

GSM Based Bank Locker Security System using RFID, Password and Fingerprint Technology

Hiloni S. Detroja

BE Student

*Department of Electronics & Communication Engineering
Dr. Subhash technical campus- Junagadh*

Prutha J. Vasoya

BE Student

*Department of Electronics & Communication Engineering
Dr. Subhash technical campus- Junagadh*

Disha D. Kotadiya

BE Student

*Department of Electronics & Communication Engineering
Dr. Subhash technical campus- Junagadh*

Prof. C. B. Bambhroliya

Assistant Professor

*Department of Electronics & Communication Engineering
Dr. Subhash technical campus- Junagadh*

Abstract

The main goal of this project is to design and implement a high security locker system based on RFID, fingerprint, password & GSM technology which can be organized in bank, secured offices and homes. In this system only authentic person can be recovered money from locker. Fingerprints are one of many forms of biometrics used to identify individuals and verify their identity. RFID is a means of identifying a person or object using a radio frequency transmission. In other words RFID is an electronic method of exchanging data over radio frequency waves the technology can be used to identify, track, detect wide variety of objects.

Keywords: RFID reader, GSM module, fingerprint scanner, keypad, 8052 microcontroller

I. INTRODUCTION

Due to increase in bank robbery and theft day by day, security at some places is very important. So the main aim of our project is to provide high security to the bank lockers, ATM, secured offices, jewellery showroom, research center, etc. The objective of this project is to design a low cost system that provides high security. It is a standalone system and also compact in size. It has low power consumption. Fingerprint verification is one of the most reliable personal identification methods in biometrics. This system consists of microcontroller, RFID reader, GSM modem, Fingerprint module, keypad, and LCD. RFID is an acronym for Radio Frequency Identification. In general terms, RFID is a means of identifying a person or object using a radio frequency transmission.

II. BLOCK DIAGRAM

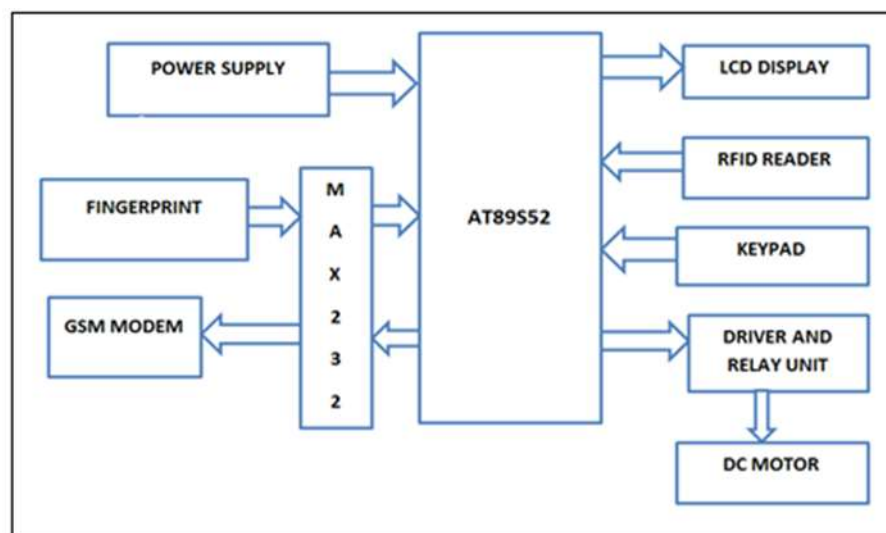


Fig. 1: block diagram of bank locker security system

As shown in block diagram we have used RFID, GSM, FINGERPRINT and PASSWORD technology. In this project first message is sent from a mobile to the GSM module, if it is verified then LCD will display "SMS verification ok". Then we can

enter password through keypad and if password is verified then, “password verification ok” will be displayed on LCD. Then we can access to RFID, RFID reader will read the id number from passive tag, then id number will be displayed on LCD and verification of RFID will complete. Then fingerprint will be scanned in fingerprint module if it will match then locker will open through dc motor and if fingerprint will not match then locker will remain close.

