBLEM WITH FACE RECOGNITION: However, the major drawbacks of any facial recognition algorithms are

Illumination Problem: Illumination problem happens when same image with condition. So person have to keep with fix lighting condition, fixed distance, same facial expression and also same view point. It can emerge extensively different when lighting condition is different.

Pose Problem: Face recognition with different facial poses that is called pose problem. If face rotation made very large changes in face appearance it reduce recognition rate. If person try to match same image with different facial pose, it show the different result.

ADVANTAGE AND DISADVANTAGE OF DIFFERENT FACE RECOGNITION METHODS:
1. Faster than Eigen faces, in some cases.

2. Has lower error rates.
3. Works well even if different illumination.
4. Works well even if different facial expression.
5. The face to classify must be in the DB.
6. Can't work well with high dimension.

CONCLUSIONS: In this study we apply three algorithms based on the face recognition i.e. PCA, LDA and EIGEN FACE. This paper has attempted to review a significant number of papers to cover the recent development in the field of face recognition. PCA approach is applied to reduce the dimension of the data by means of data comparison and reveals the most effective low dimensional structure of facial patterns and LDA used for the small training database. PCA various approach are based on the Eigen face algorithm, and they have the excellence performance. For future work in this paper we want to extent or work with large database and we used another different algorithm, and compare with different algorithm. We enhanced face recognition new algorithm has to evolve using hybrid methods of soft computing tools such as ANN, SVM and SOM may yields better performance.

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