A MODIFIED BIOMETRIC AUTHENDICATION TECHNIQUE BASED ON IMAGE PROCESSING TO ENHANCE THE SECURITY OF ATM

A.Amala Sophia Rexlin[1]| K.Venkatesh[2]| M.Varatharaj[3]

[1](Department of ECE,UG Scholar,Christ the King Engineering College,India,amalasophia1996@gmail.com)
[2](Department of ECE,Christ the King Engineering College,India,venkanadasan@gmail.com)
[3](Department of ECE,Christ the King Engineering College,India,varatharaj_ms80@rediffmail.com)

Abstract—*Face detection and recognition is challenging due to the Wide variety of faces and the complexity of noises and image backgrounds. A neural network based novel method is used for face recognition in cluttered and noisy images. A modified radial basis function network (RBFN) is used to distinguish between face patterns and Non face patterns. The complexity RBFN is reduced by PCA as it gives good results even in different illumination environments and highly un-susceptible to occlusion when compared with Classical PCA (Principal component analysis). PCA is applied on Images to get the Eigen-vectors. These Eigen-vectors are given as input to RBFN network as the Inputs for training and recognition. The proposed method has good performance good recognition rate.*

Keywords— Image processing in ATM, PCA algorithm, biometric in ATM.

1. INTRODUCTION

Automated teller machines (ATMs) are well known devices typically used by individuals to carry out a variety of personal and business financial transactions and/or Banking functions. ATMs have become very popular with the general public for their availability and general user friendliness. ATMs are now found in many locations having a regular or high volume of consumer traffic. For example, ATMs are typically found in restaurants,

Super markets, Convenience stores, malls, schools, gas stations, hotels, work locations, banking Centres, Airports, Entertainment, establishments, transportation facilities and a myriad of other locations. This has added new capabilities and features, however, most of the time, the Implementations are proprietary and networking is not always possible. Yet there is an increasing demand for Smart banking, where appliances react

Automatically to changing environmental conditions and can be easily controlled through one common device. According to increasing development of technology and in order to approach electronic government, most citizen services are presented electronically using smart electronic cards. Regarding this fact, people have several smart cards which are increasing in number every day. Despite of so many advantages, these cards have various disadvantages such as multiplicity, troublesome carrying, Unavailability of card readers in many places, waiting in the queues of ATMs, etc.

A new approach is proposed named multipurpose smart SIM card in order to solve these problems. Proposed SIM card, acts based on mobile database architecture and location dependent queries process in it. The problem of finding the nearest and most unoccupied ATM as a case study and the method to authenticate users is proposed here.

2. LITERATURE REVIEW:

So far, numerous approaches using texture features have been developed and successfully applied to FR. These works roughly fall into four categories: 1) methods using Gabor wavelets or LBP features; 2) methods using the fusion of global and local face features; 3) methods using the fusion of magnitude and phase information of Gabor wavelets; 4) methods using fusion of Gabor and . However, most of these works have been limited to greyscale texture analysis. FR using colour information is a relatively new research topic in the area of automatic FR. Initial works on colour FR focused on determining fixed colour component configurations (from various colour spaces) suitable for FR through empirical comparisons. Colour space conversions in order to further obtain an enhanced FR performance. In (1) the authors proposed an optimal conversion of colour images in the colour space into a monochromatic form. They developed a colour image dis criminate model to find a set of optimal combination coefficients and demonstrated the usefulness of the proposed monochromatic representation. Liu (2) proposed three new colour representations, i.e., the so-called uncorrelated colour space, the independent colour space, and the discriminating colour space. The author shows that the later three-color representations are effective for enhancing the FR performance, as compared with the use of colour images represented in the colour space. In (3), the authors found out a common characteristic of a powerful colour space for FR by analyzing the transformation matrix of the different colour spaces from the colour space. In addition, based on the characteristic of powerful colour spaces, they proposed colour space normalization techniques, which are able to convert weak colour spaces into powerful ones, so that better FR performance can be obtained by making use of these normalized colour spaces.