III. WORKING MODEL

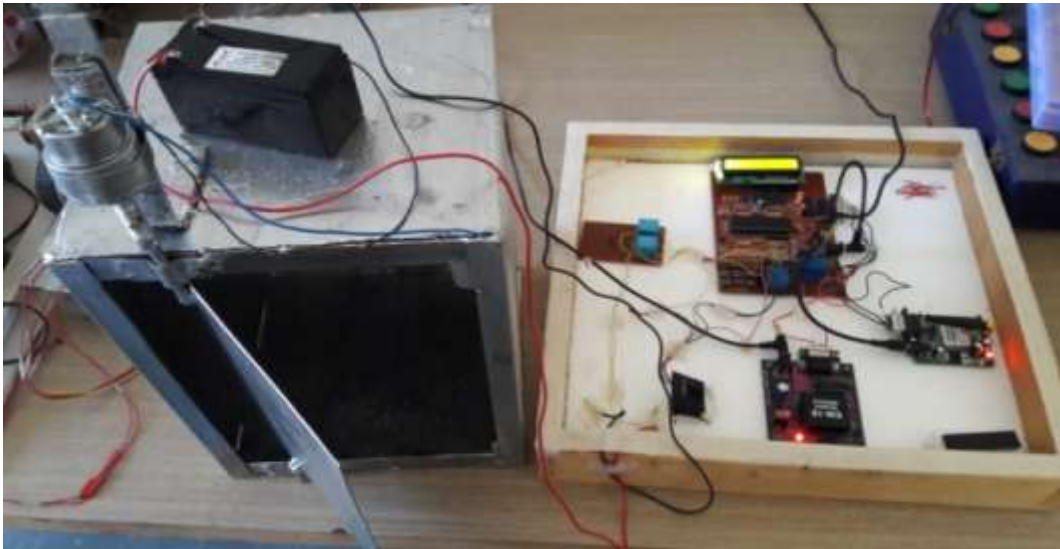


Fig. 2: working model of bank locker security system

As shown in figure when all verifications of GSM, RFID, PASSWORD, and FINGERPRINT is complete then locker will open

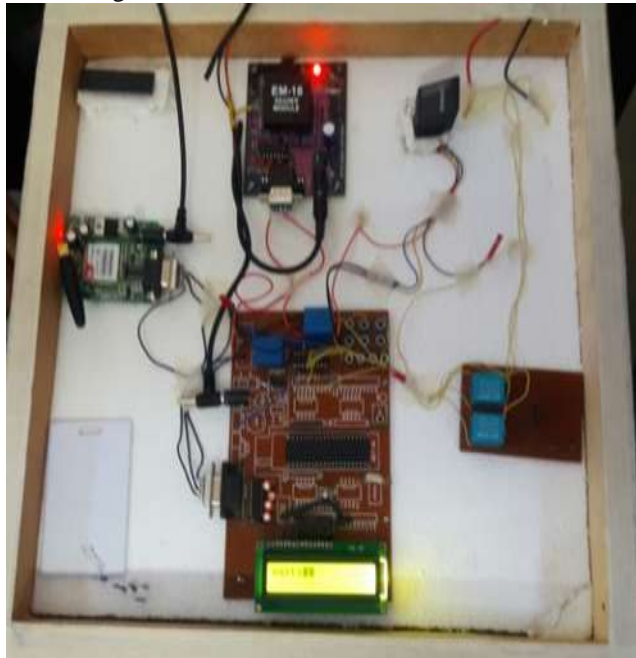


Fig. 3: Main Circuit



Fig. 4: locker

As shown in figure 3 and 4 shows interfacing of GSM, RFID , FINGERPRINT module. First SMS verification is done through GSM module then password is entered through keypad. Then after RFID and FINGERPRINT is verified and locker will open.

