

Advanced Security System for Bank Lockers Using Biometric and GSM

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ABSTRACT - The main goal of this project is to design a Advanced security system for bank locker using Biometric and GSM technology, which provide a secure, authentic and user-friendly mechanism for operating safety lockers. This can be organized in bank, offices and homes. Bank locker is safest place for the valuables. But Present day bank security systems use mechanical key method wherein a user possesses one of the two keys whereas an authorized bank official possesses the other. This method has following Drawbacks

- i. Both the bank employees and user must have to present with the keys to open the locker.
- ii. There is possibility of losing the key which makes the system insecure.
- iii. The keys can be duplicated.
- iv. The system is unable to match with today fast pacing digital world.

Improvement to this we proposed advanced Security system for bank lockers using biometric and GSM. In this system first person enroll finger, username, password and mobile number. While login user has to enter username and password

First, If username and password matches then. The finger of person will detect and match with stored finger .If the finger gets matches. Then four digit code will send on authorized person mobile through GSM modem and by punching the code into locker ,this will be open the locker . So biometric and GSM security is more advance and secure than conventional system. This system can also create a log containing check in and checkout of each user along with basic information [1].

Keywords: Security System, Authentication, ARM, Biometrics, Fingerprint, GSM, Lockers, Security.

1. INTRODUCTION

In this present age, safety has becomes an essential issue for most of the people especially in the rural and urban areas. Some people will try to cheat or steal the property which may endanger the safety of money in the bank, house, and office. To overcome the security threat, a most of people will install bunch of locks or alarm system. There are many types of alarm systems

available in the market which utilizes different types of sensor. The sensor can detect different types of changes occur in the surrounding and the changes will be processed to be given out a alert according to the pre-set value. By the same time this system may not be good for all the time. In this paper we have implemented safety of the money in the bank locker, house, and office (treasury) by using Biometric and GSM technology which will be more secure than other systems[4]. The word "biometrics" comes from the Greek language and is derived from the words bio (life) and metric (to measure). Biometric systems use a person's physical characteristics (like fingerprints, irises or veins), or behavioral characteristics (like voice, handwriting or typing rhythm) to determine their identity or to confirm that they are who they claim to be. Biometric data are highly unique to each individual, easily obtainable non-intrusively, time invariant (no significant changes over a period of time) and distinguishable by humans without much special training. Enrollment and authentication are the two primary processes involved in a biometric security system. During enrollment, biometric measurements are captured from a subject and related information from the raw measurements

is gleaned by the feature extractor, and this information is stored on the database. During authentication, biometric information is detected and compared against the database through pattern recognition techniques that involve a feature extractor and a biometric matcher working in cascade. [3]

2. 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 OTP will be send on mobile number of the user which entered during enrolment through GSM .Then 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.

3. HARDWARE DESIGN

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:

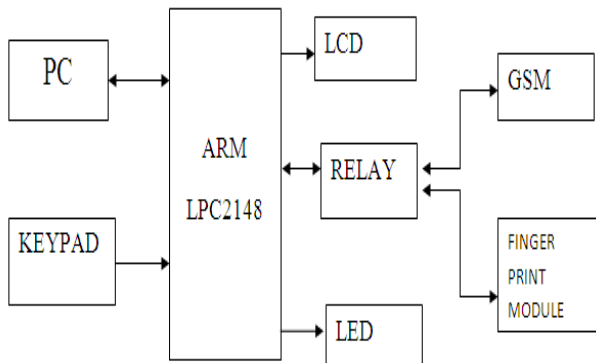


Fig2: Block Diagram of Advances security System for bank locker using Biometric and GSM

3.1 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.

3.2 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.

3.3 Keypad:

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

3.4 GSM Modem(SIM900A):

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

The SIM900A 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.

3.5 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.

4. SOFTWARE DESIGN

We have created a GUI using java language from which user will login. The application is connected to Apache Derby 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 Apache Derby server in online mode and in offline mode also[1].

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.

