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Door Phone Embedded System for Voice and Finger print Based User Identification and Verification Platform

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Abstract - ***Recent days security systems plays a crucial role at many places like banks, industries etc .There are many banks using authorize access control approach to prevent the locker room from unauthorized access. In this project highly reliable, multi level and most efficient locker room security system has been designed. A Multi Layer Bank Security System is a system for validating, monitoring and controlling the security at bank locker rooms. The system includes a biometric system, i.e. a fingerprint scanner, which is responsible for the security at the main door of the locker room and also voice recognition module v2 which is responsible for the security at 1st door of the lock room the and also includes RFID system to provide access of the locker room area to only authorize people.***

Keywords—*finger print scanner (Biometric system), RFID, voice recognition module V2 , GSM.*

1. INTRODUCTION

The main aim of this project is to provide high security to the vehicles with the help of advance technologies like RFID, GSM and voice recognition technology. In present days Security is primary concern for everyone at everywhere, we have various security systems based on cost and object, to which we are using security systems .This project, gives the best solution to provide security for Homes, offices, ATMs and bank locker rooms

We have some security systems at present; none of them are providing complete solution to avoid theft or not restricting unauthorized entry completely. Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure, with these latest advanced technologies we are providing sophisticated security systems.

2. SYSTEM HARDWARE COMPONENTS

This section will illustrate us brief idea about the main components which are going to be used in this security system and their functionalities.

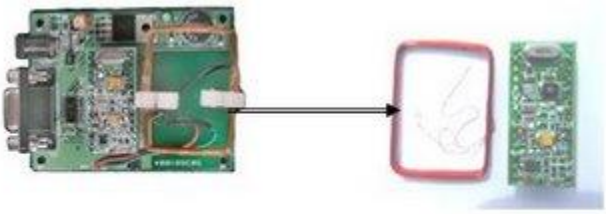
2.1 Lpc2148 micro controller

The LPC2141/42/44/46/48 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems.

2.2 RFID:

RFID stands for Radio Frequency Identification System which is an intelligent bar code technology. The advantage of RFID system over bar code technology is that it does not require line of sight. The RFID system supports a large number of unique IDs with additional data storage. Data in a RFID system can be changed and updated which provides it flexibility. The RFID system basically consist

two things, one is tag and other one is tag reader. Each tag has a unique 12 to 16 digit identification number. The tag reader is responsible for powering up and communicating with a tag. When the tag is placed on the tag reader, the reader captures the energy and reads the identification number and transfers it. The RFID system is further connected to the micro controller via the serial port.



RFID Module

Figure 1.RFID module

Figure 2.RFID tag

2.3 GSM

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.

GSM (Global System for Mobile communication) is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1,800 MHz frequency band. It supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).

2.4 VOICERECOGNITION MODULE V2

The module could recognize your voice. It receives configuration commands or responds through serial port interface. With this module, we can control the car or other electrical devices by voice. This module can store up to 15 pieces of voice instruction. Those 15 pieces are divided into 3 groups, with 5 in each group. First we should train the module with voice instructions group by group. After that, we should import one group before it could recognize the 5 voice instructions within that group. If we need to implement instructions in other groups, we should import the group first. This module is speaker dependent. If you trained the module, your friend might not be able to make it work.

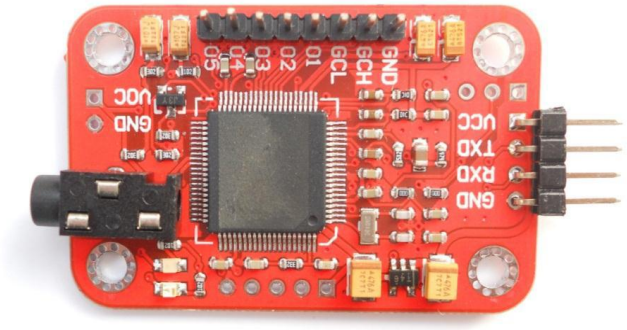


Figure 3.Voicerecognition moduleV2

2.5 FRINGERPRINT SCANNER

Figure 4.Fingerprint scanner

Operation Principle Fingerprint processing includes two parts: fingerprint enrollment and fingerprint matching (the matching can be 1:1 or 1:N). When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of

the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. For 1:1 matching, system will compare the live finger with specific template designated in the Module; for 1:N matching, or searching, system will search the whole finger library for the matching finger. In both circumstances, system will return the matching result, success or failure.

