ATM security based on Iris Recognition

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Abstract -   *Security system is the major aspect of today's life. Security systems growing up, Iris recognition is emerging as one of the important methods of biometrics-based identification systems. Biometrics systems have significantly improved person identification and authentication, playing an important role in personal, national, and global security. Nowadays iris recognition is getting more popular in many areas of security, in hospitals to detect disease (fault in eye).Iris pattern is more stable with ages , correctness and acceptability, uniqueness are major features of iris pattern. Due to its high reliability and nearby perfect recognition rates, iris recognition is used in high security areas. This project basically explains advantages of iris recognition system over traditional biometric systems along security techniques used for ATM. In this project ARM7 processor is used to communicate with computer and laptop, matlab software is used for iris detection , webcam is used to capture images , for connecting kit to computer and for sending command DB9 connector is used with serial to USB convertor .*

*Keywords***: ATM security system, iris recognition, Biometric, circular Hough transform, feature extraction, feature mapping, Image Enhancement, Histogram equalization.**

1. INTRODUCTION

For the traditional ATM system customer recognition systems depend only on bank cards and passwords. For solving the bugs of traditional ones, the designs a new ATM terminal recognition system is designed. By using biometric system we can ensure the secure, safe, and improved system for banking. The iris recognition systems have recently shown very high accuracies in verifying an individual's identity. For Iris detection of person we can split this method into following parts which are: Image acquisition, segmentation, encoding and matching. The results of this system are very efficient for ATM transactions. This project helps for maximum security for the ATM users. This project will detect the iris of the user and allows the person to make transactions. By using matlab software we are able to detect the human iris and allows person for the transaction and send the message automatically to authorized person. It consist of a generated OTP and other banking details. After verification of correct OTP which customer will use for banking operation. After particular banking operation provided OTP is not used then if person wishes to do other banking operation will receive another OTP. This system provides high security access for banking and also to ensure security for ATM.
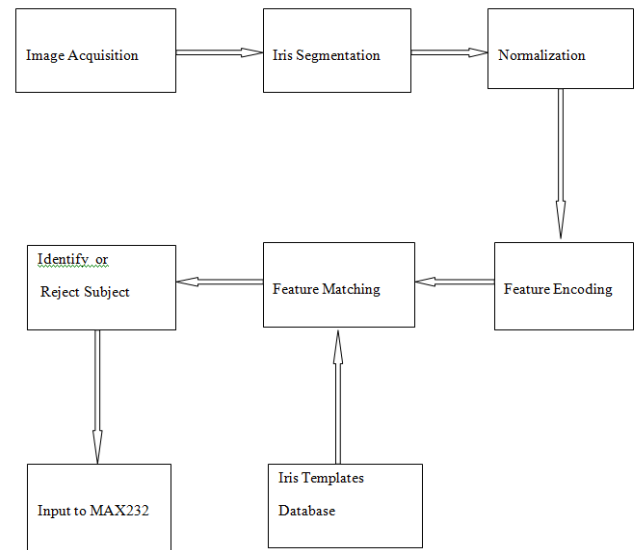
1.1 Software design

Fig1.Steps for Iris recognition

Here we have attempt to implement algorithm in matlab software. The first step is to capture the images of iris using high resolution camera and then took one image as test image. This image should represent iris and pupil clearly. Image then converted to gray image and also to size [256,256] for performing operations on to it. Then edge detection technique is used to detect iris boundary and vertical gradient technique is used to avoid influence of eyelids and etc. to remove the eyelids from the detected image threshold is used. Then noise iris image can be used for further use. The circular Hough transform can be employed to speculate the radius and centre coordinates of the pupil and iris regions. From the edge map, votes are cast in Hough space for the parameters of circles passing through each edge point, the iris region is normalized so that it has fixed dimensions in order to allow comparisons. The centre of the pupil was presumed as the context point, and radial vectors pass through the iris region.

