

# 4G Mobile network Based ATM Security for Smart Cards

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**Abstract:** The suggested method aims to create a wireless security system for banks using the 4G network and Global Positioning System. It is built on an 8-bit microcontroller (ATMega328) with 32Kbytes of flash memory and a 16MHz operating frequency, and it interfaces with a GSM modem and a GPS to inform the user of the lost card's details and location. When a user loses his ATM card, he can notify the bank by sending a message, and when the lost card is placed in the ATM center, the user will immediately receive the card's details. The ATM machine is equipped with a GSM modem and GPS. Here, a vibration sensor might be included as an extra security measure which is attached to ATMs for enhanced protection, so that if an unauthorized individual tries to steal money from the machine at night, a warning will be transmitted to the adjacent police station. The results demonstrate that the proposed system operates better than previous systems, therefore by regularly checking it, one can receive the highest level of protection for their ATM card.

**Keywords:** *ATMega328controller, GSM Modem, GPS receiver, RFID, Vibration Sensor*

## I. INTRODUCTION

In the modern era, the ATM system is a very essential part of our life. We know that over the past three decades, consumers have been largely depending on and trust Automatic Teller Machine, known as an ATM machine to conveniently run into their banking needs. As the social computerization, automation and developed techniques has been increased and the ATM and credit card has been installed and spread out to simplify the financial activity, the banking activity has been simplified so more, however the crime related with financial organization has been increased over numbers in the world in proportion to the ratio of spread out of automation, devices and technologies. Now, a day theft from robbery increases gradually. ATM related crime cases are increases[1]. To stop this situation we put GSM technology in ATM system. It makes our transactions very easy which was very

tedious in early time. Traditional ATM systems authenticate basically by using the debit card and the password, this method has some defects. Using the debit card and password cannot verify the user's identity exactly. A lot of criminals tamper with the ATM terminal and steal user's debit card and password by illegal means. Once the user's bank card is lost and the password is stolen, the criminal will draw all cash in the shortest time, which will bring enormous financial losses to the customer. If user loses his ATM card and any one placed in the ATM center the card details will be immediately sent to the user. Here additionally during night times any unknown person tries to theft the amount present in the machine, an alert will be sent to the nearby police station[2]. However the crime related with financial organization has been increased over numbers in the world in proportion to the ratio of spread out of automation, devices and technologies. By using GSM and GPS, we provide double security in the ATM banking. So, some amount of robbery can be control.

## II. LITERATURE SURVEY

S.Rohan khanna et.al, has developed a model on 4G GSM Based Smart Information System for Lost ATM Cards, here Whenever any user loses his ATM card, he puts a complaint in the bank. When this lost card if placed in the ATM center the card details will be immediately sent to the user and nearby police station[1]. The message is sent but it does not track the location. Chen lie had proposed a Gsm Based Smart Information System For Lost Atm Cards, Microcontroller use only low power devices. Harshad Joshi proposed GSM based Anti-Theft Transaction System, Whenever person enters account number onto the ATM machine, the system requires PIN to authenticate the user[4]. If PIN gets verified, it makes a call to the user's mobile. Janhavi Rane proposed ATM Security Using fingerprint and GSM

Module, When the customer places his finger on the fingerprint module then access it automatically generates different 4-digit code as a message every time to the mobile of the authorized customer through GSM modem. It helps only during transaction and not used for getting the information of lost ATM cards. Miss Sanchitha, R Jantre proposed GSM based ATM Security ATM Banking. When card user insert ATM in ATM machine type the password[5]. Then message goes through card holder using GSM technology. Then card holder provides security code to ATM via message using GSM[6]. Then transaction takes place. Microcontroller having 4K bytes of flash memory.

III. METHODOLOGY

Components Used

1. ATMEGA328 Controller
2. Global System for Mobile Communication (GSM)
3. Global Positioning system (GPS)
4. RFID Module
5. Vibration Sensor
6. Buzzer
7. Software (Integrated Development Environment)

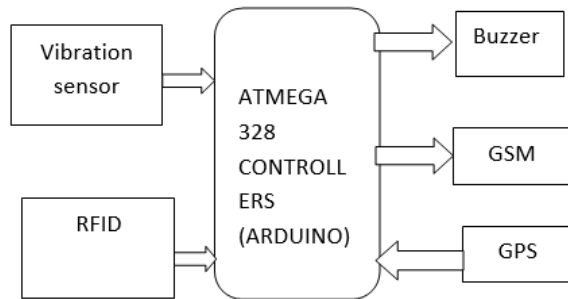


Fig 1. Block diagram of Smart Information System for Lost ATM Cards

The System consists of an Arduino Uno which is having a ATmega328 microcontroller for controlling the whole process with GPS receiver and GSM module[8]. GSM digitizes and compress the data, then sends it down a channel with two other streams. GPS is used to track the location of the ATM center where the card is used last time. If someone wants to steal the money in the ATM, Vibration sensor senses and activates the buzzer.

A. Microcontroller (ATMEGA328)-Microcontroller can be termed as a single on chip computer which includes number of peripherals like RAM, EEPROM, Timers etc., required to perform some predefined task.