3. BLOCK DIAGRAM OF FIRSTDOOR

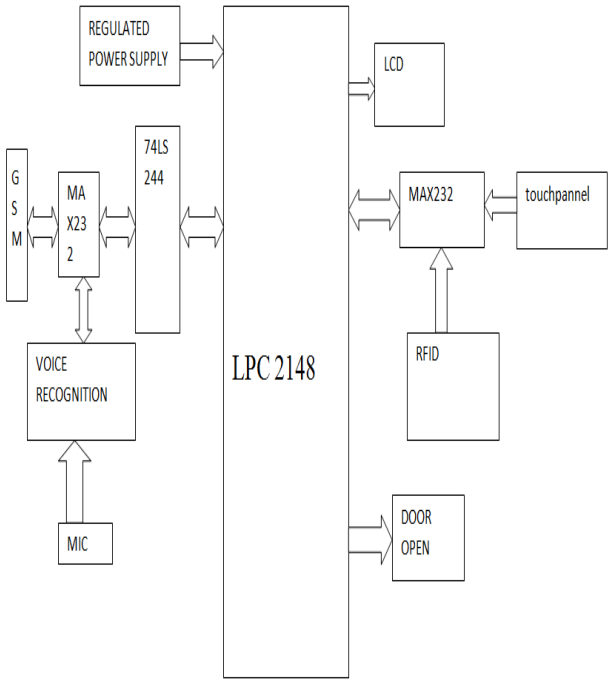


Figure 5.Block diagram of First door

In this we are providing three levels security system to make this system more secure using RFID, GSM and voice recognition, finger print methods.

In this system, RFID technology is used in level1 security layer, Authorized users will be given RFID tags which contains unique number, whenever user show his RFID tag near RFID reader, the unique number is read by reader and sends it to micro controller, then controller will decide whether that card is authorized or not by comparing card data with preload authorized users data, If it matches with authorized then only it allows for the next process.

After successful processing of security level 1, then it checks second level using GSM technology. If the RFID tag is authorized then it sends one time password to pre register mobile number with respective to RFID tag number, each user has different numbers. If the user has that mobile with him then only he can see that password and allowed to next level of security. is UART with default baud rate is 9600 bps ,and it is operated through AT commands

In the third level of security we are using voice recognition method, for this we are using Easy VR voice recognition module. We have to give the one time password (received to mobile) through voice commands,if it matches with that password then it gives the permission to access the system

4. BLOCK DIAGRAM OF MAIN DOOR

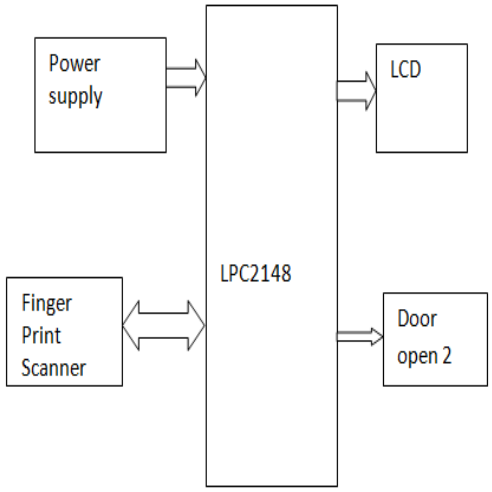


Figure 6.Block diagram of main door

The second system which is placed at the locker room entrance consist a biometric system. To open the gate of the locker room the person needs to get his/her fingerprints to be verified. When these two processes will complete, only then the locker room will be opened.

5. FLOW OF FIRST DOOR

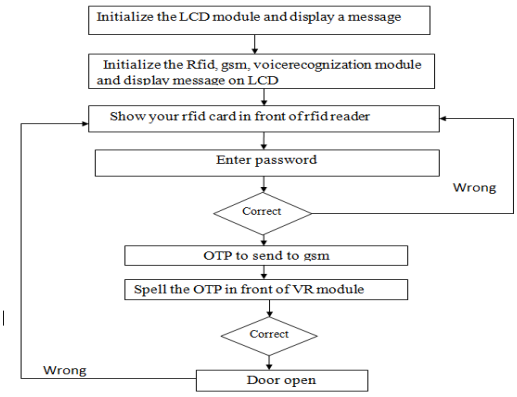


Figure 7.Flow of First Door

The below flow chart figure 4.3.describe the hardware design of the project. every user has a unique rfid card. when the person enter into the room at that time user swipe their rfid card in front of the rfid module and display a message on lcd enter the password. The user after enter the password , controller send OTP through gsm to the user mobile. If user get the password that password spell the in front of voice recognition module, password matches the door will be opened otherwise will not be opened

