Smart Tracking and Locking System for ATM Trunk

AIM: "**Smart Tracking and Locking System for ATM Trunk'' is** to achieve security and privacy issues of ATM System. It is to ensure the protection from security attacks on ATM Trunks.

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Abstract— **Security is the important thing in our day to day life, and digital locks become a primary element of these security systems. Secure transportation of money is an important thing in our daily life. Carrying money (hard cash) from one place to other place is risky. ATM cash depositor suffering the same situation, while carrying money from the main branch to ATMs.**

This project is implementing to give security to ATM Trunk while traveling from bank to ATMs. Here the GPS system fitted on the Trunk and all the record of the Trunk is send to the server. The main mottos of project implementing is securing the ATM Trunk with lock and unlock system to Trunk by using RFID and FINGERPRINT Sensor module and GPS tracking for these Trunks which are carrying money.

Keywords— RFID, Fingerprint Sensor Module, GPS, Database etc.

1. Introduction

Security is the emerging technological trend in the present computing technology, and digital locks become a primary element of these security systems. Our system is basically for the money depositor who deposits the money to the ATM. Nowadays we see that money moving from one location to other location is a part of the risk. In ATM system money transferred from the main branch to ATMs in Trunk. The trunk which is used for carrying this
money has the only simple locking system and human security.

In the existing of this security for ATM Trunk robbery of money it happens. Some of the time humans which are giving security to Trunk is involved in the robbery. Hence we don't think human security is better for this system. So to avoid such activities of robberies we are implementing the smart locking and unlocking system for ATM System. We replace a simple locking system and only human security by RFID and Fingerprint Sensor module. This all system will help to give security to Trunk while traveling from one place to another and avoid the robbery.

2. LITERATURE REVIEW

This para tells the survey of different technology that has used in secure locking systems. In early days, only mechanical locks were available which was not secured the Trunk. As rapidly increases in technology, modern electronic locks were introduced into the market to avoid further theft and unauthorized access. One of the modern electronic locks was introduced was password based locking system as used to verification factor. Then the next electronic lock system which is based on RFID. Working of RFID based system is described where RFID tag and reader are the important components and RFID value acts as the authentication factor.

Then later biometrics lock system came into present such as face, fingerprint, voice, iris recognition and many more. They proposed two methods verification and identification. Later Encryption based lock system was introduced where the original password was encrypted to generate the new password. This technique is used to avoid the hacking activity to the lock.

Now the latest technology is used to secure locking system by OTP. Generated OTP will be unique at each and every time when the lock is being accessed and its lead to avoid the hacking activities.

They all use various unlocking systems like electronic lock, OTP based lock etc. for user authentication. In our system, we use RFID and Biometric Fingerprint Sensor for unlocking the Trunk.

In this project, we use RFID system for activating and deactivating the Fingerprint module, and Fingerprint Module is used to Lock and Unlock the Trunk. Security attacks get reduced as compare to other systems because all lock control is access in only in the range of RFID reader and the reader is fitted in the ATM.

3. PROPOSED ARCHITECTURE

We describe the architecture and the various components used for implement the Smart locking system.

In this project, we have use RFID System to activating and deactivating the fingerprint sensor module. Here RFID Tag is fitted on Trunk RFID Reader is fitted in ATM.

When Trunk with RFID Tag enters in the coverage area of RFID Reader it will automatically activate the fingerprint sensor and when RFID Tag is away from RFID Reader it will deactivate the fingerprint module. Fingerprint module is use to capture the finger impression as an input to the system.

Here we attach a electronic lock with the trunk which will only open when the system will read the correct fingerprint. Here Red LED mark that trunk is lock and Green LED marks that Trunk is unlocked.
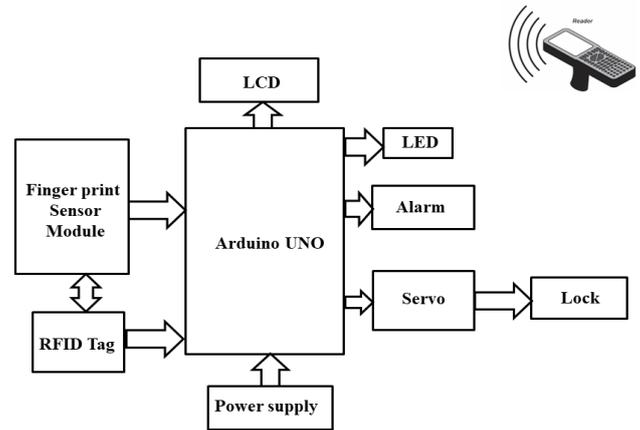

Fig1. System Architecture

First, the person who carries the trunk is commitment to enroll its fingerprint using of fingerprint module.

To unlock the Trunk authorized person needs to take the Trunk into the RFID Readers range i.e. fitted in ATM. Once Trunk with RFID Tag comes in the range of RFID Reader it will activate the Fingerprint Sensor Module then authorized person needs to verifying itself by verifying its fingerprint by placing a finger over fingerprint Sensor module.

Now Fingerprint Sensor Module takes the finger image and converts it into template and checks with the stored template in the database. If Fingerprint match with the verified fingerprint stored in the database, then trunk will open with the help of servo motors otherwise it will ring Buzzer alarm.

