

COMMERCIAL SECURITY SYSTEM BASED ON ARDUINO USING GSM

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ABSTRACT

In the era of digitalization, everyone needs money without interaction with the bank at any time. So the ATM (Automated Teller Machine) are installed everywhere in the localities. As the number of ATM increased, prevention of theft and security of customer is the prime objectives. At present, security systems are not highly secured as they are only provided with alarm system. This project deals with designing of ATM security system using multiple sensors and GSM modem. The prime objective of this project is, to secure the ATM system using sensors and GSM modem. In this project, when the thief enters and tried to harm the machine, the sensor which is attached to the machine gets data and sends the signal to the ARDUINO microcontroller. Once the controller receives signal, it lock the door of ATM room by sending signal to the dc motor, the buzzer and flasher light will also be getting activated at the same time to alert the nearby people of the ATM system. Simultaneously, the controller will send a message and make a phone call to an door is made to open only entering the passkey through a message send by an authorized person. The project is designed and worked successful

Keywords : ATM, GSM, ARDUINO, SECURITY SYSTEM

INTRODUCTION

In present scenario, ATM has become one of the most important facilities in our day to day life. This facility enables us to withdraw the money from the authorized account at any time. Security is the major aspect, as the need of ATM is increasing day by day. Security systems are the demands of the day, which helps to avoid theft. Although the banks are deploying security personnel at the ATM spots, but the security arrangement is not quite good enough to secure the facility in case a group of thieves tries to stole the ATM machine. Recently we have seen many cases wherein a group of people entering into ATM and overpowering the security personnel and stole the money from the ATM. Generally a single person is unable to handle the gang of robbers. Thus an automatic security system plays very important role to avoid robberies.

However the crime related with financial organization has been increased in proportion to the ratio of spread out of automation and devices. Those crimes for the financial organization have been increased gradually from year 1999 to 2003, little bit decreased in 2004, and then increased again from year 2005. In the year of 2007, 212,530 of theft and 4,439 of robber cases are happened, and 269,410 of theft and 4,409 of robber cases are happened in year 2010 and also in the year 2011, 270,109 of theft and 4,509 of robber cases are happened. So that the cases of theft and robber have been increased gradually during past 12 years. Among the crime

for financial organization, the cases of theft and robber have very high proportion of over 90% and the crime for the ATM has been increased because the external ATM has been increased and it is always exposed to the crime. Therefore, this study is going to suggest the method of rapid reaction and minimization of loss by detecting the ATM machine at real-time when it has been stolen can be found through GSM technology.

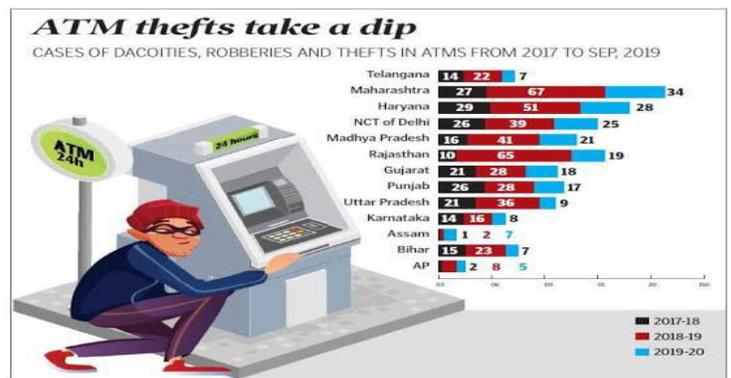


Figure 1: statistics of ATM theft

The proposed project consists of an idea of implementing Vibration Detection sensor, Temperature sensor, Door open or close indicating sensor. These sensors will generate a signal whenever someone tries to forcefully damage or burn or open the ATM machine. After detection of such signal immediately an SMS will be

sent and make a phone call to the authorized person of the bank, making him/her aware of the situation. Also we are using an automatic door open and closing technology and alarm system.

OBJECTIVES

- To overcome the ATM theft.
- Restrict the entry of any unauthorized person.
- Provide more security.
- Formal step towards smart city.

