

ATM Security System

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Abstract: The need of security for all things that exists in this world of technology nowadays is very crucial. There are various types of security system that have been created to give an assurance to the people to live more safely in a peaceful environment. This includes the ATM machine which is used daily by all people to withdraw money from their saving accounts. As the crime rate is increasing, security system for ATM is extremely essential. With this high-tech ATM security system, the implementation of using Global System for Mobile communication (GSM) technology and Global Positioning System (GPS) will focus on the security elements to notify the authorized personnel whenever the ATM machine being stolen or taken away from the bank, especially during the wee hours and at public places with a small crowd. For further implementation of the technology used, we need to interface the sensing elements such as a vibration detection sensor, MIC and PIR sensor with a GSM, GPS module to an ARM Controller which is programmed using software. The usage of GSM in this project is done because this network system has a worldwide coverage compared to other network systems. GPS is used for finding the location of the stolen ATM machine. In order to achieve this, the detectors have been installed at the back of the ATM machine and if there is a movement that will change the condition of the sensors. As a result, the GSM, GPS will act as an informer to the bank security and police forces informing them about the robbery by sending SMS and location. The efficiency and effectiveness of this system could be a great help in informing the authorized forces regarding the unfortunate incident.

Keywords: ATM machine, GSM module, Short Message Service (SMS), ARM Controller, GPS.

1. Introduction

The rapid growth in Automatic Teller Machines (ATM) has made day to day life easy. But the crime for financial organization, the cases of theft and robbery have very high proportion of over 90% and the crime for 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 GPS and GSM technology. So, by using this technology, Vibration sensor, PIR sensor, MIC theft of ATM machine can be predicted. The idea of designing the implementation of security-based ATM machine project is born with the observation in our real-life incidents happening around us. In this project we are going to design a system which will

help to catching the thieves when an attempt is made to stole the ATM machine.

In the proposed system we are using GSM and GPS based ATM monitoring and control system. ATM is monitored with vibration sensor, PIR sensor and MIC. If any person tries to break ATM it will get detected using vibration sensor. The MIC there will recognize if there is any loud noise near the ATM. The PIR sensor detects if any movement is going on near the money deposited in the back of the ATM machine. Whenever all these conditions are sensed by the sensors the police station and the bank get notified. The proposed system is a 'bidirectional system' which will send the location of the ATM machine to the police station and bank whenever they ask for it. That means the location will continuously be tracked by the police and they will get to know about where the machine is and also about the robbers. The person who is in-charge of the bank to deposit the money in the ATM should have a registered mobile number that can be used to access and deposit money in the ATM. In this way the difference between the robber and the person in in-charge can be done by the system.

So, by using this system we can monitor and control the number of cases happening. Because of this, system there will be improvisation in security and the number of cases will reduce.

2. Literature Survey

Nowadays there is no particular security system for ATM machines. The only security system provided at the ATM centers is ATM card detector near the doors. If the inserted card is authorizing then the door will open automatically [1]. Ajaykumar et al., implemented an "Anti-Theft ATM Machine Using Vibration Detection Sensor." It provides security for the ATM machine itself. When the attacker tries to damage the ATM machine vibration detection sensors gets activated. A message is passed to the nearby police stations with the help of GSM modem. We are using vibration sensor concept. It will sense if there is any breaking or vibration movement.

Another development done by author has various features that were added like image processing, GSM, vibration sensor, door locking mechanism and access card method. [2] A.P. Suganth, A. Suriyakumar, et al: developed system named as "Smart Security System in Automatic Teller Machine." This

research paper is based on the concept of smart security system in ATM by using face recognition, finger print scanner and ATM access card method. Vibration sensor is used here which senses vibration produced from ATM machine. ATM access card stores the finger print and face of the human. This card is used to open the door. This system based on embedded system to process real time data collected using the vibration sensor. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. Stepper motor is used to leak the anesthesia gas inside the ATM to bring the thief into unconscious stage. We are using GSM modem concept. Through GSM module the bank and police station will be notified about the security alertness of the system.

Now-a-days 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 as from physical damage [3]. K. Hema Sai Siyaprasad et al: "Design and Implementation of Anti-theft ATM Machine using Embedded system." 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 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, a switch on gas spray by using the relay. SD card was used to store the sensor values along with date and time for future monitoring. By using PIR sensor, it will sense if there is any movement near the money which is deposited at the back of the ATM and switch is used for locking and unlocking the ATM.