4. REQUIRED MODULES FOR PROJECT

➢ Arduino Uno: -

Arduino UNO is a microcontroller based on ATmega328. It contains 14 digital input/output pins in which 6 analog inputs, a 16 MHz connection, 6 can use as PWM output, a power jack, and a reset button.

Arduino UNO is used to control and integrate all the module required for implementation.

Fig.2 Arduino UNO R3

> **Fingerprint Sensor: -**

The fingerprint scanner is a module which captures fingerprint image and then converts it into an equivalent template and saves them into its memory on selected memory location by Arduino. Here all process is completed by Arduino like taking an image of a fingerprint and convert it into its template etc.

Fig.3 R305 Fingerprint Module

> **RFID Reader and RFID Tag**

RFID stands for Radio Frequency Identification is a technology which works on the basis of Radio waves. Whenever the tags are in the range of RFID Reader it reads the tag information and transmits feedback singles to the reader. RFID tags can be Active, Passive.

An RFID System consists of two main modules, a tag which is located on the object that we want to be identified, and a reader. RFID reader consists of a radio frequency module, a control unit and antenna coil which generates a high-frequency electromagnetic field.

Fig. 4 RFID Reader and Tag

> **GPS Module**

GPS module is used to fetch the current location of ATM Trunk. whenever the wrong attempt take place GPS Module fetch the current location data and send it to the server,

It uses at least 3 satellites to get that location data from at least 24 active satellite which orbiting over 13,000 miles around the earth

The main aim of these active satellite is to fetch the data and transmit it back to the earth over radio frequency.

Fig.5 GPS Module NEO6M

> **16x2 LCD Display**

16x2 Liquid Crystal Display is used to display the content of the program. It is an electronic display.

16x2 LCD display is very commonly used in various devices and it is very basic module to display content in electronic form.

This 16x2 Liquid Crystal Display work on seven segment and Multi segment. The reason behind the using 16x2 LCD is its capable to display electronic data, special character, custom character, animation and many more.

Fig.6 16x2 LCD

➢ **2 Relay Module**

2 Relay Module is used to control the flow of electricity which were going to pass to the solenoid lock. This module transmits the required power supply to lock by taking the electricity from external port.

Fig.7 Relay module

➢ **Solenoid Lock**

The general purpose of lock is to lock or unlock the trunk as per the signals of Arduino. It works on +9v power supply that's why we need to give extra power supply by externally.

The main purpose of this lock in our project is when we press the validate fingerprint to fingerprint module the lock will open.
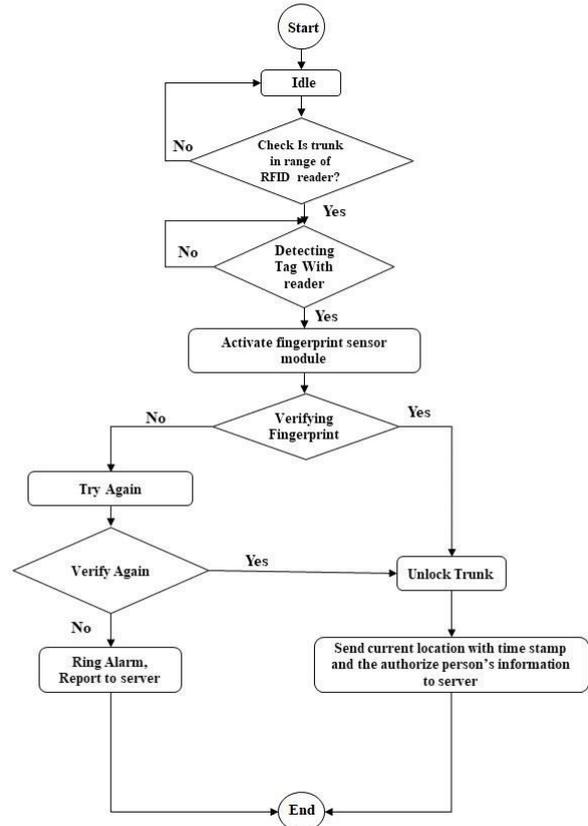

Fig.8 Solenoid Lock

Fig.9 Process Diagram

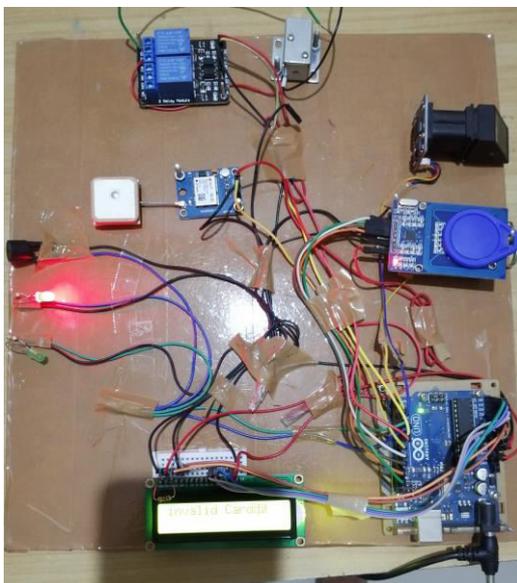**WORKING**

Fig.10 Implementation

Fig.11 Invalid Attempt

CONCLUSION

It has been a great opportunity for us to work on this exciting and challenging project. This project provides knowledge about GPS, Biometric Fingerprint Sensor Module, RFID Module and also all handling procedure related with "SMART TRACKING AND LOCKING SYSTEM FOR ATM TRUNK".

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