

Location Based Bank Locker Security System

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Abstract:-The main motive behind this work is to provide a better security solution to the existing secured vault. In today's unsafe world it is important to create some safer solution to transfer or store something valuable. Proposed system is intend to make a security vault which is far more secured than the current vaults available in the market. The vault is made secured using three levels of security system consists of Global Positioning System (GPS), fingerprint module and password protection. The idea behind this work is that the vault will open only in pre-determined GPS Coordinates. When it reaches the destination, the vault will open. So no one can open it during transit. On top of that the security system is enhanced with fingerprint and password protection.

Keywords: Aurdino mega, GPS module, GSM, matrix keypad, Atmega328p microcontroller, fingerprint scanner.

1. INTRODUCTION

The traditional ways utilized in security systems in varied sectors like banks, offices, houses etc. square measure mechanical key methodology or single secret methodology. These ancient ways are not totally secured. The proposed technique is enforced for bank locker security. Since olden days, lockers are the primary option to safeguard valuable things. This system will be of great help while transfer of cash from bank to bank or bank to ATM.

This system uses arduino mega board. This board feature serial communication interfaces, as well as USB on some models, for loading programs from personal computers. In order to perform the serial communication among three modules arduino mega board is used.

The Global Positioning System (GPS) may be a space-based navigation system that provides location and time information. In this system, GPS is the first layer of multi layer vault security system. Accuracy of Ublox NEO is about <2.5m. This layer helps to find out whether the location is predetermined location or not.

In this system 4x4 matrix keyboard is one of the layer among multilayer protection. Keypad module provides secret password protection. 4x4 keypad has numbers, alphabets (A, B, C, D), and special characters (*, #). Therefore password can be combination of numbers, alphabets and special characters. This combination makes complex password which is very difficult to guess.

A fingerprint sensor is device used to capture a digital image of the fingerprint pattern. At present fingerprint sensor is used in lot of places such as banks and industries for security purpose. In this paper fingerprint scanner is used to prevent illegal access of vault. R305 has scanning speed of 0.5s and verification speed of 0.3s. Storage capacity is about 250 images. False acceptance rate is 0.0001% and false rejection rate is 0.1%. R305 is the second layer of multi-layer vault security system. In order to find fingerprint match, enrolment of fingerprint should be done before.

GSM can accept any GSM network operator SIM card. Just like mobile phone it can be operated with unique number. The GSM can be used to send voice, SMS, GPRS and fax with low power consumption. GSM is used in various applications like security, sensor monitoring and SMS based remote control alerts. The message should be sent bank authority whenever there is an attempt to enter wrong password and dislocation of the vault can be found.

Arduino IDE is an Integrated Development Environment. Arduino software is a very flexible coding language. Using arduino IDE programs are successfully verified and dumped into arduino mega board. Libraries are available in the internet. Respected libraries for fingerprint sensor and GPS are added. Arduino IDE is a user friendly environment.

2. LITERATURE REVIEW

In [1], user will perform login operation. During login operation, face of person will be detected and finger print will be scanned. If the id is matched, then LCD will display mobile number of the user which was entered during enrolment. Then a secret code will be sent to user's mobile number through GSM. Then the user will punch the secret code through keypad. If the code matches, the locker will open with an LED indication. LCD will show message access granted.

In [2], when an authorized person inserts a locker key, at that moment microcontroller generates random password and sends it to the user mobile using GSM module. When user enters a password via key pad, the door can be opened. If the user enter correct password, then it will display that "Code is Correct- Access allowed".

In [4], low-cost fingerprint scanners designed for this environment are mainly thought to avoid the computer screen and passwords. Thus, one interesting experiment is to see whether they are suitable for 24x7. The problem rose due to continuous mode of operating system for several days.

In [5], if the tag is valid then user has to enter password through keypad. If the entered password is correct then

locker will open. If the entered password is wrong then the buzzer will turn ON in order to indicate user is accessing the locker with wrong password. All these activities are informed to user with the help of message through GSM technology.

In [6], it provides a multi function solution, based on GSM (Global System for Mobile Communication) networks or control of a motor driving circuit and LCD (Liquid Crystal Display). This system provides ideal solution for controlling the direction of motor driving within a specified range of time, two directions where controlled in addition to activated functionality with 5V. The system can also be configured to control an alarm or any other electrical device via a mobile phone using SMS text messaging. This system is used to control the motor direction from the remote location, to determine the time duration and direction of motor, whenever it crosses the cellular shield to the SM5100B Module. The cellular shield will send the signal to the output pins which are programmed using C language to control the motor operation. The concerned authority can control the system through his mobile phone by sending AT Commands to GSM MODEM and in turn to microcontroller.

3. PROPOSED WORK

In the first level of verification, the GPS starts to check for exact location. This prevents robbery during the money transit from bank to ATM. If the location given differs from

present location, then the vault cannot be opened. If the location matches with predetermined location, then it will display “location matched” and pass to the next level.

The second level is fingerprint authentication. The fingerprint module glows if it has already enrolled with proper coding. This module prevents the vault from unauthorized access. The storage capacity of fingerprint module is 250. In this part, the first step is the enrolment of authorized fingerprints. It will store the fingerprint with an identification number during enrolment process. Illegal access can be restrained by fingerprint module. If the fingerprint is matched the system proceeds to the next level and the LCD displays “fingerprint matched”.