IV. HARDWARE & SOFTWARE

R305 Fingerprint Module:

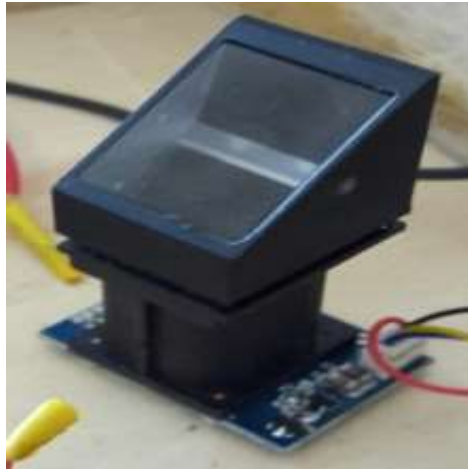


Fig. 5: R305 fingerprint module

Fingerprint scanner is low cost, low power consumption, small size, and excellent performance professional optical technology. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person. Good image processing capabilities can successfully capture image up to resolution 500 dpi.

SIM 900A GSM Module:



Fig. 6: SIM 900A GSM module

GSM (global system for mobile communications) is the technology that underpins most of the world's mobile phone networks. Its quad band is 850/900/1800/1900 MHz. it can communicate with controllers via AT commands.its operation temperature is – 40 to + 85 C.

EM-18 RFID Reader:



Fig. 7: EM- 18 RFID readers

This module directly connects to any microcontroller UART or through a RS232 converter to PC. Its operating frequency is 125 KHZ. It reads upto 10 cm. there is LED and buzzer for pass indication. RFID module has bridge rectifier and 5v voltage regulator so it can be powered by 9-12 V AC as well as 9 – 15 V DC adaptors.

DC motor 100RPM:



Fig. 8: DC motor 100RPM

It operates on 12V, 1 ampere battery. When voltage is given, centre shaft rotates clockwise and anticlockwise. When it rotates clockwise the locker will open and when it rotates anticlockwise locker will close.

AT89S52 microcontroller:-

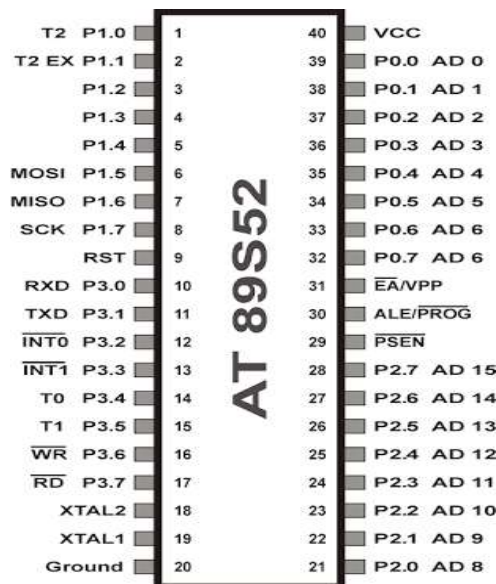


Fig. 9: AT89S52 IC

AT89S52 is a 8-bit, low power and high performance microcontroller. It has 8k bytes of internal programmable flash memory. ATMEL 89S52 has RAM of 256 bytes. It has three 16- bit timer/ counters. It can be erased and program to a maximum 1000 times.

Power Supply:

Here we required power sources to operate microcontroller, GSM module, RFID reader, Fingerprint as well as DC motor hence 9volt and 12volt using external battery with 1 ampere load current.

Software Coding:

For coding we have used keil software and we select keil uvision3 from their official website. We can easily test program in this.



Fig. 10: keil uvision3 software

Programming:

Very first we started the coding of microcontroller with LCD. And result shows in following screen.

