RESEARCH ARTICLE   OPEN ACCESS

Smart Bank Locker Access System Using Iris ,Fingerprints,Face Recognization Along With Password Authentication And Billing System

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ABSTRACT
In today's modern world, security plays an important role. For that purpose, we proposed advance security systems for banking locker system and the bank customers. This specialized security is proposed through four different modules in combination i.e. face detection technique, Password verification, finger prints and Iris verification .All these steps are followed in the sequence if anything goes wrong he or she is unable to access the system.
We are also providing some additional billing with it i.e. it will always for after 1 transaction. It will give the intimation of first transaction is complete and you are left with prescribed number transaction mentioned in system.
KEYWORDS: - ARM 7, MATLAB, Camera, DC Motor.

I. INTRODUCTION

Every person has precious accessories such as gold, jewellery or in terms of cash. To prevent it from any mishandling. We keep it in a locker system of bank concern with it likewise in old way system of a bank there was a private key system which is associated with the concern user and every time he or she has headache to carry key with him or has keep burden of key lost or key duplication problem. So to overcome above major drawbacks the recent system of biometrics is introduced. It is very advance as compared to any traditional system. This system comes with the features of which included not only face detection but also fingerprint detection technique, iris detection technique, along with password authentication

For banking which provides genuine access to the customers who will overcome the problem associated with unauthorized access. As above mention proposed system includes face detection technique which gives us effective and fast access .Secondly fingerprint detection technique gives easy access to system which contains specified finger pattern of that person. Also password verification is provided in system using dot mat format in MATLAB tool.

Finally technique provides more secure approach to the system by scanning mechanism. By combination of all these above secured technique gives us better advancement in banking security systems.

II BLOCK DIAGRAM OF PROPOSED SYSTEM

In this proposed system we are using ARM microcontroller LPC 2148 as it is a 64 bit microcontroller along with four security technologies i.e. face reorganization, fingerprint reorganization, password, and iris reorganization in series combination.
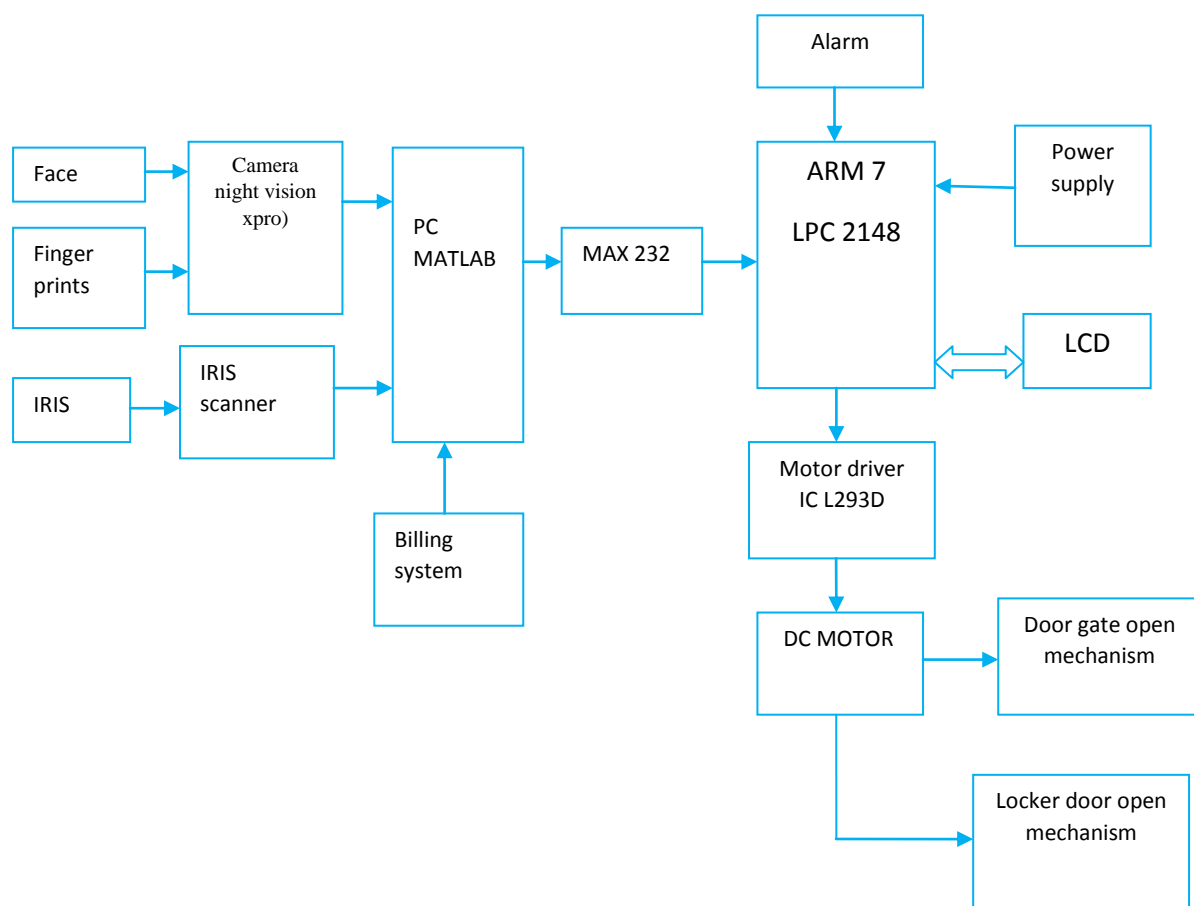
Fig.2.1 Block Diagram of Proposed System

