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HIGHLY SECURED LOCKER SYSTEM BASED ON BIOMETRIC IDENTIFICATION

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Abstract: The main goal of this project is to design and implement a lockers security system based on Biometric and GSM technology, which provide a secure, authentic and user-friendly mechanism for operating safety lockers. Bank locker security is most important for the safety of the valuables. Present day bank security systems deploy mechanical key method wherein a user possesses one of the two keys whereas an authorized bank official possesses the other. Improvement towards the current model that relies heavily on the key of the user is proposed which helps in the functioning of the locker with biometric and secret code (password) [1]. In this system first person enroll username and password and mobile number. If username and password matches then. The finger of person will detect and store with id .If the id gets matches. Then four digit code will send on authorized person mobile through GSM modem and by punching the code lockers will be open[2]. So biometric and GSM security is more advantages than other system. This system can also create a log containing check in and checkout of each user along with basic information.

Key Words: Authentication, ARM, Bio-metrics, Fingerprint, GSM, Lockers, Security.

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INTRODUCTION

The safety locker is a convenient way provided by the financial institution or the bank to place the valuable belongings and documents of the user. This system operates using the concept of dual keys - one provided to the user and the other held by the branch official.[1]

This conventional method has many drawbacks such as**:**

1. Both user and the bank official must have to present with the keys to open the locker.
2. There is possibility of losing the key which makes the system insecure.
3. The keys can be duplicated.
4. The system is unable to match with today fast pacing digital world.

Due to the above mentioned drawbacks, a need has arose to develop a more secure, reliable and faster technique which would overcome the drawbacks and provide full security to the customer.

So I am proposing a locker system based biometric and GSM technology which provide more security then traditional system[2][8]. So we will discuss about biometric and GSM technology. A biometric system is essentially a pattern recognition system that recognizes a person based on a feature vector derived from a specific physiological or behavioral characteristic. The behavioral characteristic include signature, gait, speech these character are changer with age and environment. Physiological characteristic include fingerprint, face and iris etc[3][7]. This character is remaining unchanged through life of person .so because of this reason we are using physiological biometric parameter. Biometrics measure individual's unique physical or behavioral characteristics to recognize or authenticate their identity [4]. Biometric system is operates in verification mode or identification mode in the verification mode the system validates person's identity by comparing the captured biometric template which is pre-stored in the system data base. In the identification the system recognition an individual by searching entire template data base for match. And the system is perform one to many comparisons to establish the individual identity or fails if the subject is not enrolled in the system data base. so in our project we are using fingerprint and face biometric security.

Global system for mobile communication is mainly used for sending or receiving data such as voice and message. In our security system GSM plays important role through GSM the use of GSM the user will receive random number .This random number can be a password can be used as another security for system. The three stages of biometric system are shown below [2].
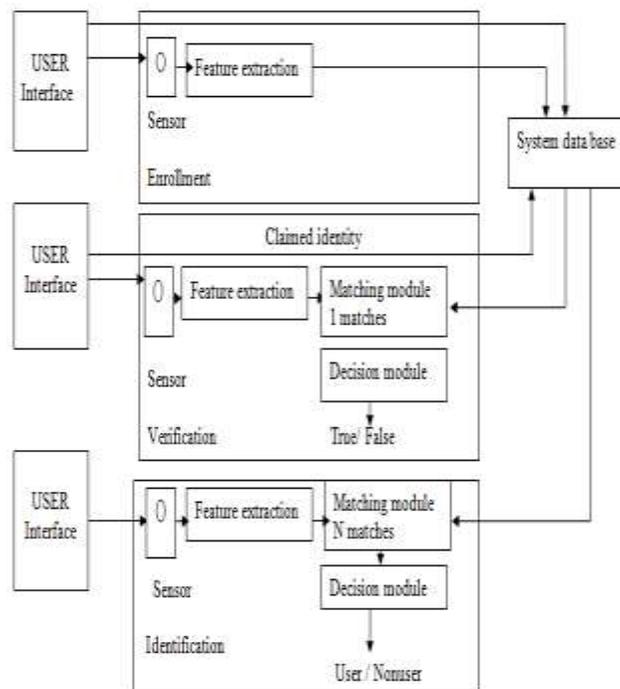
Fig 1: Three Stages of Biometric System

