

# A Review on Face Recognition Techniques

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## ABSTRACT

In Today’s world Face Recognition plays a crucial role in various Applications. Today many applications have face recognition as an important part involved in them. Face recognition is a biometrical approach capable of identifying a person from a digital image or a video frame from a video source. The task of face recognition is comparing the given image with the template image in the database. This paper provides a contemporary review of major human face recognition. Firstly presenting an overview of face recognition and its utilization. Then, a review of the face recognition techniques is presented.

**Keywords:** Face Recognition, Biometric, Database, Techniques, Template.

## I. INTRODUCTION

In the Present day scenario, Face Recognition plays a crucial role in providing security and resolving the problem of authentication and the illegal identification. It has advantages over the biometric methods since it doesn’t require any voluntary action from the user. There have divided into two basic applications: identification and verification. In the identification problem, the face to be recognized is unknown and matched against face of a database containing known individuals. In the verification problem the system confirms or rejects the claimed identify of the input face.

However, before face recognition is performed. The system should determine whether or not there is a face in a given image or given video, a sequence of images. This process is called face detection. Once a

face is detected, face region should be isolated from the scene for the face recognition.

The Overall process is depicted in the following figure

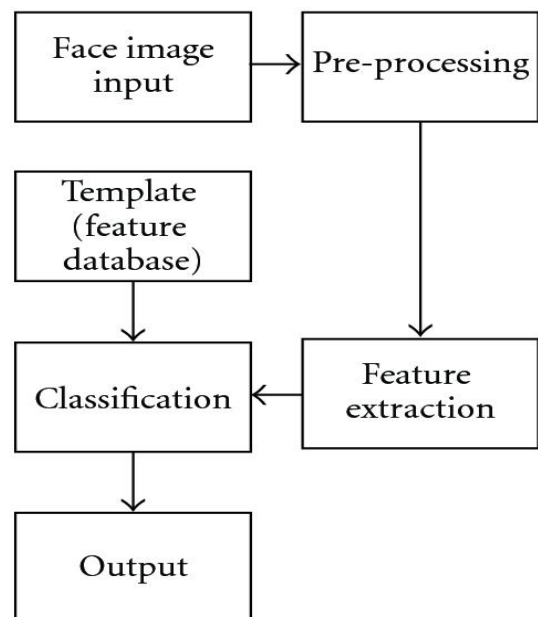


Figure 1

After detecting the face, the face is pre-processed for extracting the features from the facial image and classification implies and it compares the

template(feature database) and the output indicates whether the face is detected or not .

Face Recognition allows provides to protect the data by integration of the artificial intelligence to recognize the person. These kinds of applications are highly used by today's trending smartphones.

## II. RELATED WORK

Face Recognition Using Principal Component Analysis, in this paper it was stated that acquisition of the trained images by Artificial Neural networks and extracting the features by the principal component analysis .The Combination of these two methods gives better recognition rate [18].Human Face Recognition using Facial Feature Detection Techniques, in this paper explains how human face feature extraction can be done by different methods and using different databases, the accuracy of the recognition rate is compared among these methods [19].

An Experimental Comparison of Face Detection Algorithms, in this paper comparison of face detection algorithms that is active contour model and segmentation using the silhouette model obtaining the capability of the algorithms based on the different real time datasets[15].Face Recognition based on Local Pattern of DWT and LBP, in this paper proposed the recognition of the local pattern of DWT and LBP, along with the different databases trained for the evaluation of the performance by creating a 9x9 matrix[28].

Two-Dimensional PCA: A New Approach to Appearance-Based Face Representation and Recognition, in this paper developed an 2D PCA based on the 2d image matrix and considering the Eigen vectors to obtain the matrix, this method has significant advantages over the traditional PCA, the results are obtained by considering the different facial variations with different expressions under the different lighting conditions[4].Face Description with

Local Binary Patterns: Application to Face Recognition, in this paper presents the face description based on local binary patterns, the texture classification and image retrieval by using the LBP operator[6].

An Introduction to Face Recognition Technology, in this paper the biometric measures like false recognition rate and false acceptance rate and the factors that affect the performance of the recognizer, pattern face recognizer, Eigen face extraction and utilization of neural networks are also explained[1].Recognizing faces with PCA and ICA , in this paper compared principal component analysis and independent component analysis in the context of the baseline face recognition system and comparison of InfoMax with PCA and Fast IDA[2].

A Review of Face Recognition Techniques for In-Camera Applications, in this paper it was explained the face detection and face region normalization. Algorithms like DCT based recognition, Component Analysis and Hidden Markov Model used for training the datasets and experiments are conducted for obtaining the recognition rates of these algorithms for digital camera captured images [7].