REVIEW OF LITERATURE

Bharati M Nelligani; N V Uma Reddy; Nithin Awasti : This paper gives the description of the new approach towards the security of ATM (Automatic Teller Machine) systems. The objective of the paper is to know the Enhanced smart ATM security system which is developed using the Embedded system and advanced technologies. In our proposed system RFID card is used as ATM card, IR sensor in order to sense the presence of the card holders and to turn on Fan and Light, if ATM is tampered then SMS is sent to two main stations via GSM. GPS is used to track the location in case the cash box is robbed. Finger print is used to identify and verify authorized bank personnel. Hence the proposed system is the highly secured system for ATMs

Jalla Pavan Sai Kumar Reddy: Automated Teller Machines (ATMs) security is the field of study that aims at solutions that provide multiple points of protection against physical and electronic theft from ATMs and protecting their installations. From anti-skimming defend systems to silent indicate systems, integrated ATM video surveillance cameras and ATM monitoring options, security specialists are ready to help the people get more out of the ATM security and ATM loss prevention systems. The implementation is achieved with the use of Machine-to-machine (M2M) communications technology. M2M communications is a topic that has recently attracted much attention. It provides real-time monitoring and control without the need for human intervention. The idea of M2M platform suggests new system architecture for positioning and monitoring applications with wider coverage and higher communication efficiency. The aim of the proposed work is to implement a low cost standalone Embedded Web Server (EWS) based on ARM11 processor and Linux operating system using Raspberry Pi. It offers a robust networking solution with wide range of application areas over internet. The Web server can be run on an embedded system having limited resources to serve embedded web page to a web browser. The setup is proposed for ATM security, comprising of the modules namely, authentication of shutter lock, web enabled control, sensors and camera control.

Sudhakar Hallur, Manjunath Bajantri, Sagar Santaji : Automated Teller Machine (ATM)'s now a days are

extensively used all over the world for the withdrawal of cash. A unique card is issued for each user along with the unique code provided to him so as to the person may do all his transactions personally without anyone getting known. Since transactions are extensively secure there is no much more security required but in countries like India its very necessary to have a physical security to the machine. A provision to give physical security to the machine is being discussed over here in this paper presented over here.

K. Hema Sai Sivaprasad B. Kanna Vijay: Nowadays security is the main concern and that too in case of ATMs it is very critical. The main aim of this project is to provide the security to the ATMs from theft as well from physical damage. Automated Teller Machines (ATMs) security is the field of study that aims at solutions that provide multiple points of protection against physical and electronic theft from ATMs and protecting their installations. M2M communications is a topic that has recently attracted much attention. It provides real-time monitoring and control without the need for human intervention. The idea of M2M platform suggests new system architecture for positioning and monitoring applications with wider coverage and higher communication efficiency. The aim of the proposed work is to implement a low cost standalone . The setup is proposed for ATM security, comprising of the modules namely, authentication of shutter lock, sensors and message alert. If burglars try to theft the ATM by destroying it, then the vibration sensor will activate and buzzer will give alert and the alert message was sent to the authorized person. If any person locked inside the ATM after lock of the ATM, then the PIR sensor will activate and send the alert message again. For locking and unlocking the ATM we are using a switch in the prototype. If the smoke was detected in the ATM, the smoke sensor activates and switch on the gas spray by using the relay. SD card was used to store the sensor values along with date and time for future monitoring.

Sivakumar, Gajjala Askok, k. Sai Venuprathap: The Idea of Designing and Implementation of Security Based ATM theft project is born with the observation in our real life incidents happening around us. This project deals with prevention of ATM theft from robbery. so overcome the drawback found in existing technology in our society. Whenever robbery occurs, Vibration sensor is used here which senses vibration produced from ATM machine. This system uses ARM controller based embedded system to process real time data collected using the vibration sensor. Once the vibration is sensed the beep sound will occur from the buzzer. DC Motor is used for closing the door of ATM. Stepper motor is used to leak the gas inside the ATM to bring the thief into unconscious stage. Camera is always in processing and sending video continuous to the PC and it will be saved in computer. RTC used to capture the robber occur time and send the

robbery occur time with the message to the nearby police station and corresponding bank through the GSM. Hear LCD display board using showing the output of the message continuously. This will prevent the robbery and the person involving in robbery can be easily caught. Here, Keil tools are used to implement the idea and results are obtained. keil tools is used for run the DC motor and stepper motor for automatic door lock and also leak the gas inside the ATM.