Microcontroller- Arduino is an open source microcontroller which can be easily programmed, erased and reprogrammed at any instant of time. Introduced in 2005 the Arduino platform was designed to provide an inexpensive and easy way for hobbyists, students and professionals to create devices that interact with their environment using sensors and actuators. Based on simple microcontroller boards, it is an open source computing platform that is used for constructing and programming electronic devices. It is also capable of acting as a mini computer just like other microcontrollers by taking inputs and controlling the outputs for a variety of electronics devices [7]. It is also capable of receiving and sending information over the internet with the help of various Arduino shields, which are discussed in this paper. Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed easily using the C or C++ language in the Arduino IDE. It is the heart of our system. The Arduino UNO is a widely used open-source microcontroller board based on the ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins.

B. GSM Module (SIM900A):

The SIM900 is a complete Quad-band GSM/GPRS Module which can be embedded easily used by the customer or hobbyist. SIM900 GSM Module provides an industry standard interface. SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data with low power consumption. It is easily available in the market. SIM900 designed by using single-chip.



Fig 2. 4G GSM Module

C. GPS Module (SIM28ML) Global Position System (GPS) is a space-based satellite navigation system that

provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellite. The system provides critical capabilities to military, civil, commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver



Fig 3: GPS Receiver

D.RFID Sensor: The RC522 module has a total of 8 pins. This module supports various communication protocols and each pin has a different function for each communication protocol. The RC522 module consists of an MFRC522 RFID chip from NXP. It is clocked at 27.12MHz by the onboard crystal oscillator in the 49S package. The board also consists of the required EMI filter circuit and matching circuit. It also consists of a PCB antenna for communicating and energizing the RFID tags.



Fig:4. RFID TAG

E. Vibration Sensor: A vibration sensor is a device that measures the amount and frequency of vibration in a given system, machine, or piece of equipment. The arduino vibration sensor module is based on vibration switch component which can detect the weak vibration signals. The vibration law works for vibration related modules. The conductive pin will make an instant turn on (ON) state when touched by the outside force to achieve the proper vibration force or an appropriate speed from the (partial) energy [3].



Fig 5: Vibration sensor

IV. RESULT

Connect TX pin of GSM Module to digitalPin 11 of Arduino Uno. Connect RX pin of GSM Module to digitalPin 10 of Arduino Uno. Connect GND pin of GSM Module to GND pin of Arduino Uno and VCC to the 5V. Connect I/O pin of vibration sensor to Arduino digitalPin 7 and the ground to ground in arduino and VCC to 5V pin. Now connect the buzzer, Connect Supply wire (positive) of the buzzer to the Digital Pin 13 of the Arduino. Connect Ground wire (negative) of the buzzer to Ground Pin on the Arduino. When a vibration is detected by the vibration sensor, the buzzer alerts and sends a message to the near by police station that a vibration is occurred by the GSM.

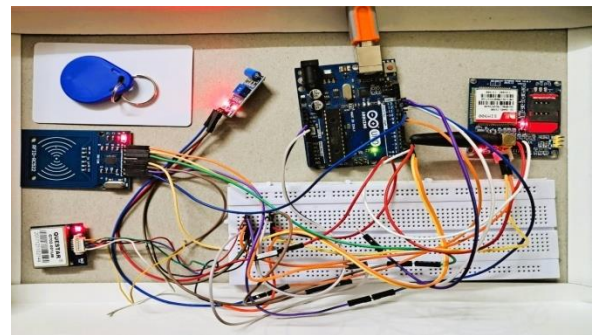


Fig 6: GSM Based Smart Information System using Lost Atm cards

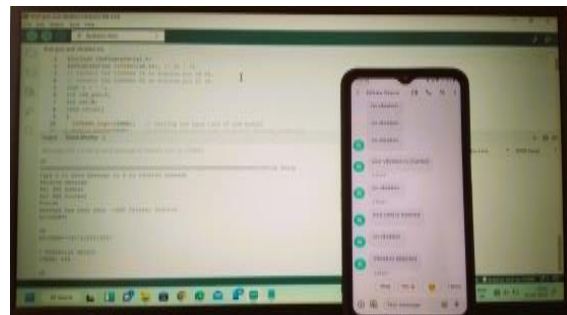


Fig 7: GSM Based Smart Information System using Lost Atm cards, message passing using GSM & GPS

V. CONCLUSION

The proposed system based on Arduino microcontroller is found to be more compact, user-friendly and less complex, which can readily be used in order to perform several tedious and repetitive tasks. The implementation of ATM security. As we all know, these days most of the ATM has been attacked by the robberies. whenever any user loses his ATM card, he puts a complaint in the bank just by

sending message, when this lost card is placed in the ATM center the card details will be immediately sent to the user. This proposed work demonstrates how an automation of “ATM Theft prevention from robbery (or) thief can be implemented using GSM Technology, vibrating sensor. By implementing this proposed work we can catch thief and robberie’s in ATM itself and also we can save our precious time. The results shows that proposed System performs better compared with other systems and therefore one gets maximum security to their ATM card by monitoring it continuously

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