Real time face recognition techniques used for the interaction between humans and robots, in this paper presents an automatic face recognition system for a person following robot, two dimensional Haar wavelet transform and a classifier trained with the DCV algorithm and it is compared with machine learning algorithms like PCA and LDA.[8]

Comparison of PCA and LDA Techniques for Face Recognition Feature Based Extraction With Accuracy Enhancement, in this paper the explained the feature extraction techniques like PCA and LDA by extracting the Eigen faces and obtaining covariance matrix and calculating the Euclidean distance for scatter matrix calculation[24].Face Detection and

Recognition using Viola-Jones algorithm and Fusion of PCA and ANN, in this paper presents an efficient approach for face detection and recognition using Viola-Jones algorithm and fusion of PCA and ANN for obtaining the better performance and the recognition rate[26].

Face Recognition System Using PCA, LDA & Jacobi Method, in this paper presents the Jacobi method for the calculation of the Eigen values and Eigen vectors which are important for the PCA and LDA algorithms, this paper concerns about the image pre-processing to smoothen image, RGB to Gray Conversion and the calculation of the Euclidean distance between known and unknown nodes of the dataset image [29]. Face recognition: component-based versus global approaches, in this paper the authors the component-based method and global approach method for face recognition, in this methods the components are obtained by extracting them from the dataset and combined them into a single feature vector and classified by the Support vector machine. The SVM compares the extracted image with the trained images in the database [3].

Image-based Face Detection and Recognition this paper is to evaluate various face detection and recognition methods, provide complete solution for image based face detection and recognition with higher accuracy, better response rate as an initial step for video surveillance. Solution is proposed based on performed tests on various face rich databases in terms of subjects, pose, emotions, race and light. Image processing techniques can be used for the extraction and the extracted image can be used for recognition [10].

Comparison between face recognition algorithm- Eigen faces, fisher faces and elastic bunch graph matching, in this paper explains the comparison between the Eigen face ,fisher face and elastic bunch graph matching by calculating the 2D vector distance

between the nodes and labelling the Gabor wavelet for different scales and orientations of the trained image[9]. A Real-Time Face Recognition System Using Eigen faces, in this paper the author explains the real time face detection by recognizing the face images from videos of a surveillance camera, the images are projected into the feature space and the Eigen values and obtaining the Eigen vectors for the set of faces.[10]

Face Recognition Using Principal Component Analysis and Linear Discriminant Analysis on Holistic Approach in Facial Images Database, in this paper used the holistic approach on PCA and LDA and calculation of the Eigen vectors and training the dataset images for different pose variations and experimentation on the various Facial image databases[12].

Face Recognition: A Literature Review, in this paper explains the various techniques like Eigen faces, fisher faces, Hidden Markov model, 3D morphable model and geometric matching and template matching methods and a comparison among these methods is also obtained[5].

Face Recognition Techniques, in this paper reveals that for enhanced face recognition new algorithm has to evolve using hybrid methods of soft computing tools such as ANN, SVM, SOM may yields better performance [11]. face recognition techniques: classification and comparisons, in this paper explains the comparison of PCA, LDA and multilayer perception for obtaining the neural networks approach for the classification of the trained dataset images [13].

Face Recognition Using Principal Component Analysis Method, in this paper explains how the principal component analysis is used for calculating the Eigen values and obtaining the Eigen vector and trained dataset images [14]. face recognition using

principal component analysis and neural networks, in this paper explains the face recognition using PCA and neural networks for the calculation of the Eigen values and Eigen vectors for the training of the dataset.[16]

Domain adaptation for ear recognition using deep convolutional neural networks, in this paper the authors investigated unconstrained recognition of ear, deep domain convolutional neural networks for the domain adaption and selecting the trained datasets [25]. Face recognition techniques and neural network, in this it was explained that some of the most common techniques like PCA and MPCA are available including applications of neural network in facial recognition are studied and compared with respect to their performance [12].

### III. CONCLUSION

The modern day technologies however are preferably using the face recognition in combination with their respective artificial intelligence technologies for providing the security to various devices and also for handling various kinds of the security related applications. In this paper, how face features are recognized is explained and the various techniques of the face recognition are studied. However the Principal component analysis and linear component analysis are the most used techniques for the face recognition. These techniques uses the Eigen face and Fisher face for the feature extraction. The different databases are used for the storage of the different trained datasets. A survey on the various modern face recognition techniques is presented.

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