WORKING METHODOLOGY

Block Diagram

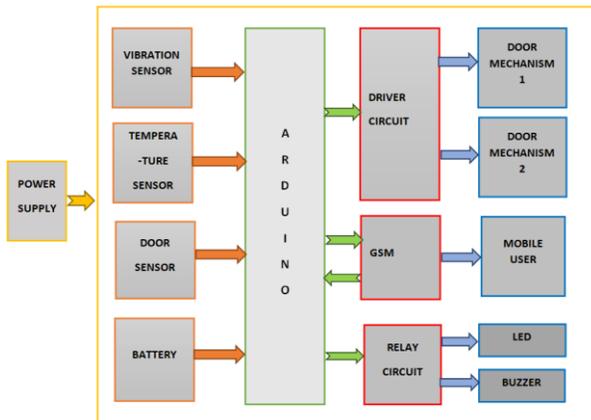


Figure 4.1 BLOCK DIAGRAM

Explanation of Block Diagram

- The 12v dc is converted to 5v and 12v supply by using a regulator IC and it is given to the controller and the corresponding sensor.
- The vibrating sensor is used to detect the vibration on the ATM machine. The sensor which is attached on the ATM, when they tried to hit or cut the ATM machine through hammer send the signal to arduino. The signals are input as analog.
- Temperature sensor is used to monitoring the temperature. Here, we use LM35 sensor. It sends the data to the arduino when ATM machine temperature raises above set values, the arduino gets input from it.
- In controller, vibration ranges are set previously whenever, it gets above from range sends the signal to the arduino.
- The door sensor is used to detect opening the door of the ATM. When they tries to open the door, it sends the signal to the controller.
- Once the controller receives the signal from the

sensor. It gets communicate with GSM through serial communication (Rx,Tx).

- Then GSM sends a message and makes a phone call to an authorized person.
- Simultaneously ATM door will be closed with the help of dc motor circuit. Operates the door mechanism1 (i.e) close the door and door mechanism 2 (i.e) open the door of the ATM room.
- The door is made to open only after entering password through send a message to the controller.
- The finally alarm system will also activated with the help of controller through relay circuit.
- Thus relay circuit will also controlled by sending a message to the controller why because, whenever bank staffs worked with ATM machine at the time they will switch off the alarm system. The flashing LED and buzzer are used for alarm system.

CIRCUIT DIAGRAM

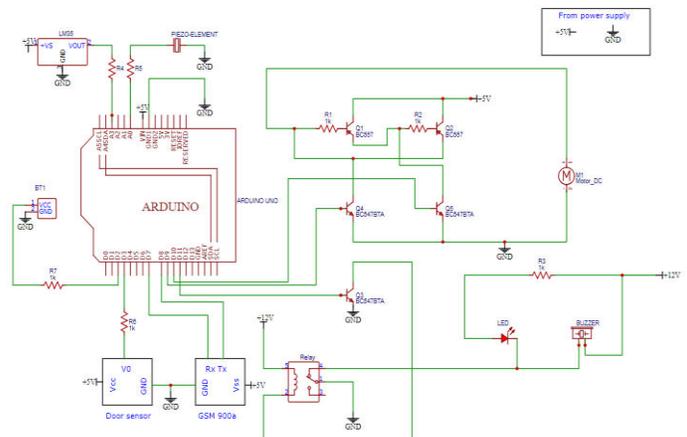


Figure 4.2 CIRCUIT DIAGRAM

Explanation of Circuit Diagram

- Sensors like LM35 sensor, door sensor have positive terminal that is connected to the 5v supply and the negative terminal connected to the common ground.
- Piezo electric device and LM35 sensor output pins are connected to the analog pin of arduino.
- Then door sensor and battery output voltage pins are connected in digital pins of arduino.
- 12v power supply is given to the buzzer, LED, relay circuit.
- Arduino, GSM, dc motor driver circuit works on the 5v dc supply.
- Then, the transmitter Tx of arduino is connected to the Rx receiver of GSM module and the receiver Rx of the arduino is connected to the Tx

transmitter of GSM module.

