

Advanced ATM Crime Prevention System by using Wireless Communication



Mohd. Abdul Naqi, Sireesha Pendem

Abstract: *The Implementation of Advanced ATM theft avoidance System is brought into world with the perception of ATM wrongdoing occurring far and wide. This paper manages the counteractive action of ATM wrongdoing. At whatever point burglary happens, MEMS module presented to detect crime to ATM machine. Proposed framework done by ARM controller based installed framework designed for constant information gathered utilizing a MEMS module. When the theft happens this designed system automatically alerts alarm such as buzzer, dc motor control gate, GSM sends SMS to authorized person and the status is displays in LCD to monitor. When IR detects misusage of ATM this designed system automatically alerts alarm such as buzzer, dc motor control gate, GSM sends SMS to authorized person and the status is displays in LCD to monitor. Simultaneously this framework additionally manages the wellbeing of the client by cautioning the encompassing individuals and close-by police headquarters at whatever point the client is in risky circumstance. Here we utilizes RFID module to verify ATM Card. RFID discovered ATM card swipe anyplace. It naturally sends burglary alert through GSM, buzzer ready individuals, dc motor entryway lock and all the status displays on LCD. Keil software is used to implement programmatically and execute the project successfully.*

Index Term: ARM Microcontroller, ATM, GSM, MEMS, RFID

I. INTRODUCTION

ATM was turned into indispensable correspondence & administration tool among money bank and cash card persons because of quick, comfort and human asset sparing favorable circumstances. Presentation of ATM in 1967, culprits has concocting approaches are attempt to take money inside. Since a machine called ATM wipe out that requirement to nonstop individual inclusion, will in general be situated in spots that make them increasingly powerless against assault. The quantity of ATM machine being used increments, due to that recurrence & modernity of safety dangers, designing the advanced wrongdoing avoidance estimates the peek requirement for ATM makers, monetary organizations (FI). Because of huge misfortune for cardholders and banks we are

fabricate secure ATM violations avoidance system for quick and simple user friendly money transactions between banks and human being with safe and secure.

II. LITERATURE OVERVIEW

In 1975, Korea trade bank presented the main ATM, trailed By Shinhan bank in 1982, by ATM industry Association (ATMIA). There are currently near 2 million ATM in this World [1]. As of now, the ATM machines are not verified that much. Those are just having the card swapping office [2] at the passage at the entryway. Be that as it may, this office doesn't control the quantity of clients entered at a specific example. Number of ATMs are additionally secured under this framework are likewise not many. Another proposed verified framework is to put vibration sensor [3] into the ATM machine. In any case, in the event that the total machine is stolen, at that point it has not so much physical use. For that circumstance we need a GPS beacon on that machine, which isn't being used at this point. ATM burglary and extortion event is discernible increment in most recent couple of years. ATM Under Attacks:

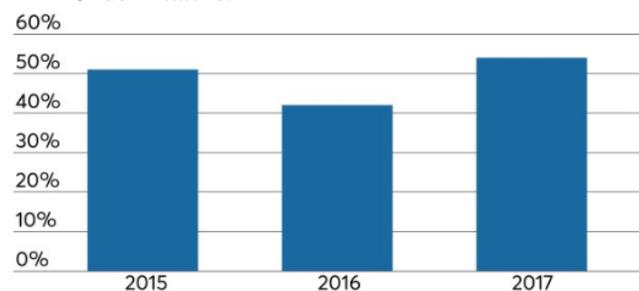


Fig. 1. ATM fraud attacks and physical attacks graph.

III. EXISTING SYSTEM

The probability of this endeavor is procured from the issues which are happening in our standard life. Nowadays taking of ATM has a great deal of extended. At present lawbreakers are essentially accepting the rupees from ATM just as they are expelling the whole cash box with the objective that we need to apply some security structures to get a handle on the cheat if any bad behavior is observed. The above condition requires the use of ATM bad behavior balancing activity structure. Subsequently, this paper prescribes the system for offering security to both the ATM and the customers whoever using ATM organizations. ATM thievery, it appears as the downturn's most sultry bad behavior.

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There were more than 100 instances of teller machine robberies in India alone in 2010. The gangsters have gotten or tried to grab ATMs on various occasions in 2013. That is up from 2 occasions of the bad behavior in the 2012. In Atlanta, which has furthermore watched a spike in ATM bad behavior, as much as 35 machines have evaporated in 2014. As this is tremendous issue of security of government money. Along these lines, we have improved our present security system. In past activities, numerous analysts have built up a framework for programmed ATM security utilizing Microcontroller 8051 without any wireless data transfer system. Practically all frameworks are wired, yet now we have attempted the equivalent by the utilization of remote.