Initially bank customer go through face reorganization when the customer enters into the bank locker system, he has to recognize his face through captured face image using camera i.e. night vision xpro. For face reorganization we are using the principle component analysis algorithm in MATLAB is used for face reorganization technique [8]. For image recognition and compression PCA is most successful techniques that have been used. PCA can perform various operation 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. The main idea of using PCA for face recognition is to express the large1-D vector of pixels constructed from 2-D facial image into the compact principal components of thefeature space. This can be called Eigen space projection. Eigen space is calculated by identifying the eigenvectors of the covariance matrix derived from a set of facial images (vectors). All this process is done in matlab software & captured image is compared with database stored in the PC and if it is match with the stored database then first gate of locker will be open

automatically. For the locker gate we use Motor driven IC L293D which is driven by LPC 2148 which has sufficient output current of 600mA to drive the DC motor and then bank customer will go for the next technology i.e. Fingerprint. [8].
A fingerprint is made of a series of ridges and furrows on the surface of the finger. The uniqueness of a fingerprint can be determined by the pattern of ridges and furrows as well as the minutiae points [3].Minutiae points are local ridge characteristics that occur at either a ridge bifurcation or a ridge ending. Fingerprint matching techniques can be placed into two categories: minutiae based and correlation based. Minutiae-based techniques first find minutiae points and then map their relative placement on the finger. [7]In Matlab for fingerprint recognition we use Gabor filter.For Fingerprint recognition is considered using a combination of Fast Fourier Transform (FFT) and Gabor Filters to enhancement the image. An input fingerprint is first matched at a coarse level to one of the pre-specified types and then, at a finer level, it is compared to the subset of the database containing that type of fingerprints only [7]. If captured image is compared with stored database in PC and if captured image is authorized then bank customer will go for next step i.e. Password.

Password module is a secret word or string of characters used for authentication to prove identity or gain access to a resources and it is programmed in matlab software. That string is in the form of dot mat (.mat) format. If string is valid then next process is Iris reorganization.

The iris pattern is unique to each person and to each eye, and is essentially stable during an entire lifespan. These reasons make iris recognition a robust technique for personal identification. The first automatic iris recognition system was developed by Daugman. He applied Gabor filters to the iris image for extracting phase features, known as the Iris Code. Use 2D wavelet transform at various resolution levels of concentric circles on the iris image. They characterize the texture of the iris with a zero-crossing representation. Employ a bank of spatial filters, with kernels that are suitable for iris recognition to represent the local texture features of the iris [6].If the given iris matches with stored database in pc then the person is authorized otherwise it is unauthorized. After this whole process door is open and bank customer enters into the locker system. An alarm circuit is to interface to ARM7 for security access when an unauthorized access is done alarm will ring to give intimation. If authentic, then only using the gate control the door will be open [1].