- Finally, all the outputs are taken from the digital pin of arduino then it is connected to the corresponding components of the project.

4.3 ACTIVITY DIAGRAM

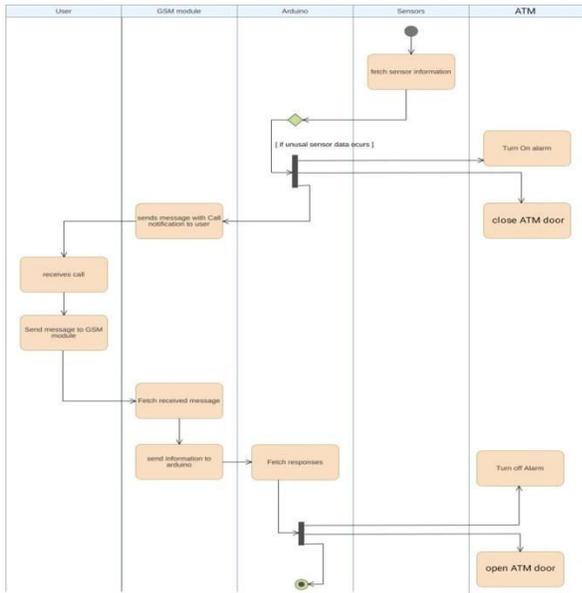


Figure 4.3 ACTIVITY DIAGRAM

SOFTWARE RESULT

Screenshot of the data coming from the sensors .when theATM is in normal condition we get null readings from the sensors. Shown in figure 5.1

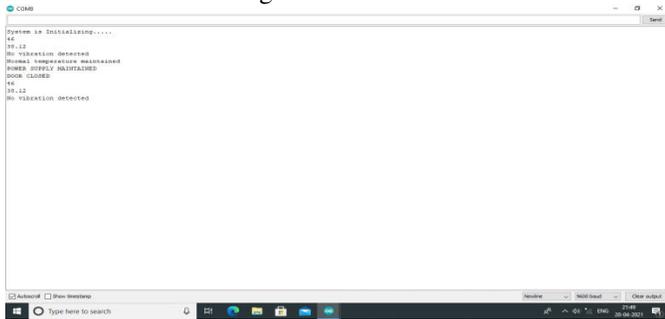


Fig 5.1 Software Result

Screenshot of the data coming from thevibration sensor when theATM is hit.When the vibration sensorsenses the pressure, we are getting a reading proportional tothe force applied. We get null readings, when no force isapplied. Shown in figure 5.2.

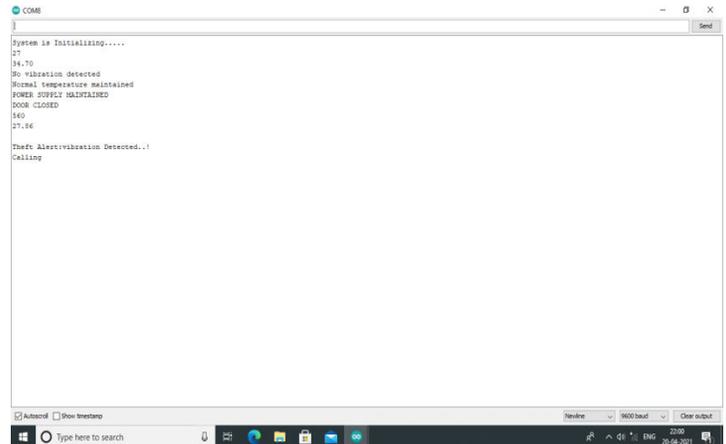


Fig 5.2 Software vibration sensor

Screenshot of the data (in degrees) coming from the temperature sensor. When temperature raises above from normal temperature. This sensor is placed on a metal surface of the ATM machine. Shown in figure 5.3