3. Block diagram and Description

A. Transmitter

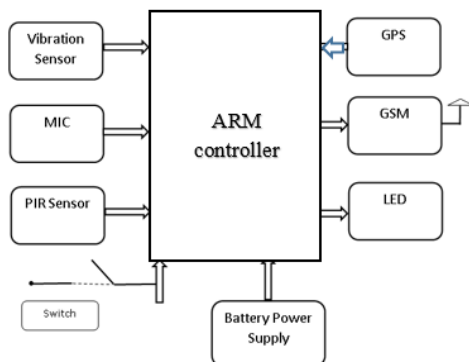


Fig. 1. Transmitter Block Diagram of ATM Security System Receiver

Figure 1 shows the block diagram of transmitter. The blocks connected here are PIR sensor, vibration sensor, MIC, ARM controller, GSM, GPS module, battery power supply and a switch. The system acts as an ATM Security System and sends data to the nearest police station and bank. For this the GSM

and GPS based system is used along with the ARM controller.

B. Receiver

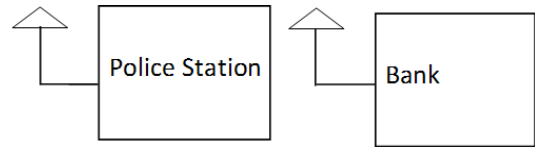


Fig. 2. Receiver Block Diagram of ATM Security system

Figure 2 shows the block diagram of receiver. The block connected here is of receiver at the police station and bank based on the condition will take necessary actions accordingly. Whenever the system detects any of the movement i.e. the movement detected by PIR sensor, breaking action detected by Vibration sensor and any noise detected by MIC then the data is sent to the ARM controller according to their threshold decided by the bank and the police station. If the actions exceed their threshold value, the message is sent to the bank and the ATM about the location and status of the ATM. And according to the status the bank and the police station will take necessary actions. The sensors will continuously sense the signals and will repeat the loop. The system is bidirectional the police and the bank can check the location and status of the ATM. When the bank person comes for deposition of money in the bank, there will be switch there which they have to press and after pressing the switch the person will receive a message via GSM and will get access to deposit the money. As soon as the person presses the switch all the sensors will be disabled. After the deposition of money, the person has to reply to the message sent to him and again the sensors will be enabled and will restart their process. All these processes will be on a continuous loop and bidirectional.

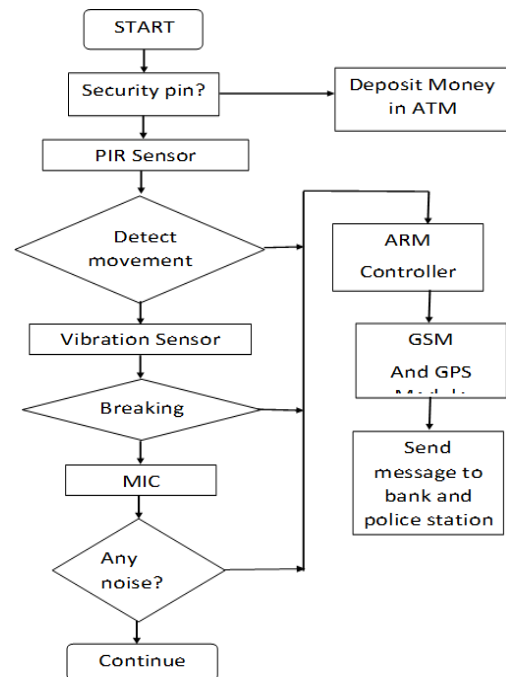


Fig. 3. Flowchart

The LPC2138 microcontroller are based on a 16-bit/32-bit ARM7TDMI-S with real-time emulation and embedded trace support, that combine the microcontroller with embedded high-speed flash memory ranging from 32kb-512kb. A 128-bit wide memory interface and unique accelerator architecture enables 32-bit code execution at the maximum clock rate. Serial communication interfaces ranging from USB 2.0 full speed device, multiple UARTs, SPI to I2C-bus and on chip SRAM of 8kb up to 32kb, make these devices very well suited for communication. Various 32-bit timers, 10-bit ADC(s), 10-bit DAC, PWM channels and GPIO lines and external interrupts pins make this microcontroller suitable for industrial control.

4. Expected results

The implementation of realization of “Design and Implementation of ATM Security System” is has been done successfully. If the sensors exceed the threshold values, it will give the proper signal to GSM through controller and send messages to bank and police station and then find location through GPS. then the communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements.

We have threshold values for these sensors,

- Vibration sensor: 2.12v
- PIR sensor: 2.25v

5. Conclusion

The proposed system ensures to develop advanced ATM

security system. Our suggested system will be very much effective to reduce the ATM robberies. This secured system will also help the higher authority to take necessary steps when unauthorized access by any trespasser. It can be installed in the back of the ATM. This Proposed system is very effective in many ways from older ATM robberies and theft control systems. Before used systems are very expensive and not effective. It is reliable, inexpensive system. This advanced ATM security system will provide secured, smarter and better tomorrow for the Banks.

References

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