III.SYSTEM FLOW
STEP-I
Face Reorganization using PCA algorithm
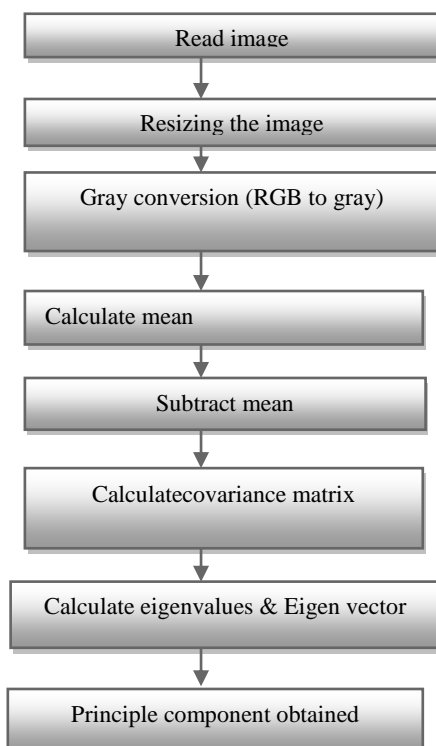
Fig;-3.1.System flow for Face Reorganization

For face reorganization we use principle component analysis algorithm. Initially we are acquiring data through camera night vision xpro. Read image operation is performed in which image is shown on screen. After resizing operation of image is done in which we are predefined setting the format of image for e.g. (200*200) size of image and whatever image is shown on screen earlier is converted into column and row format of matrix then RGB to gray conversion is done. The basic purpose is to make image in gray color because RGB format image contains each pixel of three values i.e. from 0-255 each for Red, green and blue color. If RGB to gray conversion is there then time is reduced used for each pixel of RGB color and for gray color each pixel contains only one value i.e.0-255. So we use RGB to gray conversion. After gray conversion unnecessary part of image is removed so that concatenation of faces should be done then create tensor image then calculate the mean of captured image then subtract the mean image from the tensor image vector. Find covariance matrix for captured image & then calculate Eigen values & Eigen vectors. Finally we got principle component of image.

STEP-II
Finger prints and IRIS Reorganization using Gabor Filter
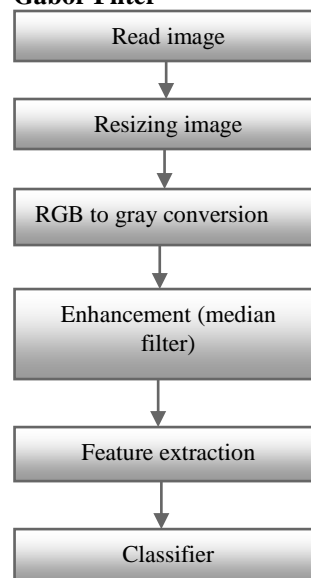

Fig: 3.2.System flow for Fingerprints & IRIS reorganization

For both fingerprint and iris reorganization system we use Gabor filter. Initially we are acquiring data through camera night vision xpro. Read image operation is performed in which image is shown on screen. After that resizing operation of image is done in which we are predefined setting the format of image for e.g. (200*200) size of image and whatever image is shown on screen earlier is converted into column and row format of matrix then RGB to gray

conversion is done. The basic purpose is to make image in gray color because RGB format image contains each pixel of three values i.e. from 0-255 each for Red, green and blue color. If RGB to gray conversion is there then time is reduced used for each pixel of RGB color and for gray color each pixel contains only one value i.e.0-255. So we use RGB to gray conversion.

Next step is Enhancement process in which we have used median filter is a nonlinear method used to remove noise from images. It is widely used as it is very effective at removing noise which preserving edges. The median filter works by moving through image pixel by pixel, replacing each value with median value of neighboring pixel then the next step is feature extraction.

STEP-III
Password Authentication
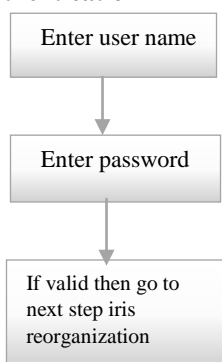
Fig: 3.3.System flow for Password Authentication

After the fingerprint reorganization, if bank customer is authorized then move towards password authentication. In that, first of all bank customer have to enter their username and then enter the password using keyboard and if that password is valid then go for next step i.e. iris reorganization. If that entered password is invalid then it indicates unknown user.

IV. Result Analysis

We created database for customers as per our requirement.