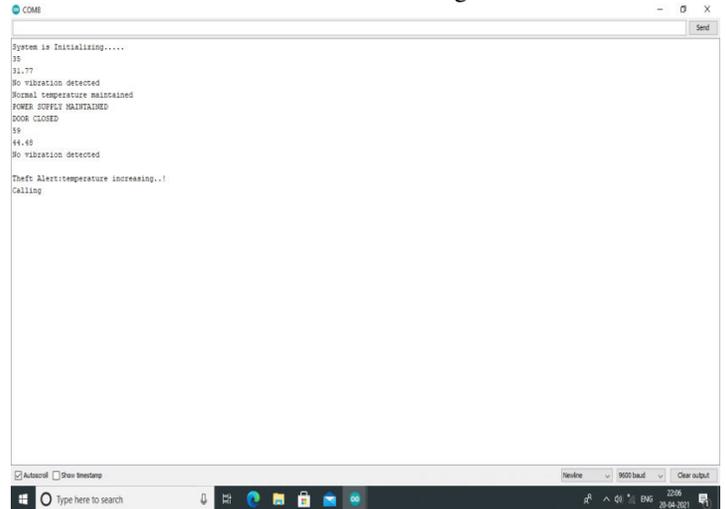


Fig 5.3 Software - Temperature

When a person tried to shut down the power supply of the ATM machine, the sensor sends the data to the controller. Shown in figure 5.4

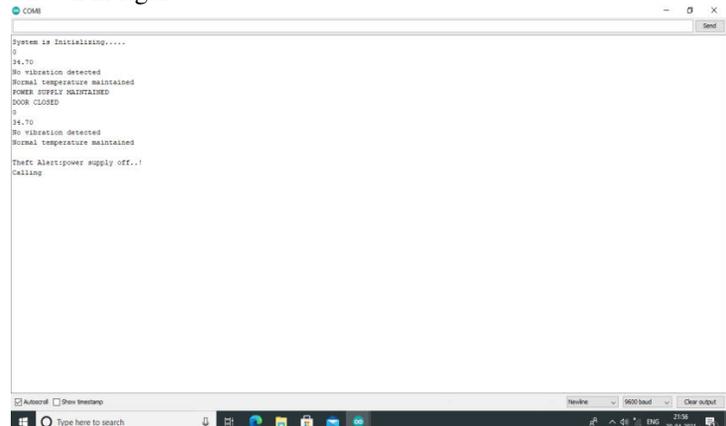


Fig 5.4 Software – Shut down

When a person tried to open the door of the ATM machine, the sensor sends the data to the controller. We get null readings, when door is closed. Shown in figure 5.5

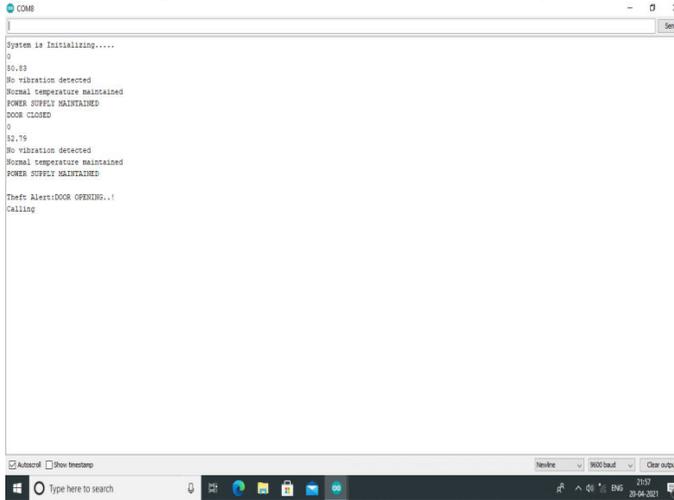


Fig 5.5 Software - Open door

RESULT & DISCUSSION

First step: we hit the proposed model of ATM machine ,the vibration sensor sends the data to the arduino.Then the arduino closes the atm door and activate alarm system.After few seconds,we receive a alert message (i.e Theft alert : vibration detected)with phone call in our mobile from GSM.

