A Prime Survey on Face Recognition System

G.KAVITHA*1

Ph.D Research Scholar
Department of Computer Science
Periyar University salem-11
Tamil Nadu, India
kavitha.swe93@gmail.com

Dr.I.LAURENCE AROQUIARAJ*2

Assistant Professor
Department of Computer Science
Periyar University Salem-11
Tamil Nadu,India
laurence.raj@gmail.com

ABSTRACT- Nowadays face recognition plays foremost role in social interaction for conveying identity and feelings of person. Symbol or password-based confirmation procedures are besides easy to hack. In previous works low pixel quality, single scanned images are only used to recognize. This article mainly focused on various face recognition methods, like PCA, LDA, ICA etc... PCA is the method for decreasing the data dimension of the image. It is based on the approach that breaks the face images into a little set of characteristic feature images. These Eigen faces are the principal components of the early data set of face images. Finally this paper provides a better performance method for face recognition.

Keywords- PCA, Face recognition, Eigen faces, SVM

I-INTRODUCTION

Face recognition system is the most important biometric for identifying a person without human cooperation. Many of the face recognition systems are introduced for iris, chin, ear, mouth, nose and face outline. It is the most efficient and sophisticated method for the security System. Face recognition system can help in many ways- for example some applications are used for checking criminal records to find particular criminal, for finding lost children's by using the images from the cameras fitted at some public places, and detection of thief at ATM machines, knowing in advance if some unknown person is entering at the border checkpoints and so on. FR can operate two methods: The first method is Face verification and another method is Face identification. Any one of the method can be used to find a person.

Face recognition can generally be categorized into one of the following three scenarios based on the characteristics of the image to be matched. Such as, Video-to-video, Video-to-image recognition, image-to-image face recognition. Video-to-still image matching occurs when a sequence of video frames is matched against a database of still images, Video-to-image face recognition can be seen as an extension of still image based face recognition. Still-to-still image

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matching is used in both constrained and unconstrained applications. The Following methods are used in face recognition system, Face Detection, Feature Extraction, Image acquisition, pre-processing and Classification and Edge Detection Methods.

Face recognition can be done by several algorithms such as PCA, ICA, LDA, EP, EBGM, AMM, SVM, and HMM [2]. In PCA, a training set is collecting some formed face images. The eigenvectors of all the faces are intended and the "Eigen faces" are the linear combination of these eigenvectors.

The following paper discuss about Face recognition Detection method in section II Research Background, section III discuss about Face Recognition recommendation methods at the end summarized conclusion.

Steps for Performing Face Recognition System

Acquire Image

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Locate Face

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Face Detection

↓

Face Recognition

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Person Identify
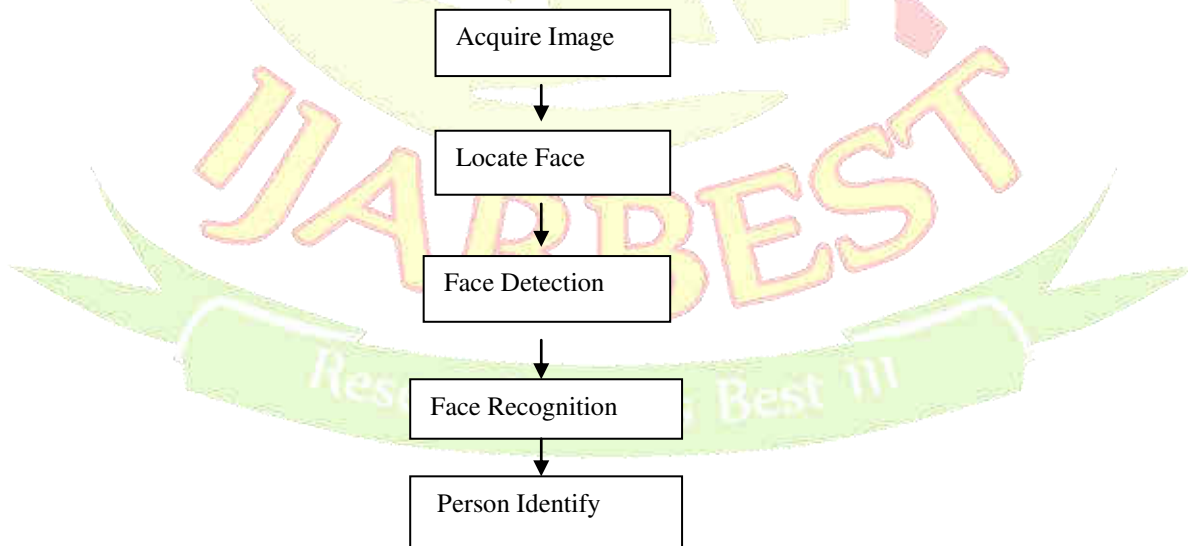
Functions of Face Recognition