3. EXISTING ATM AYSTEM:

Existing bio-metric methods we commonly are using 1.fingerprint authentication 2.password (personal identification number) based security systems. In this two system database store the user fingerprint or pin number. When transaction or any other biometric security process match user information like pin number or fingerprints the system access the further process, in case not match system access denied. Anyone knows to our pin number access the further process. Finger print method sometimes not authenticate correctly. Then time delay process. Transactions are done through keyboard only.

4. THE SECURITY OF ATM:

In this proposed system I have created the new bio-metric technique using face recognition method instead of finger print and password (personal number identification (pin)). (fig 1:1) The camera will capture the user's image and compare it with the user image in the server using MATLAB.

Only when the image matches further processing starts. Otherwise the process is terminated. The PCA algorithm used to compare the database image and captured image. By using this system malfunctions can be avoided. Our security system will be much secured.

ADVANTAGES:

- Flexibility and portable system
- Less Cost and compact
- Effective security system
- Alert system
- Optimized System

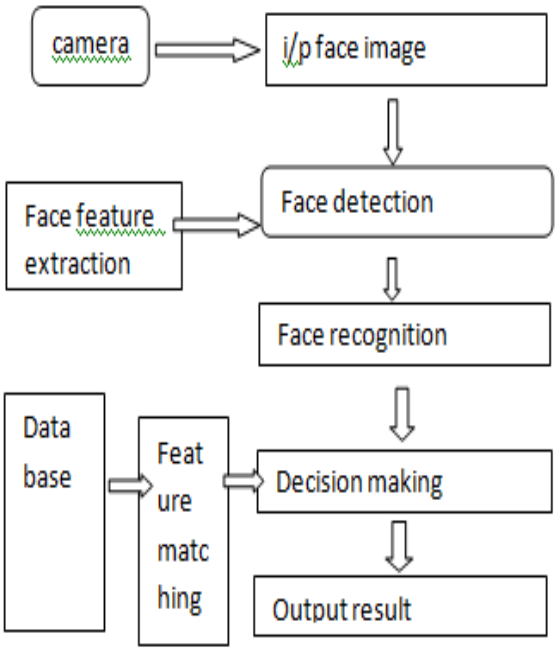

Fig1:1 Block diagram

5. IMAGECOMPASSION:

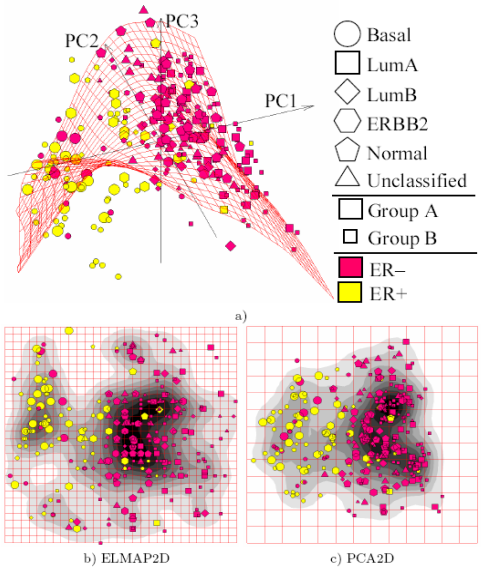

Fig1:2 Image compassion

IMAGE EXTRACTION:

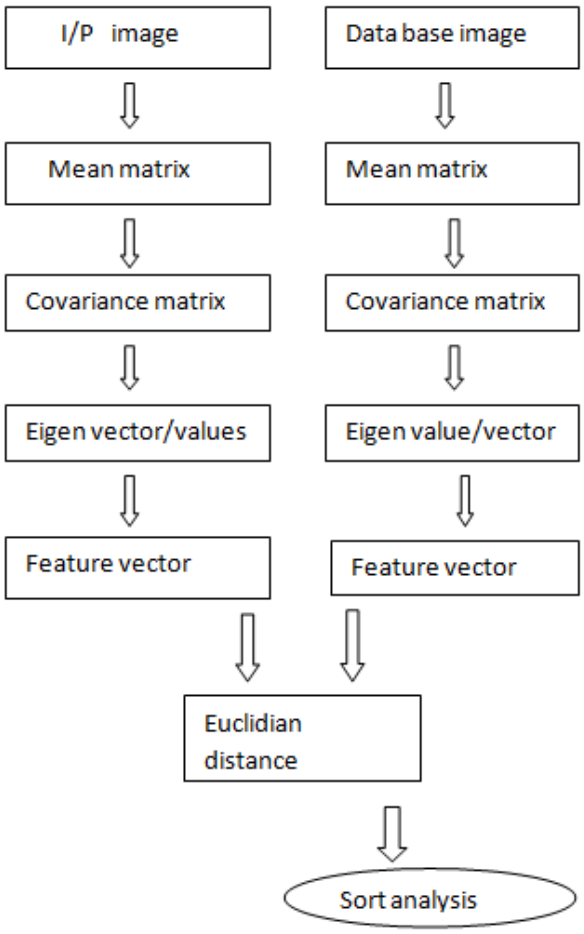

Fig1:3 Image extraction

6. FACE RECOGNITION:

Once the Eigen faces have been computed, several types of decision can be made depending on the application. What we call face recognition is a broad term which may be further specified to one of following tasks:

- Identification where the labels of individuals must be obtained.
- recognition of a person, where it must be decided if the individual has already been seen,
- Categorization where the face must be assigned to a certain class.

PCA computes the basis of a space which is represented by its training vectors. (fig1:3) These basis vectors, actually Eigenvectors, computed by PCA are in the direction of the largest variance of the training vectors. As it has been said earlier, we call them Eigen faces. Each Eigen face can be viewed a feature. When a particular face is projected onto the face space, its vector into the face space describes the importance of each of those features in the face. The face is expressed in the face space by its Eigen face clients (or weights). We can handle a large input vector, facial image, only by taking its small weight vector in the face space. They can reconstruct the original face with some error, since the dimensionality of the image space is much larger than that of face space. This report, let's consider face identification only. Each face in the training set is transformed into the face space and its components are stored in memory. The face space has to be populated with these known faces. An input face is given to the system, and then it is projected onto the face space. The system computes its distance from all the stored faces.

1. What if the image presented to the system is not a face?
2. What if the face presented to the system has not already learned, i.e., not stored as a Known face. The First. Defect is easily avoided since. The First Eigen face is a good face filter which can test whether each image is highly correlated with itself. The images with a low correlation can be rejected. Or these two issues are altogether addressed by categorizing following four different regions:

- Near face space and near stored face = known faces
- A near face space but not near a known face = unknown faces
- Distant from face space and near a face class = non-faces
- Distant from face space and not near a known class = non-faces

Since a face is well represented by the face space, its reconstruction should be similar to the original, hence the reconstruction error will be small. Non-face images will have a large reconstruction error which is larger than some threshold . The distance k determines whether the input face is near a known face.

PCA ALGORITHM:

The Principal Component Analysis (PCA) is one of the most successful techniques that have been used in image recognition and compression. PCA is a statistical method under the broad title of factor analysis. The purpose of PCA is to reduce the large dimensionality of the data space (observed variables) to the smaller intrinsic dimensionality of feature space (independent variables), which are needed to describe the data economically. The jobs which PCA can do are prediction, redundancy removal, feature extraction, data compression, etc. Because PCA is a classical technique which can do something in the linear domain, applications having linear models are suitable, such as signal processing, image processing, system and control theory, communications, etc.