5. FLOW CHART

The flowchart clearly explains the working of the project. Firstly user enter username and password in GUI application .then the finger of user is match with stored finger if it get match then OTP is send on users mobile number then user will enter OTP into the locker if it get match then locker will be open.[1][2]

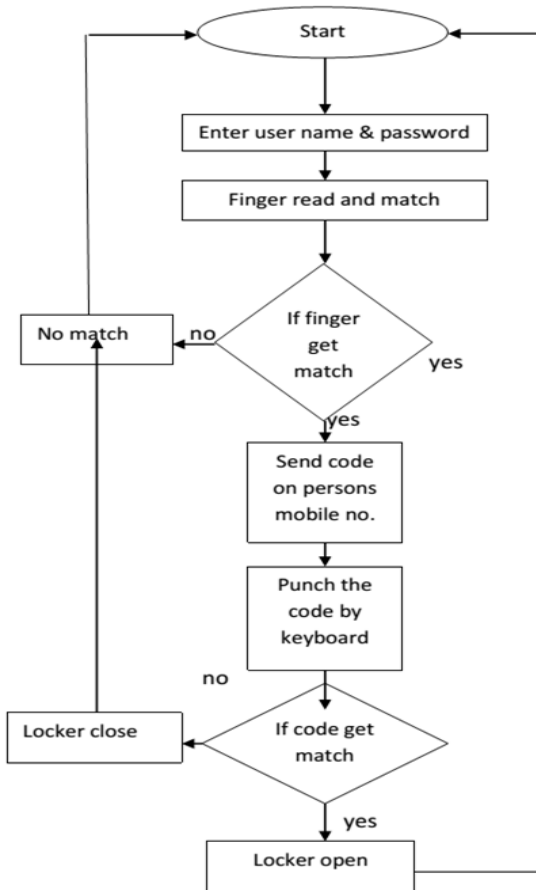


Fig3: Flow chart of System

6. RESULTS

6.1 Login Procedure:

When we start the system LCD show message “Welcome to Biometric system” and GUI application shows login page, which is connected to Apache Derby server and database shown below:

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

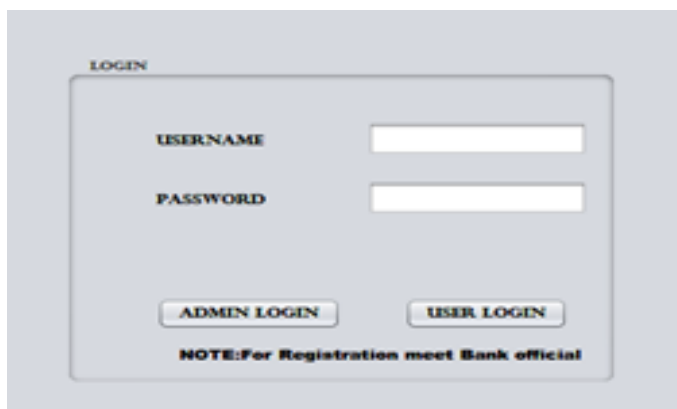


Fig4: Login page



Fig5: 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.

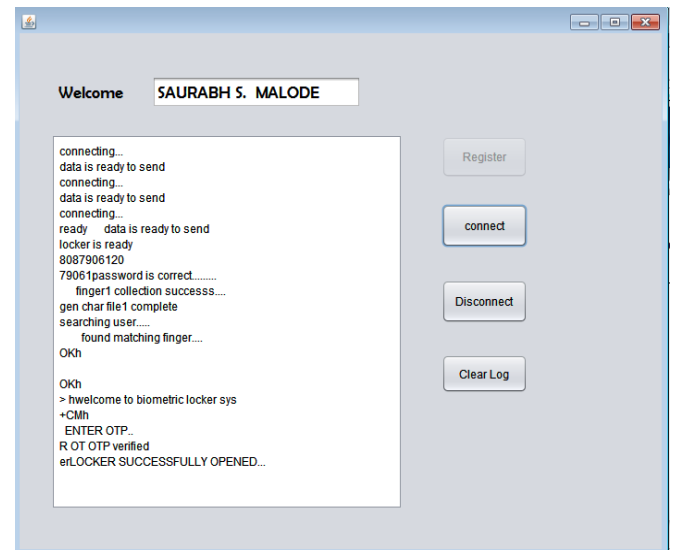


Fig6: Locker Use Screen

6.2 Registration procedure:

While registration the bank official open login into admin account. After login this screen will display



Fig7: Admin account

From admin can register new user ,update user account, delete user account ,generate report .