1. Output of STEP-I (PCA) algorithm for Authorized Person

Fig 4.1.Image capture by camera i.e. input image

Fig.4.2.execution of PCA algorithm

Fig.4.3.Output image after the execution of PCA algorithm

2. Output of STEP-II (Gabor Filter) for finger prints

Fig.4.4Input image of fingerprint capatured by camera

Fig.4.5.Execution of Gabor filter for Fingerprints
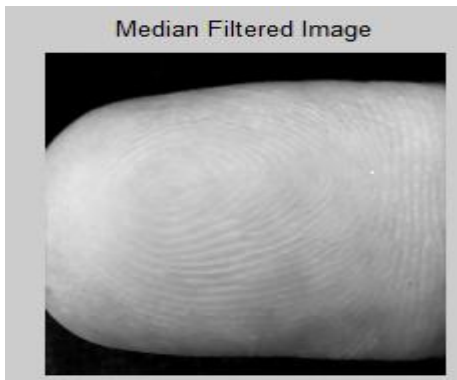
Fig.4.6.Output image after the procedure of Gabor filter

3. Output of STEP-III Password Authentication

Fig.4.7.Execution for Password Authentication

3. Output of STEP-IV (Gabor) algorithm for IRIS

Fig 4.8 Input image of IRIS captured by camera

Fig.4.9.Execution of Gabor filter for IRIS

Fig.4.10. Output image after the procedure of Gabor filter
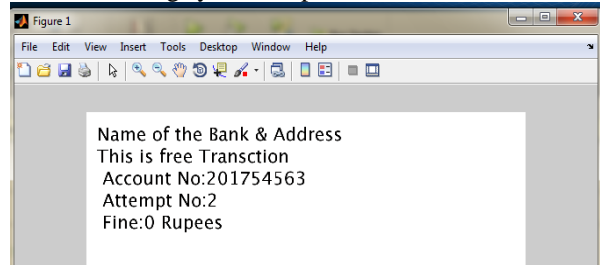
4. Billing system Step-V

Fig.4.11Execution of Billing system for free transaction

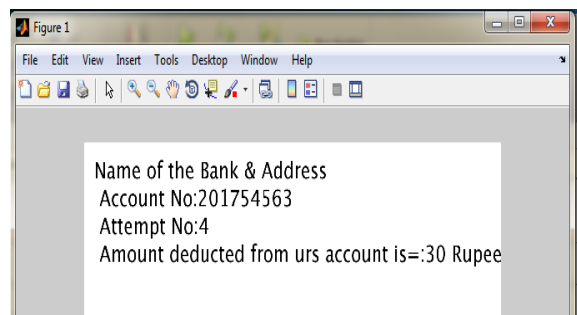Fig.4.12. Execution of Billing system for Paid transaction

Table 4.1 Total Execution time

	Time Consumed (in msec)
STEP-I	336.258
STEP-II	645.114
STEP-III	330.984
STEP-IV	669.102
STEP-V	67.404
Total time	2051.184

V. Merits& Demerits

Merits
1. It is fully automatic security system.
2. Frauds in banking can be reduced to great extent.
3. Manual mistakes in the field get reduces.
4. Ensures total genuine access of the locker.
5. Highly advanced microprocessor controlled locking system.

Demerits
1. Processing time is somehow high

VI. Future Scope

In proposed system we have obtained the Locker security in terms Sequential fashion of biometric parameters .in Future to make more secure system we can go for the fusion of the biometric parameters.

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[6.] Shirke Swati D. Prof.Gupta Deepak ME-COMPUTER-I Assistant Prof. ME COMPUTER CAYMT's Siddhant COE, CAYMT's Siddhant COE Sudumbare, Pune Sudumbare,Pune *IRIS RECOGNITION USING GABOR.*

[7.] D.ShekarGoud (1) IshaqMd (2) PJ.Saritha (3) 1P.G. Student (Embedded Systems), ELEN, Patancheru, India. 2P.G. Student (Embedded Systems), ELEN, Patancheru, India.3Associate Professor, ECE Department, ELEN, Patancheru, India. *A Secured Approach for Authentication System using Fingerprint and Iris.*

[8.] Face Recognition using Principle Component Analysis Kyungnam Kim Department of Computer Science University of Maryland, College Park MD 20742, USA.

[9.] V. Shiv Naga Prasad University of Maryland shivnaga@cs.umd.edu *Justin Domke University of Maryland* domke@cs.umd.edu Gabor Filter Visualization

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