

ATM SECURITY USING GSM AND GPS

D. Arul Kumar¹, N. Jeyakannan², Divyalakshmi. V³, Divya . R⁴, Mahalakshmi . T⁵

¹Associate Professor, Dept. of ECE, Panimalar Institute of Technology, Chennai, India

²Assistant Professor, Dept. of ECE, Panimalar Institute of Technology, Chennai, India

^{3,4,5}Student, Dept. of ECE, Panimalar Institute of Technology, Chennai, India

Abstract - The idea of designing this project is by observing many ATM problems happening around us in the real time situation. This project gives us a new idea overcomes the older technology used in the ATMs. In this Project we have discussed about security of ATM machine. Whenever robbery occurs, the movement of an ATM machine is changed and the MEMS sensor is used to sense that movement. Using the tri band GSM, we can send the message to the vigilance team and for the respective bank authorities. once the movement of machine is detected by the MEMS sensing element the buzzer can make an alarm sound that acts alerting device for protection. The Door is shutted down by using the DC motor. The alphanumeric display (LCD) board shows the status of our project. A relay is also used in this project to switch on the fan, when the fan is turned on the anesthesia powder is sprayed on the thief, so that the thief gets fainted. We also avoid the problem of skimming. The RFID technology is used for enhanced security of money transaction in ATM system. Then OTP is generated and the message is sent to the registered customer mobile number by using GSM. The GPS is used for location tracking. After entering the OTP ATM will show options like cash withdrawal, cash deposit etc.

Keywords: ARDUINO UNO, MEMS, GSM, GPS, LCD, DC Motor, Relay, Buzzer, RFID Reader & RFID Tag

1. INTRODUCTION

In recent days the crime rate at ATMs is widely increasing. It is necessary to increase the security of ATM. This project attempts to develop an effective solution of monitoring the ATM security by using RFID technology for money transaction and theft detection by MEMS sensor. The objective of this project is to handover the culprit to the police by sending the location via message to the vigilance team and bank authorities by using GSM modem and GPS.(13) Nowadays robbers are using fake cards for money transaction. To prevent this, we use RFID reader which reads the RFID tag and send an OTP message for each transaction.(14)

2. LITERATURE SURVEY

The concern of customers about security and privacy was pointed out by Madu and Maggie (2002). The concern about the lack of cooperation among banks in the fight to stem was expressed by Ihejiahi (2009). According to Obiano (2009) one of the frequent causes of frauds when customers are careless with their cards and pin numbers.

The major challenge faced by ATM user in Nigeria is security and power outage and it was identified by Adeloye (2008). According to Brunner et al. (2004) the location of ATM is highly determinant to fraud or crime. Diebold (2002) said that pin theft is carried out by various means. Force withdrawal, card theft, skimming and congestion method of fraud at ATM are the other form of fraud that were enumerated.

3. PROPOSED SYSTEM

In our system we use MEMS sensor to detect the angular displacement of the ATM machine. GSM module is used to send alert message to the authority and vigilance team saying that the ATM is tried to be theft. GPS is used for location tracking. RFID technology is used where the RFID reader identifies the account holder information and sends a 4-digit OTP to the registered customer's mobile number. If the password matches, we receive money. In our proposed system higher security is guaranteed and manpower is not needed much.

4. FLOW CHART

A flow diagram is a graphical illustration of a method. Each step within the method is drawn by a different symbol and contains a brief description of the that process. The flow diagram symbols are connected with arrows showing the method flow direction.