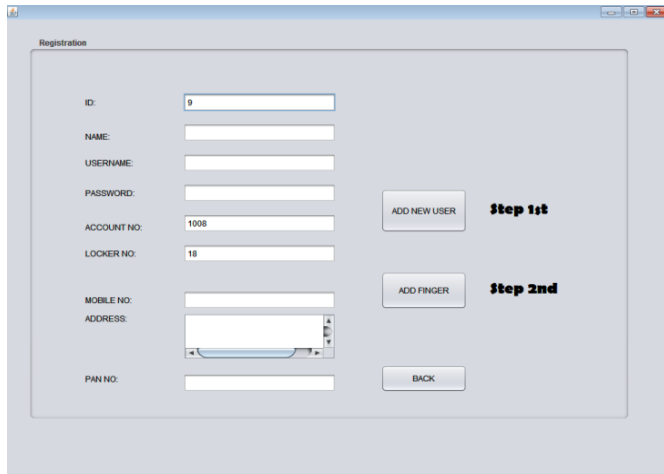


Fig8: Registration screen

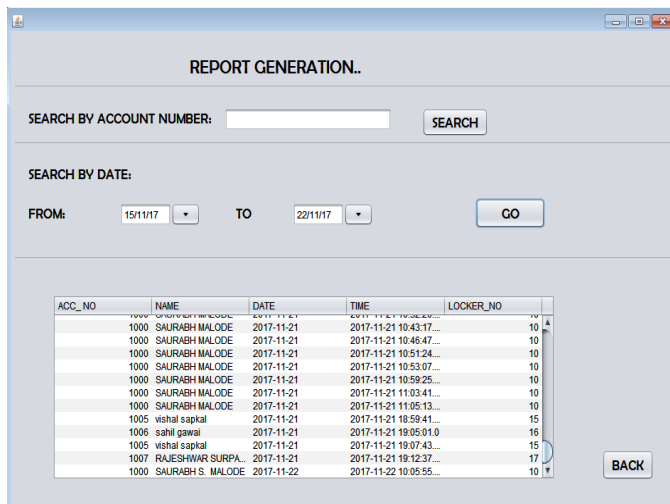


Fig9: Report generation screen

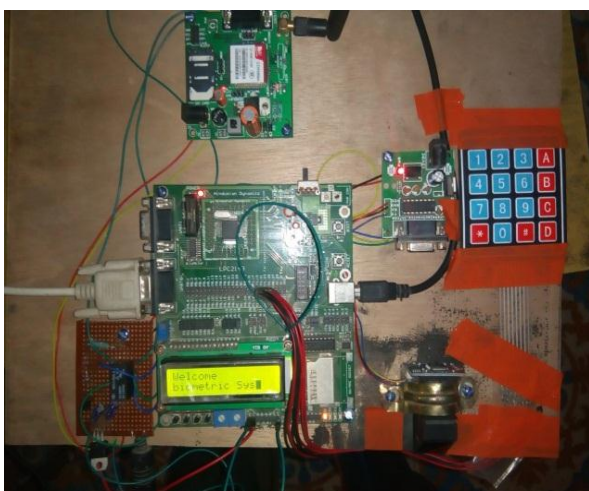


Fig10: Hardware implementation of advanced security system for bank lockers

7. ADVANTAGES

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

8. APPLICATION

- Bank lockers use : provide a secure, authentic and user-friendly mechanism for operating safety lockers and ensure the safety of the valuables.
- ATM Machine use: Most of the leading banks have been experimenting with biometrics for ATM machine use and as a general means of combating card fraud.
- Workstation and network access: Many are viewing this as the application, which will provide critical mass for the biometric industry and create the transition between sci-fi device to regular systems component, thus raising public awareness and lowering resistance to the use of biometrics in general.
- Travel and tourism: There are multi-application cards for travellers which, incorporating a biometric, would enable them to participate in various frequent flyer and border control systems as well as paying for their air ticket, hotel room, hire care etc.
- Many telesales and call center managers have pondered the use of biometrics

9. CONCLUSION

Finger print and GSM security system will provide higher security than existing system. The design system 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.

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