Second step: we use a candle for increasing the temperature of the ATM machine from normal temperature .when the temperature raises above 100 degree Celsius ,the sensor LM35 sends the data.Then again arduino closes the atm door and activate alarm system. After few seconds,we receive a alert message (i.e Theft alert : Temperature increasing) with phone call in mobile from GSM.

Third step: we cut the power supply cable of anyone sensor,then again above process will happened (i.e door closing mechanism,alarm activation, and receive a phone call with sms.).

Fourth step: we open the proposed model of ATM machine, the door sensor sends the signal to the arduino.Then the arduino closes the atm door and activate alarm system.After few seconds,we receive a alert message (i.e Theft alert : door opened) with phone call in our mobile from GSM.

Fifth step: we tries to open the atm door through sms.The

door will be opened ,after sending a password to the GSM.

TOP VIEW OF THE PROPOSED WORK

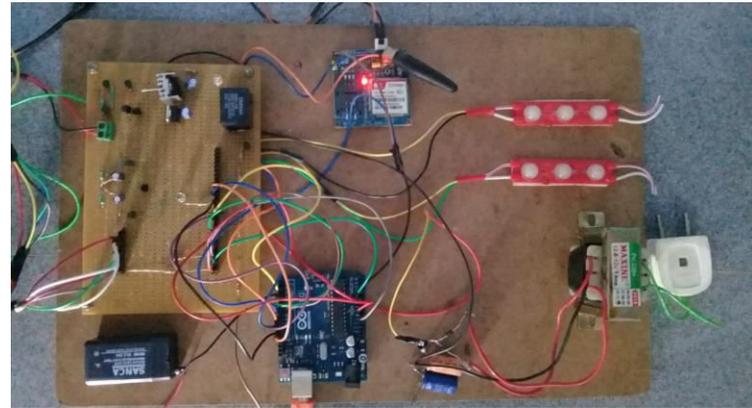


Figure 6.1 (a) TOP VIEW OF THE PROPOSED WORK



Figure 6.1 (b) TOP VIEW OF THE PROPOSED WORK

FRONT VIEW OF THE PROPOSED WORK

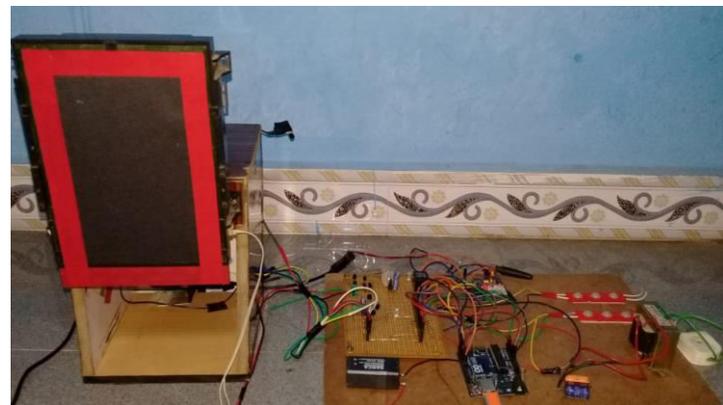


Figure 6.2 FRONT VIEW OF THE PROPOSED WORK

CONCLUSION

Our suggested security system will be very much effective to reduce the ATM robbery. This secured system will also help the higher authority to take necessary steps

before happening of a theft or unauthorized access by any trespasser. Limitation of this proposed system may be a little bit costly as compared to current ATMs, but when it's all about someone's money, potentiality is more of this system. This advanced ATM theft security system will provide secured, smarter and better tomorrow for the human being.

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