

## Intellectual Bank Locker Security System

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### ABSTRACT

In today's modern world, security plays an important role. Every person has precious accessories like gold, documents or cash. The main goal of this project is to design and implement a bank locker security system based on fingerprint and GSM technology. It reduces wastage of time for both banker as well as customer and provides advanced security. In this system, only authentic persons can recover money or accessories from bank locker. In this system the user's name, fingerprint and mobile number are enrolled. If the fingerprint matches, then four digit code will be sent to the authorized person's mobile through GSM modem and the locker door will be opened then, otherwise it will be in locked position and gives an alarm when any mismatch occurs. The sensors will be active during night times to provide security against thefts.

**Keywords:** Fingerprint, GSM, Microcontroller, PIR sensors, Vibration sensor.

### I. INTRODUCTION

In this present scenario, safety has become an essential issue for most of the people. Increase in anti social activities is a cause of concern as the banks are considered soft targets by criminal. Increasing incidence of crimes against banks has necessitated a serious re-look at the security arrangements and guidelines followed by the banks. The prevailing crime scenario demands compatible, efficient and reliable security and safety measures. In order to overcome this type of frauds, authentication of the person who wants to use the locker is very important. In the ubiquitous network society, where individuals can easily access their information anytime and anywhere, people are also faced with the risk that others can easily access the same information anytime and anywhere. Because of this risk, personal identification technology, which can distinguish between registered legitimate users and imposters, is now generating interest.

Currently, passwords, Personal Identification Numbers or identification cards are used for personal identification. However, cards can be stolen, and passwords and numbers can be guessed or forgotten. To provide perfect security and to make our work easier, we are taking the help of two different technologies viz. embedded systems and biometrics. To solve these problems, biometric authentication technology which identifies people by their unique biological information is attracting attention. Biometrics can be defined as recognizing and identifying a person based on physiological or behavioral characteristics. Biometrics commonly

includes fingerprint, face, iris, voice, signature, and geometry recognition and verification.

In this project, we provide two level security by fingerprint authentication and GSM. GSM provide one time password which changes for every access and gives high security. By this two level automated security system we can not only provide security but also save the time of both banker and the customer.

### II. RELATED WORKS

In this section some related works are discussed below. In most of the banks, the locker systems involve manual lock. The major drawbacks of such manual lock systems are lack of security and the waiting time of the customers. This can be overcome by automatic locker system. There are many techniques in which this can be implemented. In our project we are using fingerprint and GSM technology.

#### 2.1 Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit micro controller. It provides a highly flexible and cost-effective solution to many embedded control applications. It has 256 bytes of internal RAM and 32 Programmable I/O Lines.

#### 2.2 Fingerprint

In this technology one's finger is the key i.e., one's fingerprints are used as the "PASSWORD" for identification and verification. Fingerprint technology was developed by Fujitsu to help combat the increasing incidence of financial fraud and forgery.

Among these biometric traits, fingerprint proves to be one of the best traits providing good mismatch ratio, highly accurate in terms of security and also reliable.

### 2.3 GSM

GSM (Global System for Mobile communications) is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the American continents use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated. The rarer 400 and 450 MHz frequency bands are assigned in some countries, where these frequencies were previously used for first-generation systems.

#### 2.3.1 GSM Advantages

GSM pioneered a low-cost, to the network carrier, alternative to voice calls, the Short message service which is now supported on other mobile standards as well.



Fig.(1): GSM

### 2.4 PIR sensors

A PIR-based motion detector is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically-activated lighting systems. They are called simply "PIR", or sometimes "PID", for "passive infrared detector".

### 2.5 IR sensors (IR LED pair)

In this IR LED pair, one LED is a transmitter IR LED and it will transmit infrared light which is not visible to human eye, and the other LED is a photo diode or IR receiver LED. When a person breaks the infrared beam, it triggers the alarm.



Fig.(2): IR LED pair

### 2.6 Vibration sensor

Vibration sensor is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge. The vibration sensor is placed on the locker door. It triggers the alarm when any pressure is applied on the locker to open it forcibly.