Face detection: Face detection and indication of any facial zones that are opposite in various guidelines in complex scene.

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Feature Extraction: feature extraction starts from an initial set of measured data and builds derived values intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Feature extraction is related to Dimensionality reduction.

Pre-Processing: Image pre-processing takes the Signal Condition form (such as noise removal, and normalization from the variation of pixel position or brightness), along with segmentation, location, or tracking of the face or its parts).

Facial classification: The classification of faces by color, gender, civilization, age, appearance and other character. Face identification: The identification of persons by comparisons with registered people.

Edge detection Based face Recognition: Edge detection is the name for a set of mathematical methods which intend at identifying points in a digital image at which the image brightness changes sharply or, more formally, has discontinuities. Using Canny Detection Method, The general criteria for edge detection includes:

Detection of edge with low error rate

Good localization

Minimal response.

Among the edge detection methods developed so far, canny edge detection algorithm is one of the most strictly defined methods that provide good and reliable detection. Owing to its optimality to meet with the three criteria for edge detection and the simplicity of process for implementation, it becomes one of the most popular algorithms for edge detection.

PCA:

PCA covers standard deviation covariance, eigenvectors and Eigen values. There are many applications which can be used for solving the recognition problem, but out of those the appearance based approach is best.

*ICA***:**

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Independent component analysis (ICA) is one such generalization. An algorithm for performing ICA has been proposed. The approach transforms face images into a small set of characteristic feature images, called "Eigen face. In PCA, a training set is formed by collecting some face images. Then, we apply the Independent Component Analysis.

LDA:

Linear Discriminant Analysis (LDA) is most commonly used as dimensionality reduction technique in the pre-processing step for pattern-classification and machine learning applications. The goal is to project a dataset onto a lower-dimensional space with good class-separability in order avoid over fitting and also reduce computational costs.
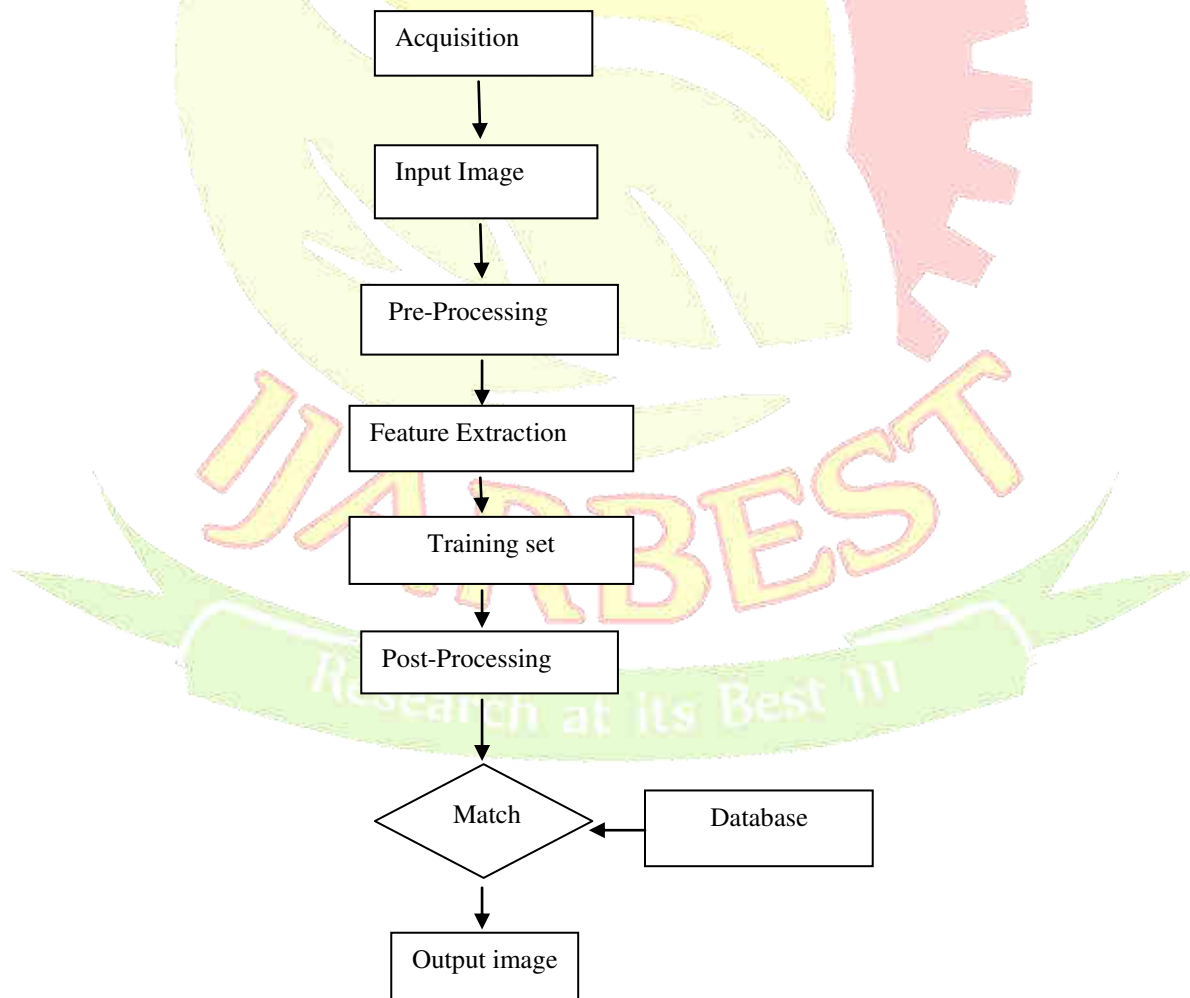
Fig: System Flow Diagram

Elastic Bunch Graph Matching:

Face recognition using elastic bunch graph matching based on recognizing tale faces by estimating a set of work of fiction features using a data structure called a bunch graph. Then the features are extracted by density with the number of instances of Gabor filters followed by the conception of face graph. The matching score (*MSEBGM*) is calculated on the basis of similarity between face graphs of database and query image.

SVM:

Given a set of points belonging to two classes, a Support Vector Machine (SVM) finds the hyperplane that separates the largest possible fraction of points of the same class on the same side, while maximizing the distance from either class to the hyperplane. PCA is first used to extract features of face images and then discrimination functions between each pair of images are learned by SVMs.

MATLAB:

Matlab is one of the most popular image processing applications available. Matlab Allows manipulations at the lowest level, such as the modification of a single value in a Data set. Many extended functions for image processing are available.