6. Flow of main door

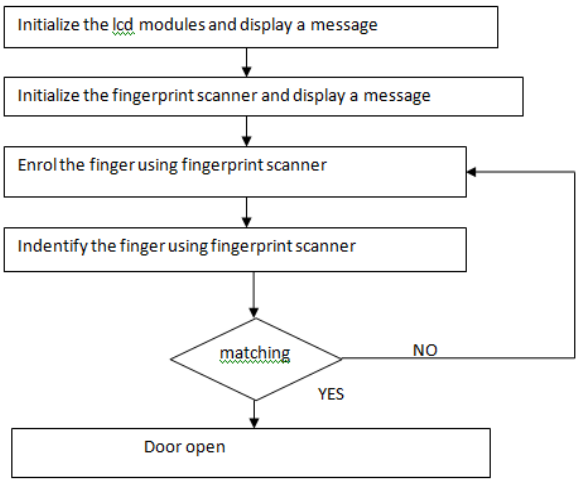


Figure 8.Flow of main door

The user enter into the main door at that time user enrol their fingers through fingerprint scanner, the scanner store the images, and user identify the finger at that time scanner compare their pre stored images. If finger print matches the door will be opened otherwise door will not be opened as shown in below figure 4.4

RESULTS

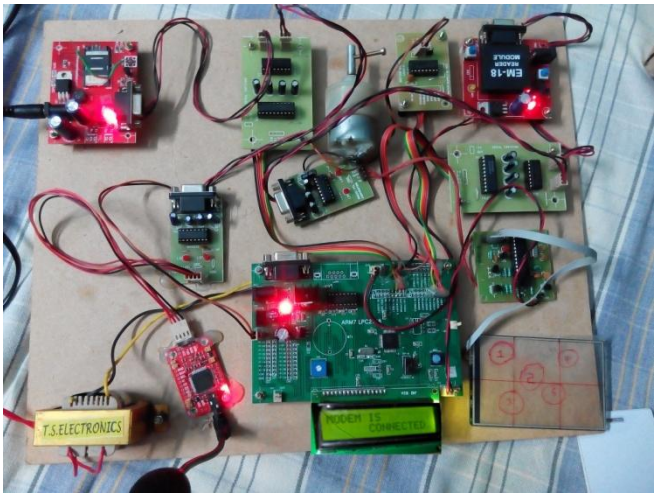


Figure 9.Hardware at First door

Figure 10.LCD displays A Message

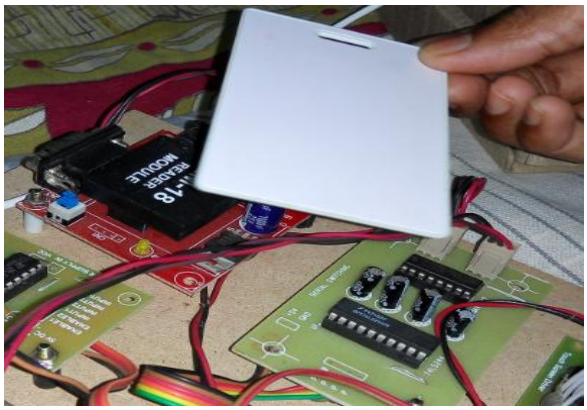


Figure 11.Showing RFID card in front of RFID Reader

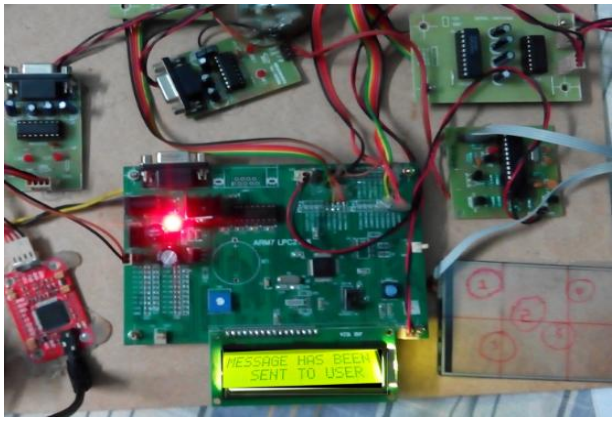


Figure 14 OTP sent to user Mobile

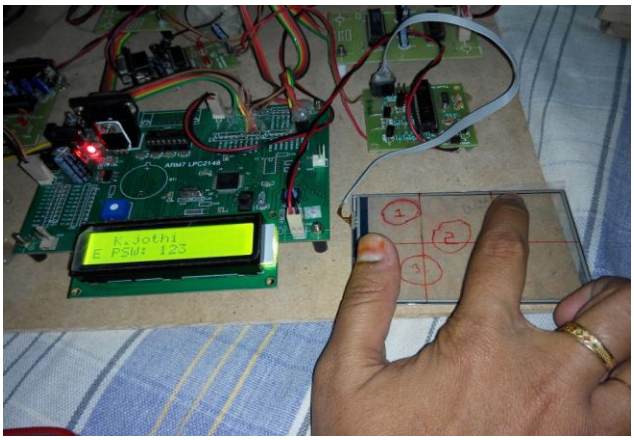


Figure 12.Enter password using touch panel

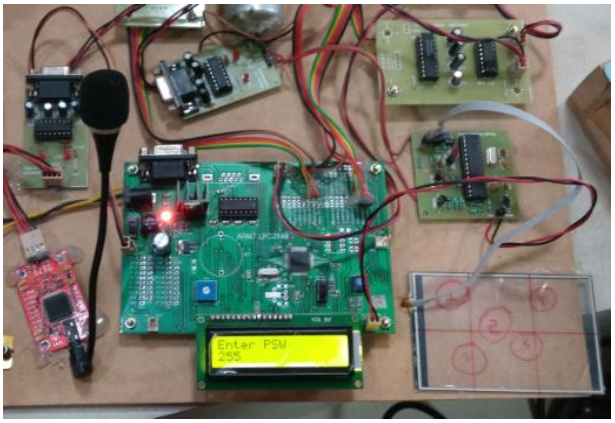


Figure 15 Entering OTP using V2 Module

Figure 13 if password is correct OTP generated

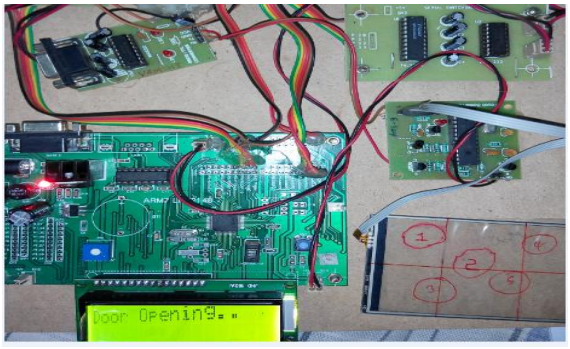


Figure 16 Door opening

Figure 17 LCD displays "Finger Print Security sys"

Figure 20.lcd displays ID of enrolling

Figure 18 LCD asks to put your finger and press the button

Figure 21.lcd displays successfully enrolled

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Figure 19 ENROLLING Finger Using Enrolling Button

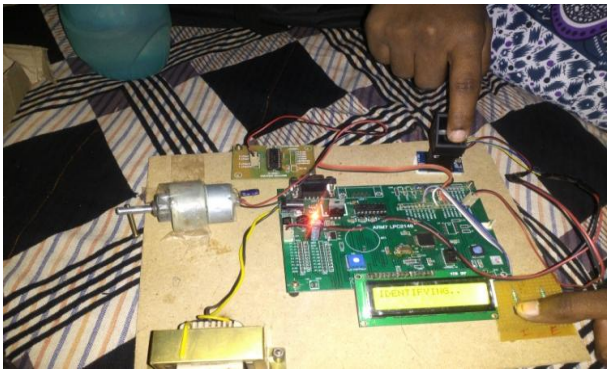

Figure22.Identifying the finger using identifying button