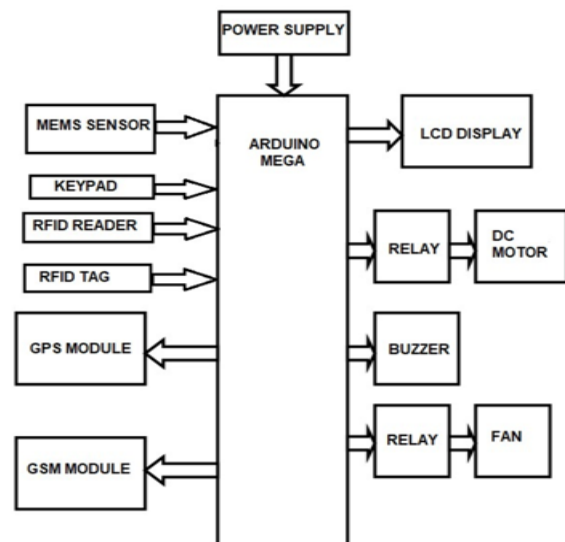


Fig 1: Block diagram of ATM using GSM and GPS

5. HARDWARE DESCRIPTION

5.1 ARDUINO UNO

It is a microcontroller board based on Atmega328. It consists of an USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It supports serial communication using transmitter pin and receiver pin. It is also an open-source platform, in which the boards and software are readily available and anyone can modify and optimize the boards for better functionality. The software used for Arduino devices is IDE (Integrated Development Environment) which is free to use and required some basic skills to learn it. It is programmed using C and C++ language.(1)

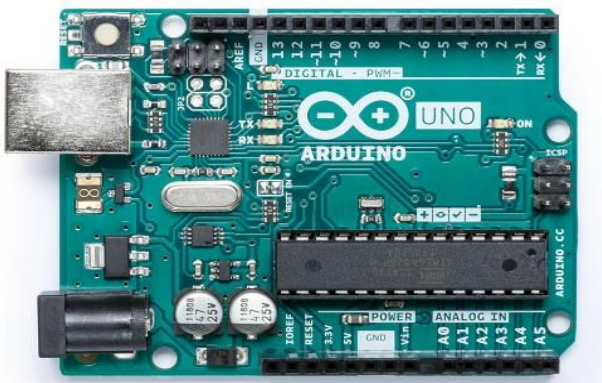


Fig 2 : ARDUINO BOARD

5.2 MEMS SENSOR

It is a very small technology. We merge at the nano-scale into nanoelectro mechanical systems and nanotechnology. The components of MEMS sensor are made up of 1 to 100micrometer in size and the MEMS device are in the range of 20 micrometre to millimeter. The technology can be implemented using different materials and manufacturing techniques. This sensor is used to detect as well as measure the external stimulus like pressure, after that it responds to the pressure which is measured with the help of some mechanical actions. The MEME sensor constructs of the microprocessor, central unit that process data and manage components that interact with outside.



Fig 3 : MEMS sensor

5.3 GSM MODEM

GSM stands for Global System for Mobile Communication. when the mobile number is entered through the keypad the program instructs the modem to send a text message using a sequence of AT commands, when a ten-digit mobile number is given. (3)Using this we can make audio calls, SMS, Read SMS, attending the incoming calls and internet using simple AT commands.



Fig 4 : GSM

5.4 GPS

Global positioning system(gps) is a satellite navigation system. It furnishes location and time information in all climatic conditions to the user. GPS consists of three major segments. They are the space segment, a control segment, and a user segment. GPS satellites broadcast signals from space. (4) The GPS receiver uses these signals to calculate its three-dimensional location (latitude, longitude, and altitude) and the current time. It is made up of 24 satellites. The satellite into orbit for military use is originally put by U.S. Department of defense (USDOD).



Fig 5 : GPS

5.5 LCD

Liquid crystal display(lcd) is an electronic delay module. This 16*2 lcd display is very commonly used in various device and circuits. It can be able to display 16 characters in 16*2 LCD. Each character of lcd is displayed in 5*7pixel matrices. The command and data are the two registers of LCD. The command register is used to store the command instructions that are given to the LCD. The data's that are given to the lcd are stored in the data registers.

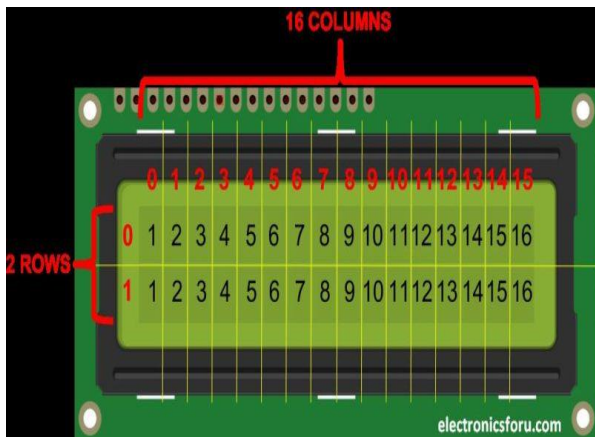


Fig 6 : LCD

5.6 DC MOTOR

DC motor is defined as a class of electrical motors that convert direct current electrical energy into mechanical energy. When the field coil of DC motor is energized the magnetic field arises in the air gap. The magnetic field enters via armature from the North pole side of the field coil and gets exit from the south pole side. The conductors located on the other poles are subjected to the same intensity but in opposite direction. Thus, these opposite forces create torque that causes the motor to rotate.