II.PROPOSED SYSTEM

In our proposed system first the user will enrol his user name, password and his mobile number in the system database through system software then the person will put finger on finger print module finger print will be scan and store with finger id . In this way user will enrolment process will be completed[2][8]. Then user will perform login operation during login operation user will first enter user name and password if it is correct then finger print will be scan. if fingerprint get matched with pre-stored fingerprint template then LCD will show mobile number of the user which entered during enrolment ,then code will send on persons mobile through GSM. And user will punch the code through keypad if the code get match then led will be blink or lockers will be open[5]. And LCD will show message access granted.

III. BLOCK DIAGRAM

Block diagram of system is shown in Fig2.The whole system designed around the ARM 7(LPC2148) microcontroller, which is interface to PC, fingerprint module, GSM modem, LCD, locker and buzzer. These entire components used in system are described below:
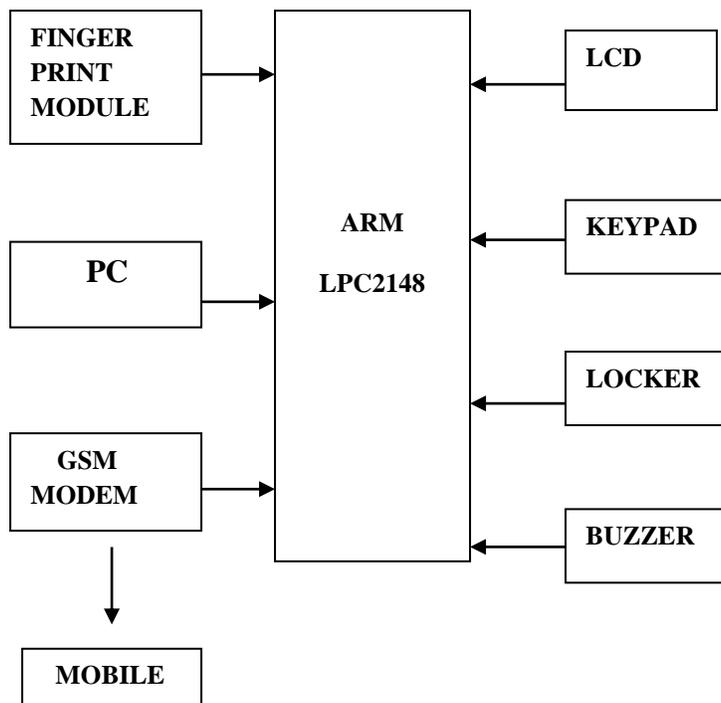
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Fig 2: Block Diagram of Biometric and GSM Based Lockers Security

1. Fingerprint Module:

In our project we are using R305 finger-print module. The user can store the finger print data in the module with id and can configure it in 1:1 or 1: N (matching module) mode for identifying the person. It is having FAR value is <0.001% .and FRR value is <0.1%. Low power consumption, low cost, small size, excellent performance. Good image processing capabilities and can successfully capture image up to resolution 500 dpi.

2. ARM(LPC2148):

Arm Microcontroller is the heart of the system.16-bit/32-bit ARM7 TDMI-S microcontroller in a tiny LQFP64 package. 40 kB of on-chip static RAM and 512 kB of on-chip flash memory. It offers high performance small size low power. It has two UARTs, UART0 & UART1.UART0 interface to PC using serial cable.

3. LCD:

The LPC2148 board is included with 4 bit LCD (HD44780U). The board which we used is a 16*2 character LCD display. LCD is used to display message access granted, access denied and when lockers will be open and close.