A screenshot of the Keil uVision3 IDE showing a C program for an LCD. The code includes headers for `lcd.h` and `stdio.h`, and defines a `main` function that prints several strings to the LCD. The strings include "WELCOME TO THE", "PASSWORD", "FINGERPRINT", "RFID", "AND GSM", "SECURED OFFICE", "HOME", "AND JEWELLERY SHOP". The code uses `lcd_puts` and `lcd_puts2` functions to display the text on the LCD screen.

```
int main(void)
{
    lcd_data_puts("WELCOME TO THE");
    lcd_data_puts("PASSWORD");
    lcd_data_puts("FINGERPRINT");
    lcd_data_puts("RFID");
    lcd_data_puts("AND GSM");
    lcd_data_puts("SECURED OFFICE");
    lcd_data_puts("HOME");
    lcd_data_puts("AND JEWELLERY SHOP");
}

int main(void)
{
    lcd_puts("WELCOME TO THE");
    lcd_puts("PASSWORD");
    lcd_puts("FINGERPRINT");
    lcd_puts("RFID");
    lcd_puts("AND GSM");
    lcd_puts("SECURED OFFICE");
    lcd_puts("HOME");
    lcd_puts("AND JEWELLERY SHOP");
}
```

Fig. 11: snap shot of LCD coding

V. MERITS AND DEMERITS

- The main advantage of using RFID, FINGERPRINT, PASSWORD & GSM is more secure than other systems.
- Quick response time and low power consumption.
- Fully automated system.
- The main demerits of our project is that this can be only implemented for one locker. For other locker another bank locker security system is required.

VI. APPLICATION

- Banks
- Secured offices
- Home
- jewellery shop

VII. FUTURE SCOPE

We will develop security system based on Iris scanner for visual identification of the person.

VIII. CONCLUSION

We have implemented a locker security system using RFID, FINGERPRINT, PASSWORD and GSM. It is a low cost, low in power conception, compact in size and standalone system.

ACKNOWLEDGEMENT

We take an opportunity to acknowledge and extend our heartfelt gratitude to our guide and the pivot of this enterprise, Prof. Chetan B. Bambhroliya is most responsible for helping us to complete this work. He showed us different ways to approach the problems and the need to be persistent to accomplish our goal. His discernment in the choice of topic, his confidence in us when

we doubted ourself and his admirable guidance are some cogent reasons that make us aver that without his support this thesis would be a chimera. We are also thankful to Director, Head of Department of Electronics and Communication Engineering for cooperation and support to complete this work. we would also like to express our thanks to DSTC, JUNAGADH providing necessary facilities. We would also convey our thanks to HOD, staff members and lab technicians of Department of Electronics and Communication Engineering for their continues support.

REFERENCES

- [1] R .R .Gangi , s. sarma,” locker opening and closing system using RFID ,fingerprint, password and GSM, international journal of emerging trends & technology in computer science (ijettes). volume 2 ,issue 2,march-april 2013.. (pg no. 142 to 145)
- [2] D.V. kumar, prof. m r k murth, ”fingerprint based atm security by using arm7”,iosr journal of electronics and communication engineering. volume 2, no 5,octomber 2010.
- [3] S. S. Palsodkar, s. b. patil ,”bank locker security system using biometric and gsm technology”, international journal of electronics and communication engineering, volume 2,no 4,april 2015.
- [4] mary lourde r and dushyant khosla , ”fingerprint identification in biometric security systems” , international journal of computer and electrical engineering, vol. 2, no. 5, October 2010.
- [5] P. D. Kamble, Dr .Bharti, W. Gawali , “Fingerprint Verification of ATM Security System by Using Biometric and Hybridization”, International Journal of Scientific and Research Publications, Volume 2, Issue 11, November 2012.
- [6] Art Conklin1, Glenn Dietrich2, Diane Walz3, “Password-Based Authentication: A System Perspective”, Proceedings of the 37th Hawaii International Conference on System Sciences –2004.
- [7] Zhang Jinhai, Liu Xinjian , Chen Bo, “The design and implementation of ID Authentication System Based on Fingerprint Identification”, 2011 Fourth International Conference on Intelligent Computation Technology and Automation.

Conference Paper

- [8] N. kherna, a. verma “development of an intelligent system for bank security”, (department of electronics and communication engineering, amity university noida , india) 25-26 Septembser 2014, (pgno.319-322)