5.7 RELAY

Relays are the primary protection and switching device. Like voltage or current all relays respond to one or more electrical quantities. Protective, reclosing, regulating, auxiliary and monitoring relay are the categories of relay. Voltage, current and power are continuously monitored by protective relay. For circuit breakers and other protective equipment auxiliary content are used.



Fig 7 : Relay

5.8 BUZZER

A buzzer may be mechanical, electromechanical or piezoelectric and it is an audio signaling device. The alarm device, timers are the typical uses of buzzer. The mouse click or keystroke are the user input. The buzzer consists of two pins. one is connected to the power and another is connected to the ground. When current is applied to the

buzzer it causes the disk to contract or expand. This causes the surrounding disc to vibrate. That's the sound that you hear.



Fig 8 : Buzzer

5.9 RFID READER

The brain of RFID system is the RFID reader. RFID takes auto-ID technology to subsequent level by allowing tags to be read without line of sight and, depending on the type of RFID, having a read range between a couple centimeters to over 20+ meters. RFID is divided into fixed RFID reader and Mobile RFID reader. RFID applications are extend from board areas like inventory tracking to supply chain management.



Fig 9 : RFID reader

5.10 RFID TAG

Radio frequency identification tags are the type of tracking systems that uses smart barcodes in order to identify items. RFID tag is divided in to two parts -an antenna for transmitting and receiving signal. The RFID chip is used to store the tags ID and other necessary information. The digital data encoded in RFID tag are captured by reader via radio waves.



Fig 10 : RFID tag

6. SOFTWARE REQUIREMENTS

6.1 ARUDINO IDE

Arduino IDE is an open-source software that is mainly used for compiling and writing the code in audio module. It contains of text console, a message area, text editor for writing code. It consists of toolbar with buttons for common functions and a series of menus. It is a cross-platform application that is written in functions from C and C++.

6.2 EMBEDDED C

Embedded C Programming is the soul of the processor functioning inside each and every embedded system such as mobile phones, washing machines etc. The embedded device is controlled with the help of an embedded C program. In microcontroller Embedded C language is mostly commonly used.

7. IMPLEMENTATION

In this project the RFID technology is used for money transaction. When a person inserts an ATM card into the machine the OTP is generated and it is sent as the message through that person via GSM modem. After entering the OTP, the ATM will show options like cash withdrawal and cash deposit. Thus, the ATM works properly when an authorized person handling it. When an unauthorized person tries to break the ATM the MEMS sensor sense the movement and the beep sound is produced by the buzzer. Once the buzzer goes low the door gets closed automatically by DC motor. Then the fan gets turned on and the anesthesia powder is sprayed on the thief, so that he gets intoxicated. The message is sent to the vigilance team and respective bank authorities by GSM and location is tracked by GPS.

8. RESULT AND CONCLUSION

Firstly, the RFID reader reads the tag and the money transaction process is done by sending an OTP message to the customer's mobile number and this process is done correctly. Secondly, the theft detection process is detected by MEMS sensor, while the information and location are shared to the vigilance team through GSM and GPS.