IV. PROPOSED SYSTEM

In proposed framework we are utilizing ARDUINO to actualize this task, and we are utilizing GSM innovation to send the security data through SMS. We are utilizing MEMS Technology to distinguish the breakage of ATM machines and that data would be send to microcontroller then it will send to security framework. When IR and MEMS detects misuse of ATM this designed system automatically alerts alarm such as buzzer, dc motor control gate, GSM sends SMS to authorized person and the status is displays in LCD to monitor. We are utilizing smoke sensor to recognize the flame mishaps. Advantage of Proposed system is Cost productive and Low Power utilization

V. METHODOLOGY

The proposed framework is put at the entryway where the ATM is to be secured. The Vibration sensor is set on the ATM which is associated with port 0 eleventh stick of ARDUINO. At the point when the sensor identifies Vibrations, data is given to the microcontroller, and after that lock framework Utilizing DC motor which is connected to port 0 seventeenth Pin of ARDUINO controller. Buzzer which started to alarm, individuals and send the SMS to favored people consequently. If anyone embedded stolen card into ATM When IR detects misuse of ATM this designed system automatically alerts alarm such as buzzer, dc motor control gate, GSM sends SMS to authorized person and the status is displays in LCD to monitor. RFID activates and same activity executes that buzzer will alarm, dc motor close the Entryway and GSM send the SMS to authenticate individual.

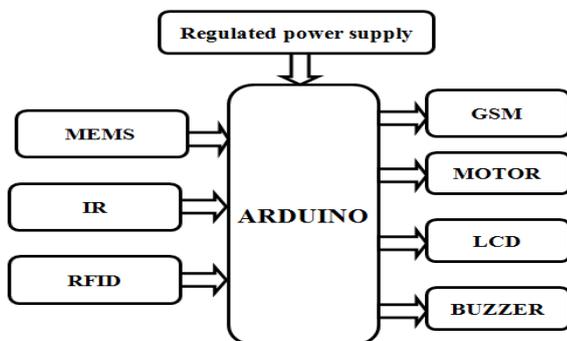


Fig. 2. Block diagram.

It's simple to discover stolen cards and simple to forestall ATM frameworks. LCD which is utilized to display the information the status of working, RFID utilized as ATM card reading module. All info and yield modules interfaced to ARDUINO smaller scale controller by utilizing ARDUINO IDE creating programming.

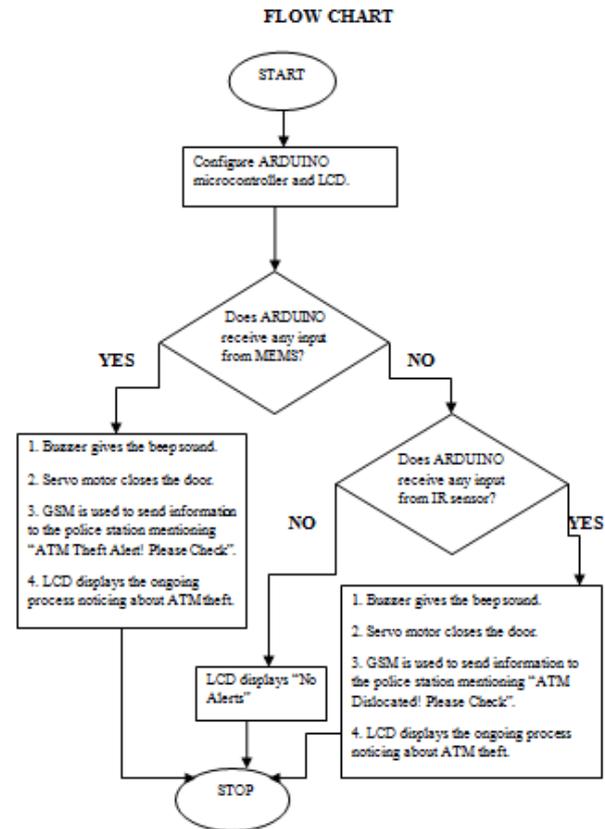


Fig. 3. Flowchart.