4. Buzzer:

Buzzer is connected to P0.11 of LPC2148 microcontroller Logic '1' on P0.11 will turn ON buzzer. The buzzer will be beep when lockers is open and when lockers is not open.

5. Keypad:

We used 4*4 hex keypad. It will use to punch received code into the system.

6. GSM Modem(SIM900A):

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine.SIM900A, works on EGSM900/ DCS1800.

TheSIM900A can search the 2 frequency bands automatically. Supports AT commands. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). The baud rate is configurable from 9600-115200 through AT command.

IV. SOFTWARE DESCRIPTION

We have created a java application from which user will login. The application is connected to MySQL server and database. At the time of registration user information will be stored into the database through java application. Database contains users basic information Name, account number, mobile number, locker no., finger id etc We can use   MySQL server   in online mode and in offline mode also.

The java application is developed in NetBeans IDE 7.2.1.NetBeans is a software development platform written in Java. The NetBeans Platform allows applications to be developed from a set of modular software components called modules. The NetBeans IDE is primarily intended for development in Java, but also supports other languages, in particular PHP, C/C++ and HTML5. For application development we use java swing GUI class. When user successfully login through application then its finger print is stored in fingerprint module and its finger id will stored in database of system. The communication between system application and fingerprint module is done through ARM kit. To programmed the ARM controller(LPC2148),we use Keil uVision4 IDE , The Keil software is a compiler and debugger use to compile C code, assemble assembly source files, link and locate object modules and libraries, create HEX files, and debug your target program. Flash magic is used to dump the hex file in to the microcontroller.

V. FLOW CHART

The flow chart of system is shown in fig.3
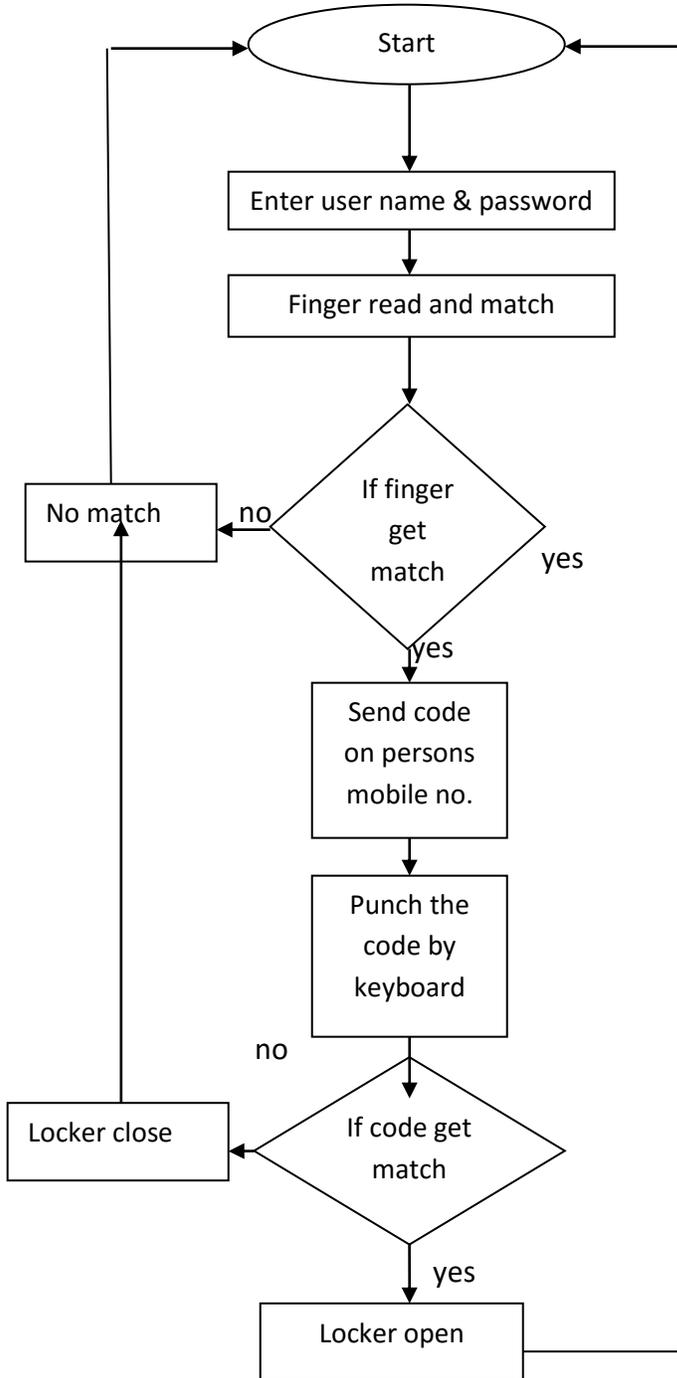
VI. RESULTS