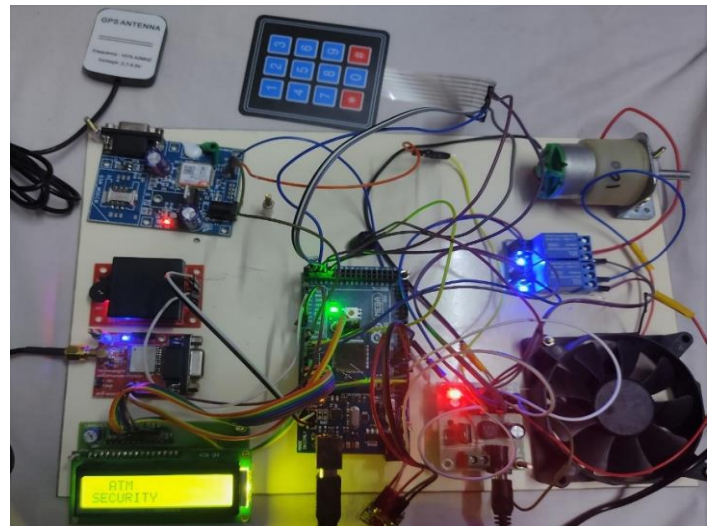


Fig 11 : ATM SECURITY USING GSM AND GPS

In our project, the objective of developing ATM security using RFID and MEMS has been achieved. Thus, by using this project the security of ATM is achieved. Whenever a person tries to break the ATM container at that time MEMS sensor sense that motion and send the message to microcontroller. The embedded system plays a major role in our project as the system is reliable, safer and easy to use.

REFERENCE

- [1] J. Schlesinger and A. Day, "Card Sharks: How ATM skimming has grown more sophisticated", CNBC, 2018
- [2] V. Zoleta, "Old ATM Cards Will Be Discontinued. Here's How You Can Switch to an EMV Card", Financial News and Advice in the Philippines, 2018.
- [3] N. Philip and K. K. Sherly, "Credit Card Fraud Detection based on Behavior Mining," TIST International Journal for Science, Technology and Research, vol. 1, pp. 7-12, 2012.
- [4] K. K. Tangod and G. H. Kulkarni, "Detection of Financial Statement Fraud using Data Mining Technique and Performance Analysis," International Journal of Advanced Research in Computer and Communication Engineering, vol. 4, no. 7, pp. 549-555, 2015.
- [5] E. Kirkos, C. Spathis and Y. Manolopoulos, "Data Mining techniques for the detection of fraudulent financial statements," Expert Systems with Applications, vol. 32, no. 4, pp. 995-1003, 2007.

- [6] S. Bhattacharyya, S. Jha, K. Tharakunnel and J. C. Westland, "Data mining for credit card fraud: A comparative study," *Decision Support Systems*, vol. 50, no. 3, pp. 602-613, 2011.
- [7] M. R. Lepoivre, C. O. Avanzini, G. Bignon, L. Legendre, and A. K. Piwele, "Credit Card Fraud Detection with Unsupervised Algorithms," *Journal of Advances in Information Technology*, vol. 7, no. 1, pp. 34-38, 2016.
- [8] A. C. Bahnsen, D. Aouada, A. Stojanovic, and B. Ottersten, "Feature engineering strategies for credit card fraud detection," *Expert Systems with Applications*, vol. 51, pp. 134-142, 2016.
- [9] N. Malini and M. Pushpa, "Analysis on credit card fraud identification techniques based on KNN and outlier detection," in *Proc. 2017 Third International Conference on Advances in Electrical, Electronics, Informative, Communication and Bio-Informatics (AEEICB)*, 2017, pp. 255-258.
- [10] Sakr, Sharif. "ARM co-founder John Biggs". Engadget. Retrieved December 23, 2011. the ARM7- TDMI was licensed by Texas Instruments and designed into the Nokia 6110, which was the first ARM powered GSM phone."
- [11] Kim, Bo-Ra, "Domestic ATM status and meanings", *Payment and Settlement, and IT*, Vol. 44, pp. 76, 2011.
- [12] El-Medany, W.M. and El-Sabry, M.R. (2008) GSM Based Remote Sensing and Control System using FPGA. *Proceedings of International Conference on Computer and Communication Engineering*, Kuala Lumpur, 13-15 May 2008, 1093-1097.
- [13] Dhinesh Kumar M, Devaram Gnanendra Reddy, Appadi Sumanth Teja, V. Jeyaramya, "Child in safety with localization awareness", *Vol.5(2)*, pp.315 -317, 2019.
- [14] A.Kathar Patcha, S. Mani Kandan, S. Venkatesh, S. Panimalar, "Enhanced Device for Security and Health Purpose Using IoT", *International Journal of Research in Engineering, Science and Management* Volume-3, Issue-5, May-2020.
- [15] T.A. Mohanapraksh, B Hariprakash and J. Mithilaesh, "Android based corporation complaint system using voice recognition", *Advances in Natural and Applied Sciences* (Vol. 10, Issue 14), Sep 2016.