VI. ALGORITHM

- Step 1: Start
- Step 2: Initialize port settings of the microcontroller for input and output and also initialize LCD which displays the ongoing process.
- Step 3: Check if ARDUINO receives any input from MEMS?
- Step 4: If yes, then Buzzer gives the beep sound, Servo motor closes the door, GSM is used to send information to the police station mentioning "ATM Theft Alert! Please Check". LCD displays the ongoing process noticing about ATM theft. Then stop.
- Step 5: If no, then Check if ARDUINO receives any input from IR sensor?
- Step 6: If yes, then Buzzer gives the beep sound, Servo motor closes the door, GSM is used to send information to the police station mentioning "ATM Theft Alert! Please Check". LCD displays the ongoing process noticing about ATM theft. Then stop.
- Step 7: RFID card swiped it detect ATM card found in certain ATM center
- Step 8: If no, LCD displays "No Alerts"
- Step 9: Stop.

VII. FUNCTIONAL DESCRIPTION

A. Regulated Power Supply

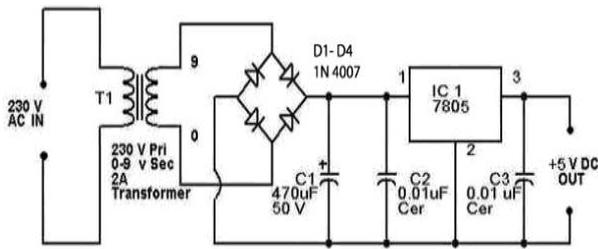


Fig. 4. power supply.

Regulated power supply is the main power source to provide +5v dc to throughout project. This section having step down transformer which converts high voltage to 12v ac voltage and bridge rectifier converts to 10v dc, filter section used to convert constant voltage and finally voltage regulator finally give 5v with 1A power supply to function circuit components perfectly.

B. ARDUINO Micro controller

To plan to the proposed system we are using ARDUINO microcontroller to interface data and yield modules and as getting ready unit. Arduino uno is having 28 pins which are assigned basic and modernized pins D0 to D13 are propelled pins. Each propelled sensor will connect with automated port. A0 to A5 are basic port each straightforward sensor is related with basic port. It is 8 pieces little scale controller and having 32KB memory for data and program memory. Working repeat is 16MHz. ARDUINO progression board we are using ATMEGA328 SMD IC.



Fig. 5. Arduino

C. LCD display

Liquid crystal display used to display the data which used for status of the proposed system. We used 16*2 LCD in the proposed system can display 32 characters from the two rows. LCD driver board used to convert 16 pins to required 8 pins among them four data pins used to display the data and remaining pins are power and special purpose pins.



Fig. 6. 16*2 LCD Module

D. GSM

The GSM is remote frameworks it has low-control, low cost and settlement module. Global System for Mobile is a wireless communication module to send the data or receive the data from one place to another place. In our project we used GSM SIM 800L model which works on 5V Power supply and consumes 100ma Current. Operating frequency of GSM modem is 860 MHz to 960MHz. it can send the data through Transmission antenna and Receive data trough Receiver Antenna. GSM modem works based on AT commands. The role of GSM in this project is to send the SMS when microcontroller request while there will be when ATM crime happens.



Fig. 7. GSM modem.

E. Buzzer

Peizo electrical buzzer which is used to convert electrical signal to sound signal. The function of the buzzer in proposed system is when ever ATM theft occurs or ATM card activated in any ATM it automatically gives sound alert to surrounding people. Operating voltage of the buzzer +5Vdc.



Fig. 8. Buzzer.

F. MEMS Accelerometers

MEMS accelerometers are one of the easiest yet additionally most pertinent small scale electromechanical frameworks.

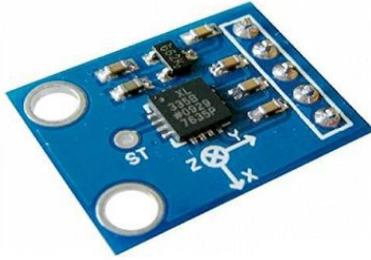


Fig. 9. MEMS module.

They wound up crucial in car industry, PC and sound video innovation. Accelerometer is electromechanical device which will work on the position base. MEMS module he position having 3 axes X, Y, Z. depends on it generate signal and gives to microcontroller. Its works with 5 v power supply. When it tilts or changed its position we use this as alert. In our project when ever ATM is vibrated or changed position.

