ATM CRIME PREVENTION SYSTEM

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Abstract

This paper presents an Automated Teller Machine (ATM) surveillance system to increase the security which is a smart system based on embedded technology. To avoid ATM fraud, the secure electronic transaction has become a top priority. This system consists different sensors to continuously monitor its surroundings for suspicious activities like physical attack, break-in and theft that might jeopardize the ATM and people nearby the machine. For proper surveillance we have also discussed the security and safety measures that can be implemented to prevent such raids. This paper focuses on different forms of physical attacks on ATM's and the methods that are used to detect the threat, commence proactive measures and tip-off officials through GSM network. Three security tools are proposed to enhance ATM transaction security.

Keywords- ATM, embedded technology, GSM network, ATM transaction security.

Introduction

Modern era has one of the primary concerns as the security. Due to the easy and readily available cash at everyone's convenience, Automated Teller Machines (ATM) today have become areas of target. The biggest disadvantage of using electronic sensors and machinery is that the data can be hacked and leaked, privacy violated, theft and burglary. ATMs are open throughout the day as 24 hours; their locations are also at prime spots in the city. As the bank is under high security, it is very difficult to steal money from bank. Hence, an ATM is in great danger of being burgled.

Due to this easy and readily available cash at very convenience, ATMs have become areas of target. Hence, the attacks on the ATMs are increasing slowly. This is a serious problem for banking sectors and law enforcement authorities. The sole purpose of the ATM is to provide service to customer through automation and reduce manual interaction through the bank. Therefore, the security provided must be efficient and automatic. To fulfill this purpose, in this research paper a secure layer for electronic transaction mechanism of ATM is developed. The main goal of the proposed mechanism is to reduce anonymity and increase authenticity, protect bank assets, confidentiality as well as users' trust towards ATM electronic transaction security and to make the place more secure for money transactions.

The proposed paper includes the embedded system which includes three sensors namely; Piezo sensor, PIR sensor and microphone. Three parameters are taken into consideration with respect to the various situations that can occur in the ATM booth when a robber tries to steal the money or break-in ATM. After detecting the threat from any of the different sensors implemented, the system will send the alert message to the police and bank authority in order to take the immediate action against the incident.

Literature Survey

Much research work has been done to increase the security level of the ATM. ATM security and surveillance had become an active research area which attracts researchers from all around the globe since last one decade. At the initial stage, security of ATM environment was limited to the detection of individual objects like helmet, knife, pistols, daggers, etc.

Raj M and Anitha Julian discussed the use of Machine-to-machine (M2M) communications technology. They implemented a low cost stand-alone 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. (ICCPCT 2015 IEEE)[1]

Jacinha V, Jamuna Rani S verbalized Protection of ATM is supplied through putting CCTV protection cameras and Emergency sirens. Other strategies are researched to put in force at low price embedded internet server. An anti-theft device is applied by way of the use of gadget to gadget and RFID. (ICONSTEM 2017 IEEE)[2]

Sambarta Ray and Sauvik Das proposed a system having detection of human face and number of the persons inside the ATM booth. Also it can detect whether a person is wearing mask or not. (INDICON 2015 IEEE)[3]

S. Shriram and Swastik B. Shetty with introduction of some parameters measurement with particular sensors. The proactive measures that are employed in the system are the siren, notification to officials using GSM and visual alert in the ATM kiosk (ICCPCT 2016 IEEE) [4]

Prachi More and S. Markande implemented a system based on Biometric technology and RFID technology. First module placed in the door and second module is placed inside the ATM center. (IJARCCE 2016)

Objectives
The objectives of offered work are as employs:

1) To detect the vibrations to the ATM machine for a longer duration of time.

2) To detect the uneven motion for a longer duration of time behind the machine.

3) To detect the increase in sound level in case of screaming or shouting in ATM booth.

4) To make the place more secure for money transactions.