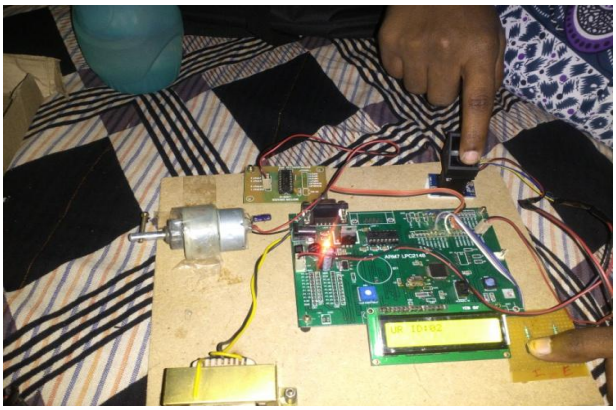

Figure 23.LCD displays ID of indentifying

7. Applications:

1. Home Security
2. Bank Locker Security
3. Missile Security
4. ATM security
5. Vehicle security

7.1 Advantages:

1. Highly secured
2. User friendly system
3. Completely restricts unauthorized entries

7.2 Disadvantages:

1. Cost is high
2. Processing time
3. It takes much time to give access to others in emergency situations

8. CONCLUSION

This paper presents a door phone embedded system and platform with speech and fingerprint technology support for recognition, identification, and verification. There was an emphasis on speech technology in nosy environments, including both software and hardware solutions .Bank locker room security is an emerging need throughout the world. In this paper we have designed two systems that allows unlocking a protected door. The paper has successfully presented a functional, low complexity microcontroller based low cost multi layer security system. The real life model of the prototype can be designed with minimum designing cost and with relatively low operational cost for bank locker rooms where high degree of security is required. In near future more number of security levels can be added for monitoring as well as control. The security can be used in other highly restricted areas also like private offices, laboratories etc.

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