The third level is password protection using 4x4 keypad module. With the help of keypad module, secret password protection is given which is only known to the licensed officials. LCD displays “welcome” if the password entered matches with secret password. If any level of verification fails, then the system will display as “Multilayer vault security system”.

Using GSM, a message is sent to the bank authority if wrong password has been entered. If the bank authority sent a “track” message, then current location of the vault in terms of longitude and latitude will be tracked by GPS and will be sent to the bank authority.

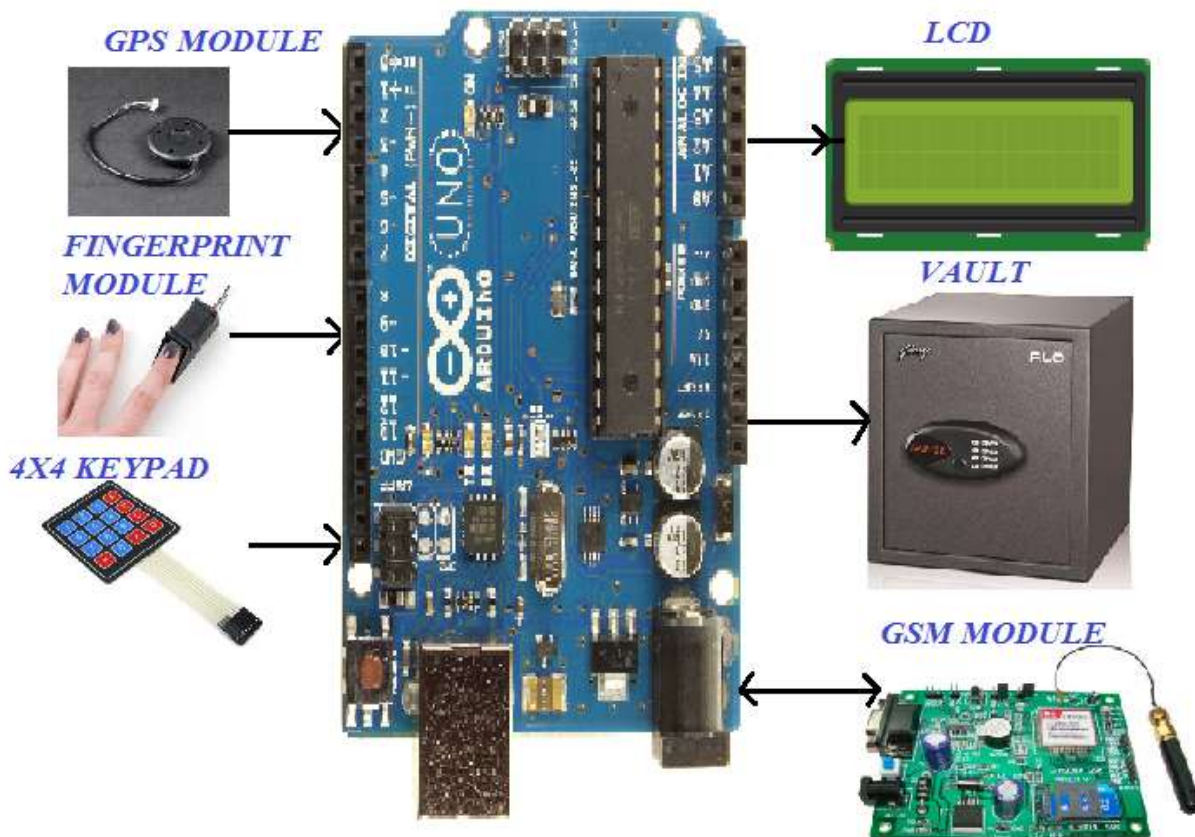


Fig.1. Block diagram

5. RESULTS



Fig.2. Experimental setup

Fig.2 Experimental setup shows the final product of this paper. Arduino is interfaced with fingerprint sensor, GPS, 4x4 matrix keypad, LCD and GSM. LCD displays the status of each level of security layer.

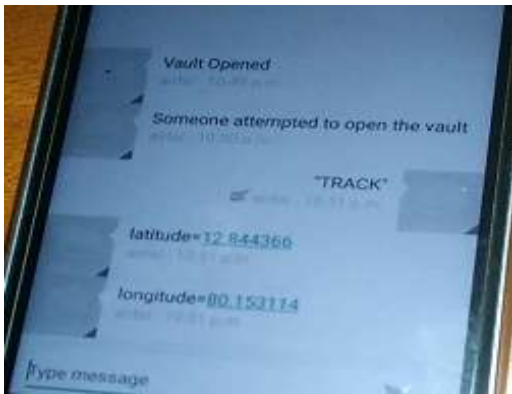


Fig.3 Emergency tracking system using GPS

Fig.3 Emergency tracking system using GPS shows that a message is received when the vault has been opened. If trespassers enters wrong password, a message will be receive by the bank authority. if a "track " message is sent back by bank authority, then location of the vault is traced by GPS interms of latitude and longitude and send back to the bank authority.

6. CONCLUSION

The existing locker security systems were designed for bank locker room. The existing systems is either more complexity, expensive or has a fewer security levels. This work is developed for mobile(moving) locker protection which is of low cost and user friendly. Proposed system has built with three levels of security. This work can be extended by including the features like updating the location and authentication details to the bank server at regular time intervals using IOT platform. This feature will be helpful to keep track on the vault and can be used for future reference.

7. REFERENCE

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