G. Door close Motor

Door close motor is a DC motor. The working of DC motor is that which convert Electrical Energy to Mechanical Energy. We used DC Motor to control the ATM door when required conditions. This is initiated by Microcontroller. Power supply to DC Motor is 5v DC. When Microcontroller triggers it move clock or anti clock direction.



Fig. 10. power supply.

H. RFID

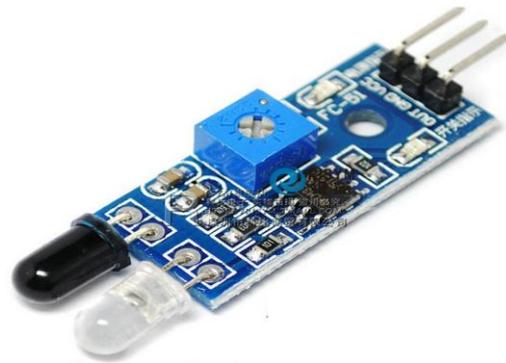
Radio Frequency Identification is wireless communication module transfer data through wirelessly. RFID system have transmitter and receiver RFID Tag acts as Transmitter and collect data, RFID Reader module acts ad receiver to collect the data. Data transfer between transmitter and receiver is due to induced EMF concept. EM18 is the RFID module we used in project Range of RFID is very less 5 to 10 cm. operating voltage is 5V. Role Of RFID In Our Project Is That When RFID Activated It Means That Stolen ATM Card Is Swiped Some Of ATM Center Them That ATM Automatically Send SMS To Authorized As well As Police To Catch Thief.



Fig. 11. RFID Module.

I. Infra Red Sensor

IR Module used to detect object. IR module having 2 sections. Transmitter and receiver. Transmitter which converts electrical energy to light energy. Receiver section which convert to light signal to electrical signal. When object presence in front of the sensor it generate 5v.



J. Software

Introduced structure deals both Software and Hardware. Writing computer programs is critical module to make programming code. To execute proposed technique we used ARDUINO IDE Software for Embedded c language modifying, assembling and dumping. Reenactment is noteworthy gadget to design adventure in every way that really matters, before hardware use. We used proteus Software to amusement of complete endeavor. Express SCH programming used to design schematic graph of adventure.

VIII. RESULT AND DISCUSSION

We successfully interfaced all input and output modules to microcontroller. Controller performed and executed results as per the requirement. We obtained ATM theft detection alert through GSM SMS and status seen in LCD module when both RFID card Swiped and vibration alert from MEMS sensor.



Fig. 12. Output Result 1

Fig 10 shows Implemented hardware circuit of the proposed system. All modules are connected and executed output of the proposed system.

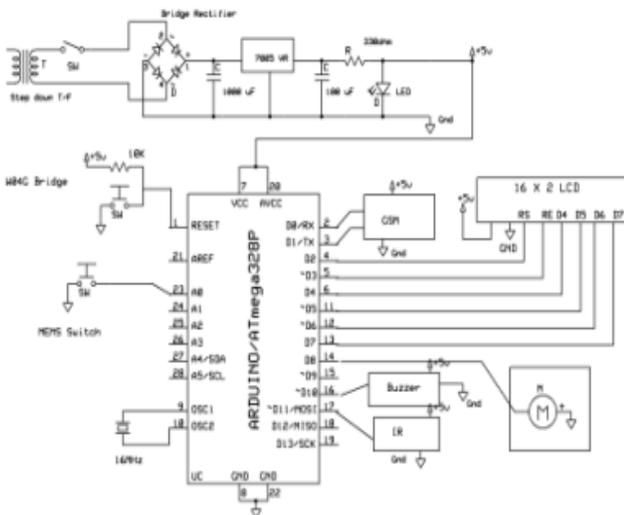


Fig. 13. Schematic Diagram

The above figure represents the schematic diagram of the proposed system, which is integrated with all modules of the system and pin configuration of the proposed system. We implemented using an Arduino microcontroller. The GSM module is configured to TX and RX pins of the Arduino, the buzzer is connected to digital pin 10, the motor is connected to digital pin 8, the IR module is connected to digital pin 11, and the MEMS switch is connected to Analog pin A0. Figure 12 is the output of the proposed system. When the system is given an alert when an ATM crime occurs, at that time the system automatically sends SMS alerts to authorized persons. We received the same alerts for this proposed system. This system is very helpful for crime rates to decrease.