Image processing in Matlab is fundamentally done by the Image Processing Toolbox. Basically, this is just a collection of image processing functions. These functions rely on the mathematical computational engine behind Matlab to do these functions. Many of these functions are in "script" format, specifically Matlab "M" files. Thus, a user wanting to view the code can easily view the source code,(possibly)make Modifications and create new functions.
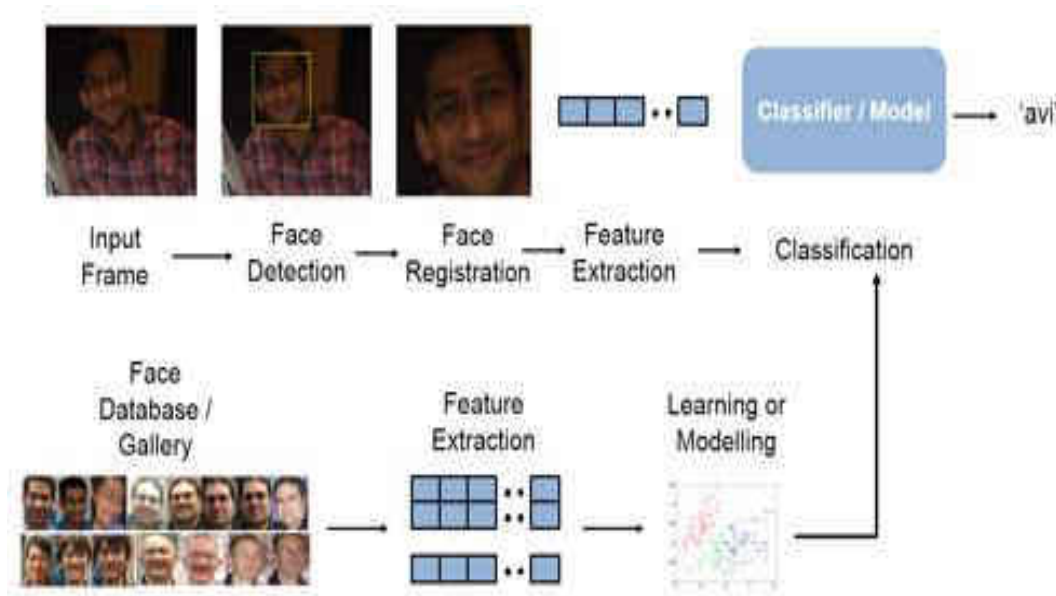
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Fig: Face Recognition Performance in Matlab

II-RESEARCH BACKGROUND

From last few decades, many researchers are working on facial Recognition. They have put their efforts to find better accuracy to detect the correct person. The Researchers Contribution in this field is mentioned below.

Shilpa Sharma,Kumud Sachdeva Using Feature extraction accord with is limited in particular facial segments of the face in the image. PCA strategy is utilized for the extraction of facial segments for picture. In PCA every individual pixels of a picture are taken through and through and after that they again changed to line vector which incorporates the intensity values or grey components of that picture. Covariance matrix is then calculated for training set images in which image is categorized by each row and pixel position is categorized by columns.

Zaid Abdi Alkareem Alyasseri In this article, a face recognition system based on the ICA algorithm. The ICA results are represented based on the Cumulative Match Characteristic (CMC), where the CMC shows the curve of plots of the probability between 1:N, where N is the

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number of people in the dataset. The ICA algorithm can be applied for face recognition In two different ways. The first way, ICA can be used as to process images as random variables and pixels as observations, or to process pixels as random variables and images as observations.

III-RECOMMENDATION

Using principle component Analysis algorithm In Previous work we can used single scan image for recognition process. In future implement some other face recognition algorithms used to recognize different scanned images simultaneously also Improve the pixel quality and reduce the noise from original image.

TABLE:1.1

Author and year	Technique used	Problems	Future Scope
Vimal,Virender Kadyan-2015	PCA,LDA	Low Quality images, and accuracy	To Detect Edges in Color Images.
Shilpa Sharma et al,2015	PCA,SVM, SURF	Low Error rate and accuracy	Work on Different Scanned images Simultaneously.
G.Hemalatha,C.P. Sumathi	Knowledge based, Appearance Based, Template Matching.	Analyze quality of Facial Expressions.	Achieve without incorporating adaptation in the recognition framework
Raed Majeed, Zou Beiji and Hiyam Hatem	3D Face Preprocessing Methods	Low Intensity Point and Performance Rate	Develop automatic nose tip detection methods for non-frontal views and faces

IV-CONCLUSION

In this paper we are using the most popular and efficient method for recognition, Principle component analysis algorithm. Here we took many images in the Training set as a

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linear combination of Eigen vectors. The system receives the input face and recognizes the face from the training set. After completing the recognition process then finding the Euclidean distance between the input face and training set face.finaly shows the result using matlab.

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