Methodology

When there is damage or mishandling for longer time to ATM machine, piezo sensor is used to sense it. Also when any mishap occurs to an individual during using the ATM machine and the thief tries to snatch away money or try to harm the individual then if the victim will shout and it will be captured by mic and the input is compared by comparator with the reference voltage which is set already. When there is an uneven motion of an individual for longer time around ATM machine, then it will be sensed by PIR sensor. If any of one condition is sensed, then by using the GSM module, a SMS will be sent to the bank authority and the nearby police station so that they can take an immediate action to track the robbery. Also there is buzzer connected to alert the surrounding people about robbery.

Components used:
PIC 16F877A: The 44-pin IC having four I/O ports with 15 interrupts and 3 timers. It consists of Synchronous Serial Port (SSP) with SPI and I2C mode. 10-bit, up to 8-channel Analog-to-digital Convertor (A/D).

1) PIR Sensor: Compact and complete, easy to use Pyro-Electric Infrared (PIR) Sensor Module for human body detection.
2) Piezo-Electric Sensor: The Piezoelectric sensor is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge.
3) Microphone: The specifications of any particular mic, and its sound, are often more important than whether that mic is an LDC or SDC.
4) MAX 232: dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F.
5) GSM Module: It stands for Global System for Mobile communication. Used to establish communication between a mobile device or a computing machine and a GSM or a GPRS machine.

Software Used:
1) Proteus Design Suite: The Proteus Design Suite is a software tool suite used mainly for electronic design automation. To create schematics and electronic prints for manufacturing printed circuit boards this software is used mainly by electronic design engineers and technicians.
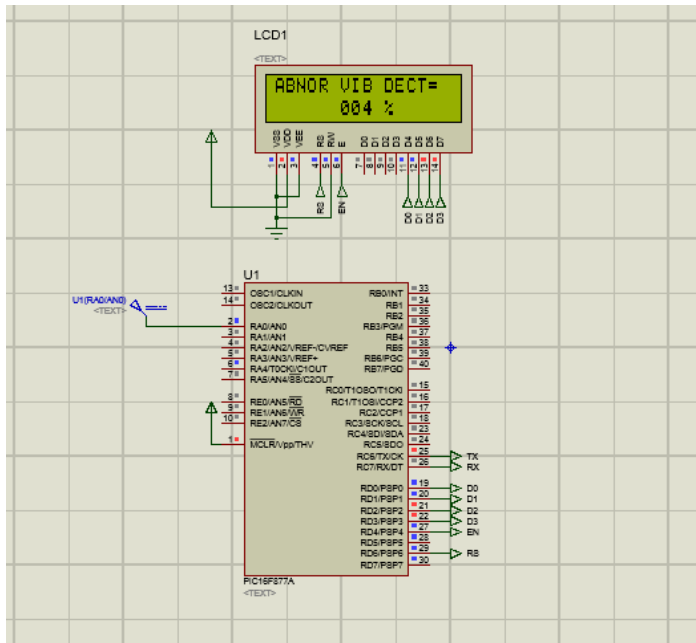2) MPLAB Software: MPLAB IDE is a free, integrated toolset for the development of embedded applications on Microchip's PIC and dsPIC microcontrollers. It provides a single integrated environment to develop code for embedded microcontrollers. Hence it is called an Integrated Development Environment, or IDE.

Future Scope:
In future by implementing this system, the security of the ATM can be improved. As the ATMs are one of the most important aspects of banking sectors, they should be more secure place for the transaction in future. By processing the real-time data, one can take action immediately and in less time as compared to now-a-days action.

Result:
Following is the result of the Piezo-electric sensor simulation.

Conclusion

The implementation of ATM security system by using smart sensors and GSM/GPRS modem took advantages of the stability and reliability of sensor characteristics. Therefore the proposed security system here utilizes the latest technology like smart sensors and GSM/GPRS modem which as a system has a very good endurance in the long run, which makes it ideal for protecting the ATM. It uses PIC controller based embedded system including PIR and piezoelectric sensors as well as microphone to process real time data collected using the sensor. Using this real time data nearest police station can be contacted using GSM module and crime can be prevented.

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