Feature encoding was implemented by convolving the Normalized iris pattern with 1D Log-Gabor wavelet. A Gabor filter is built by modulating a sine/cosine wave with a Gaussian. This is capable to supply the optimum composite localization in both space and frequency, since a sine wave is perfectly localized in frequency, but not localized in space. Disintegration of a signal is done using a quadrature pair of

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Gabor filters, with a real part specified by a cosine modulated by a Gaussian, and an imaginary part specified by a sine modulated by a Gaussian. The real and imaginary filters are also known as the even symmetric and odd symmetric elements respectively. The centre repetition of the omission is specified by the repetition of the sine/cosine wave, and the bandwidth of the filter is specified by the width of the Gaussian. Using real and imaginary values, the phase information is extracted and encoded in a binary pattern in coding the image function can display 8- bit images directly without converting them to double precision. The color elements of an 8-bit RGB image are integers in the range [0, 255].

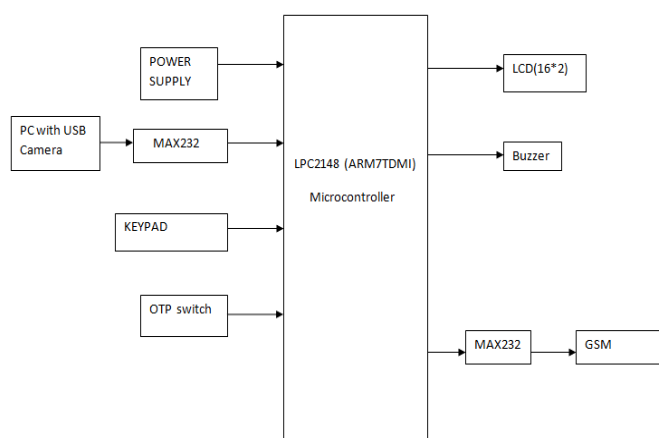## 1.2 Hardware Design

Fig2. System block diagram

In this part we have described the circuit component their details and use in the kit. Components used are as follows:-

1) Microcontroller:

Microcontroller is used to for processing and controlling the system. LPC2148 is the widely used IC from ARM-7 family. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer. Peripheral consist of LCD, reset button, UART ports serial interfacing ports, oscillator.

2) Power supply:

This section introduces power supply specification, functions and component. Typical power supply consist filters, rectifiers and voltage regulator. The power from a wall outlet is high voltage AC. Function of power supply are convert AC to DC ,provide DC voltage to the components ,provide cooling and facilitate air flow through the case

3) Webcam:

Webcam is used to get picture of iris. Iris recognition is an automated method of biometric identification that uses mathematical pattern-recognition techniques on images of one or both of the irises of an individual's eyes, whose complex patterns are unique, stable. Camera used in project is a high quality resolution 25 Megapixels, angle of view: 58 , focus range is 4cm and above image sensor used is CMOS.

4) DC Motor:

We have used DC motor to show locking of door when unauthorized person or thief is detected. DC motor converts electrical energy into mechanical energy and rotation of motor. The most common types rely on the forces produced by magnetic fields. Specification of motor used is 5v, 11600rpm, diameter 1.56cm.

5) Buzzer:

Use of buzzer in this project is to alert about thief or unauthorized person. These buzzers are offered in lightweight compact sizes from the smallest diameter of 12mm to large Pezos electric sounders. Today, piezoelectric sound components are used in many ways such as home appliances, OA equipment, audio equipment telephones, etc.

2. SYSTEM WORKFLOW

1. Start.

2. Initialize ARM board, and peripherals.

3. Capture live iris image and compare it database image.

4. If iris does not match with in 3 try alert message is send to Bank manager.

5. If OTP not sent automatically press OTP switch to resend.

6. Enter received OTP for further ATM transaction.

7. If entered OTP is wrong with more than 2 try it will send alert message to register number.

8. If OTP match further transaction will be proceed.

9. ATM transaction options: cash withdrawal, balance enquiry, deposit cash.

10. For each particular operation client need to follow step from 3 to 8.

11. Display the action performed on LCD.

12. Stop.

3. CONCLUSIONS

This project will be very much useful in providing advanced high end security and also problems such as carrying card etc will be avoided.

1. It offers high security from unauthorized person.

2. Verification time is generally less than 5 seconds.

3. Iris pattern and structure exhibit long-term stability.

4. This type of system can be used in various security systems.

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