MATHEMATICS OF PCA

A 2-D facial image can be represented as 1-D vector by concatenating each row (or column) into a long thin vector. Let's suppose we have M vectors of size N (= rows of image × columns of image) representing a set of sampled images. Pj's represent the pixel values.

Xi = [p1 . . . pn] t, I = 1, . . . , M....(1)

The images are mean cantered by subtracting the mean image from each image vector. Let m

Represent the mean image.

Wxi – m ....(3)
Our goal is To Find a set of ei's which have the largest possible projection onto each otherwise'". here a set of M Ortho-normal vectors Ei for which the quantity are found
=1/M
is maximized with the Ortho normality constraint
It has been shown that the ei's and i's are given by the Eigen vectors and Eigen values of the covariance matrix
C=w
where W is a matrix composed of the column vectors wi placed side by side. The size of Cis N × N which could be enormous. For example, images of size 64 × 64 create the covariance matrix of size 4096 ×4096. It is not practical to solve for the eigenvectors of C directly. A common theorem in linear algebra states that the vectors ei and Scalars. If I can be obtained by solving for the Eigen vectors and Eigen values of the M × M matrix W T W. Let di and µi be the Eigen vectors and Eigen values of, respectively
By multiplying left to both sides by W

7. IMPLEMENTATION AND RESULTS

It contains ten different images of each of 40 distinct subjects. For some subjects, the images were taken at different times, varying the lighting, facial expressions (open/closed eyes, smiling/not smiling) and facial details (glasses/no glasses). All the images are taken against a dark homogeneous background with the subjects in an upright, frontal position (with tolerance for some side movement). An experiment with a subset of the database, which only contains 12 subject's images, has been
Performed to ensure how well the Eigen Face system can identify each individual's face. There are 5 additional test images, each of which is the known face. I also appended 2 non-face images to test whether it can detect them correctly. The face image should be normalized and frontal-view

- The system is an auto-associative memory (p.153 in [2]). It is harmful to be over fitted.
- Training is very computationally intensive.
- It is hard to decide suitable thresholds - It is kind of Art!
- The suggested methods to deal with unknown faces and non-faces are not good enough to
- Differentiate them from known faces.

SCREENSHOT OUTPUT:

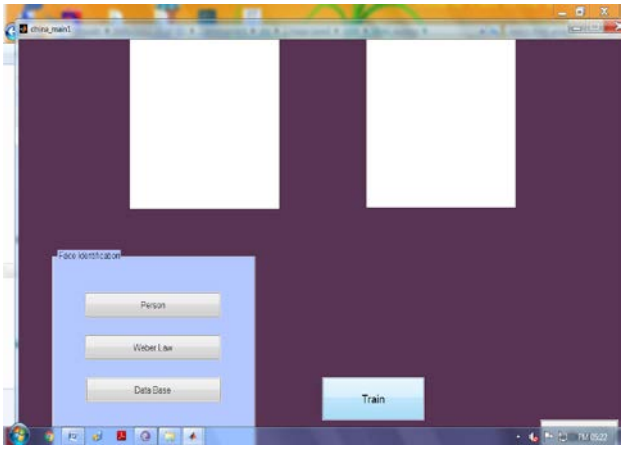

Fig2:1Authendicate the image

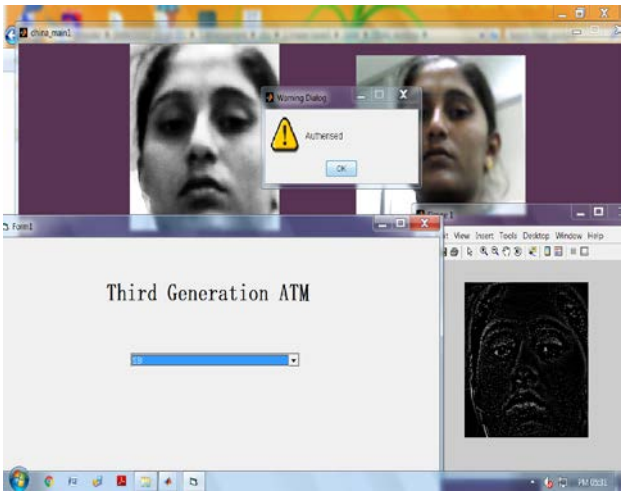

Fig: Authorized the image

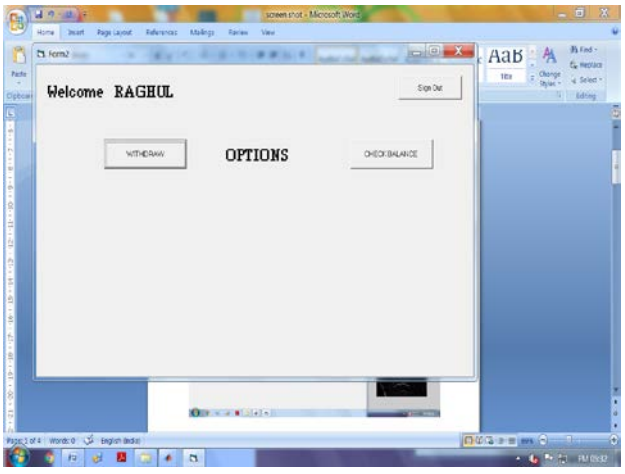

Fig2:3 Money transaction for authorized

Fig2:4 Selecting the bank

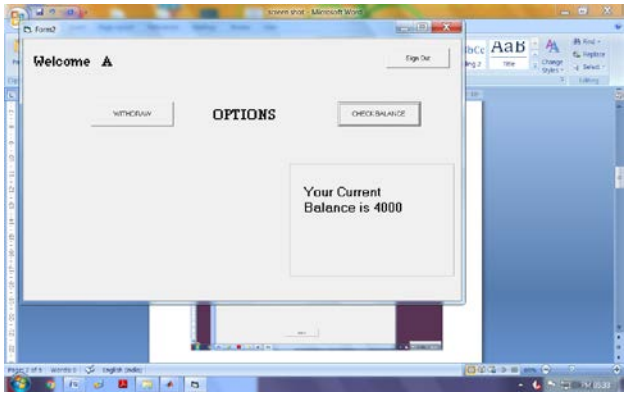

Fig2:5 End of process

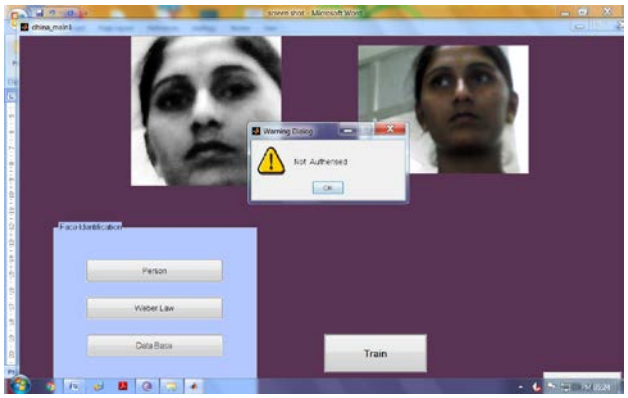

Fig2:6 Un authorized image

HARDWARE REQUIRMENTS

- Web camera

SOFTWARE REQUIRMENTS

- MATLAB2007

APPLICATIONS:

- Security applications
- Data transferring applications
- Image processing applications
- Banking applications

8. CONCLUSION:

This paper presents a novel architecture that can be used as a means of interaction facial Recognition. , ATM machine and a Banking application for the purpose of withdrawing cash. The proposed design; the secure cash withdrawal allows the use of face based bio-metric as a tool of interaction and provides flexibility through a robust identity management architecture. The architecture being implemented and all the process involved has been Analysed and justified where possible

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