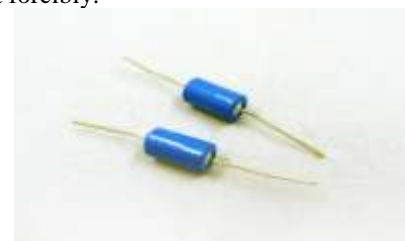


Fig.(3): Vibration sensor

## III. PROPOSED SYSTEM

### 3.1 Block Diagram

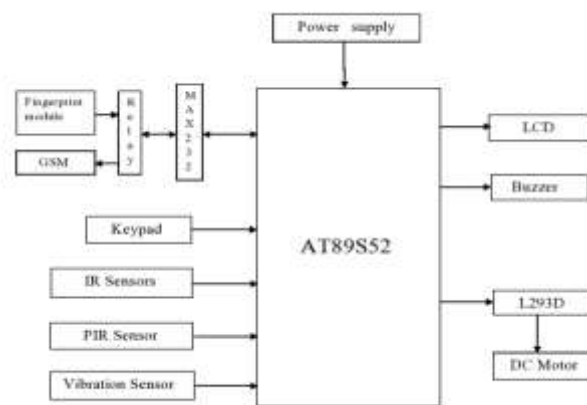


Fig.(4): Block diagram

#### 3.1.1 Block Diagram Description

The power required to the microcontroller (5V) is given through the power supply. MAX232 interfaces the microcontroller with fingerprint and GSM. Fingerprint and GSM modules are connected to MAX232 using relay. MAX232 converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. This reduces the complexity of the power supply design. The above diagram shows that various components like keypad, sensors, LCD, buzzer are connected to

microcontroller. The L293D driver provides the required power to the motor to open the locker door.

### 3.2 Working

1. Registration of the users is done by taking the required information of the user. The fingerprints used in authentication are taken and are stored in the database.
2. The primary authentication is done by using fingerprint i.e.; the fingerprint is matched with those in the database.
3. The further instructions are given clearly on the LCD display.
4. A Onetime password (OTP) is sent to the corresponding mobile number in the data base through GSM service.
5. Enter the OTP through the keypad.
6. The locker can be accessed after all the security checks are passed correctly and the locker door is opened automatically.
7. After the work has been completed if any key is pressed with help of keypad, the locker door will be closed.

NOTE: If any attempt is made to open the locker forcibly by applying external pressure, then the vibration sensor placed in locker sends an alarming sound.

PIR sensor and IR sensors are activated during night times to identify any person entering the premises. These also alert the security by an alarm sound. Here two sensors are used to reduce the false alarm.

### 3.3 Flow chart

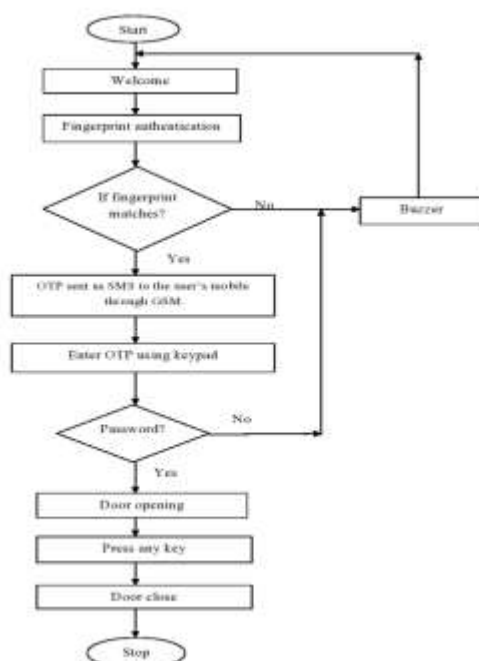


Fig.(5): Flow chart

### 3.4 SOFTWARE PROGRAM TESTING

The Keil software is a compiler and debugger use to compile C code, assembly source files, link and locate object modules and libraries, create HEX files, and debug your target program. The software program is written in c or assembly language and compiled using keil software. After compiler operation the hex code is generated and stored in the computer. The hex code of the program is burnt into the AT89S52 by using Top win Universal programmer.

### IV. ADVANTAGES

- Fully automated system.
- Easy to use and requires no special training or equipment.
- Fingerprint is unique for every person it cannot be imitated or fabricated. It is not same in the case of twins also. Thus gives a high level security.
- No need to remember passwords, or bring any identification cards.

### V. CONCLUSION

It can be concluded here that the system has been successfully implemented and the aim is achieved without any deviations. A step by step approach is used in designing the microcontroller based system for providing the security to the locker system. This project is mainly aimed at reducing banker's workload. Time is considerably saved by this automated bank locker system as there is no need for any authentication by the bank employee. We can also reduce larceny in banks by providing full security to it. This system can be applied mainly in banks and automatic door opening and locking systems. The limitation is that it can be used for specific purpose only. This concept can be extended further by using voice feedback system.

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