Before using system, make sure that all system setup has done according to block diagram. When we initialise/start the system LCD show message "Biometric authentication system" and system application shows login page, which is connected to MySQL server, as shown below:
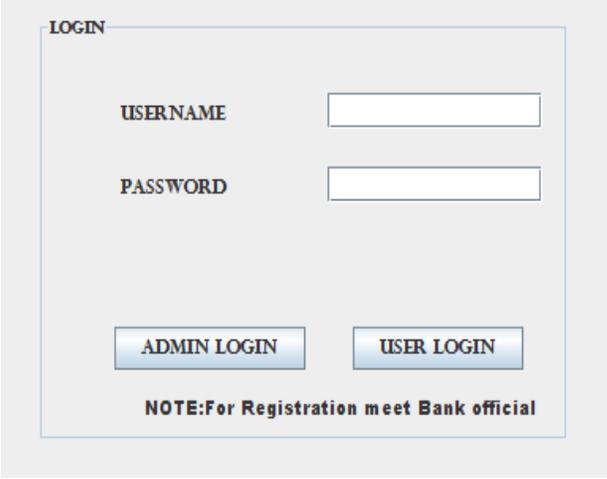

Fig4: Login page

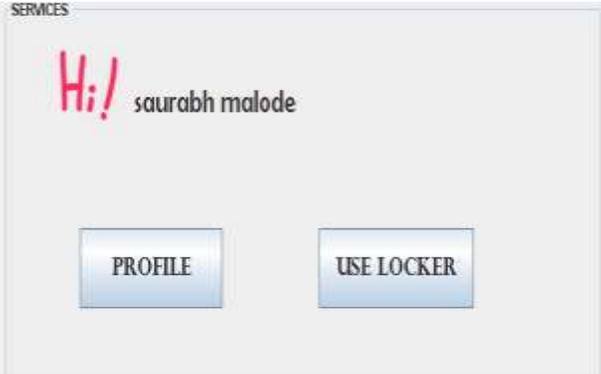After entering the user name and password, new window will be open which showed below:

Fig 5: User profile

When user click on use locker button then system will ask for finger print, then user has to keep his finger on finger scanner if finger of the user match with the template fingerprint image, which generate at the time of registration then OTP (code) will be sent on user's mobile no. then user has punch this OTP in locker system through keypad, if code get match then users locker will open.

VII. ADVANTAGES

- Efficient way of evacuation of bank.
- Less time delay and Quick response time.
- Fully automated system.
- Robust system, low power requirement.

VIII. CONCLUSION

Finger print and GSM security system will provide higher security than existing system. This proposed model which when implemented would surely give a very good protection of the lockers curbing theft and making the lockers more reliable. The assurance it will give to the bank customers will force them to use it and hence protect their valuables from theft or any kind of robbery. The reliability of the bank safety locker system is therefore improved with the help of the proposed model in addition to achieving a dual tier authentication model for the bank safety lockers.

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