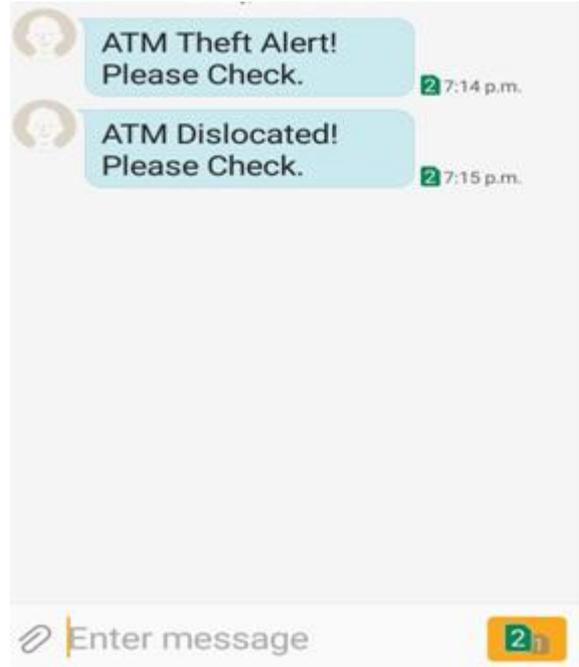


Fig. 14. Output Result 2

OUTPUT 1

A buzzer is used to make a sound. When a MEMS sensor or an IR sensor senses any information and gives it to the ARDUINO microcontroller, then ARDUINO activates the buzzer to make a deep sound in order to alert the surrounding people.

OUTPUT 2

A DC motor is used to close the door. When a MEMS sensor or an IR sensor senses any information and gives it to the ARDUINO microcontroller, then ARDUINO activates the servo motor to close the door in which the ATM is placed.

OUTPUT 3

GSM is actually used to send information to the police station (here in this project to the number allotted in the code). When a MEMS sensor or an IR sensor senses any information and gives it to the ARDUINO microcontroller, then ARDUINO activates GSM to send information to the police station in order to catch hold of the person involved in the crime.

OUTPUT 4

We get GSM SMS when an RFID card is swiped by any other authorized person. It will automatically send SMS, which gives an auto ATM crime detection system.

IX. CONCLUSION

As we all know, nowadays the vast majority of ATM machines have been assaulted by burglaries. Our aim is to prevent all crime on ATM with the proposed innovative methodology. This proposed model shows how a robotization of ATM wrongdoing counteractive action can be executed utilizing GSM innovation, ARDUINO microcontroller, MEMS sensor, DC motor, voice acknowledgment module, in ATM machines focus. By executing this venture we can without much of a stretch avoid the wrongdoing and furthermore we can spare our valuable time. We successfully implemented the system and executed it.

Advantages of Proposed System:

- This project is used to prevent ATM theft and robberies.
- This project is used to catch hold of the thief who is involving in ATM crimes.
- This project provides complete ATM theft security.
- Geological location will always be traced of an ATM machine.
- Maintains the entry of only necessary person.
- This is a formal step towards smart city.
- It is cost effective and efficient.
- Low power consumption.

X. FUTURE WORK

In further work we design a system which supports to send data through server using IOT and for further improvements sensors with better execution level can be sent to expand the productivity and execution level of the framework.

REFERENCES

1. Best Practice for ATM Security (Overview of ATM security situation, forecast, and best practices) GRG Banking Equipment (HK) Co., Ltd .2011/5/27
2. "European ATM Crime Report." The European ATM Security Team. June 2011.
3. Sivakumar T, GajjalaAskok& K. SaiVenuprathap, "Design and Implementation of Security Based ATM Theft Monitoring System",
4. "Global ATM Market and Forecasts to 2016." Retail Banking Research. September 2011. Brochure Pg 2.
5. Kim, Bo-Ra, "Domestic ATM status and meanings", Payment and Settlement, and IT, Vol. 44, pp. 76, 2011.
6. John Adrian Shepherd-Barron, British inventor (1960), "Development the cash machine Automated Teller Machine or ATM

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Mohd. Abdul Naqi received his bachelor's degree in the year 2007 from Dr.VRK College of Engineering & Technology, Karimnagar and Masters Degree from Royal Institute of Technology & Science, Hyderabad. Currently he is working as Asst. Professor in CMR Technical campus, Hyderabad. He is continuing his research work in the area of Image & Signal processing.



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