

ATM Anti Theft System

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ABSTRACT

The present day security measures taken in order to protect the ATM premises involves the remote monitoring of the premises by surveillance cameras and employing of security guards on a shift basis so as to prevent unwanted disturbance and theft occurrences. Despite the above mentioned security measures taken, the efficacy of these measures remain futile since they do not provide effective security in terms of money deposited in the ATM against the theft attacks to the ATM by means of cutting, drilling operations carried out by the thieves as well as no mechanism is employed to prevent the escape of thief during the event of theft. Hence, the proposed ATM ANTI-THEFT SYSTEM provides comprehensive security to the ATM by safeguarding the cash deposited in the vault box of an ATM machine by means of automated vault drop system as well as preventing the escape of the thief from the ATM premise by means of automated shutter locking system and alerting the bank and the concerned authorities by means of sharing the event of theft through SMS text message.

Keywords: Remote Monitoring, Security, ATM, VAULT BOX, SHUTTER LOCKING SYSTEM.

I. INTRODUCTION

An automated teller machine is an electronic telecommunications device that enables the customers of a financial institution to perform financial transactions, particularly cash withdrawal, without the need for a human cashier, clerk or bank teller. The modern cash machines involves the identification of customer by inserting a plastic ATM card with a magnetic stripe or a plastic smart card with a chip that contains a unique card number and some security information such as an expiration date or CVVC (CVV). The proposed system consists of vibration sensor which is placed inside the ATM machine. The vibration sensor goes high when it gets excited due to the external applications like pressure or any type of vibrations which are carried out during the event of the theft. The vault drop mechanism is enabled once when the vibration sensor gets activated. Thus this vault drop system is the key security system of the proposed system which helps to safeguard the cash present inside the ATM machine. Once when the vault drop mechanism is activated during the time of theft, the GSM SIM900 module shares the information of the event of theft occurred to the concerned bank officials and to the nearby police station.

II. EARLIER WORKS AND SOLUTIONS

ATM theft is one of the major threat to the country and as well as it leads to the huge monetary loss to the Banks. Several attempts were made to propose a security system using surveillance cameras, where the drawback lies with that those cameras have been either tampered using software or they have been damaged during the event of the theft attempt made.

Raj M. [1] proposed a system which works on the RFID card reader which enables to open and close the entry door once when the RF senses the particular data registered on the database. The system is now not available in many ATM locations due to the failure of the system or proper response is not achieved. But the proposed system uses door locking system using RFID, the thief can easily break out the glass

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during the time of theft and yet a proper solution for the shutter locking system is not discussed in the paper detailed.

M. Ajaykumar and N. Bharath kumar [2] proposed a system of anti theft security system which uses a vibrational sensor which gets activated or goes high the integrated GSM SIM900 module shares the event of theft to the officials. But the proposed system does not prevent the escape of thief from the ATM premises and any solution to the cash deposited or cash stored in the vault is not safeguarded using this solution.

G. Nagarajan and Sanjana devi.V. V [3] proposed a system which implies the security using a facial recognition system. This type of security system provides only security to the authentication and doesn't involve and other for providing security to the cash deposited is unavailable or information of thief is not shared to the officials.

III. DESIGN OF THE SYSTEM

1. The cash deposited in the ATM machine is isolated using vault drop system.
2. The information of theft or the event of the theft occurred is shared to the concerned bank officials and the nearby police station using GSM SIM900 module.
3. The shutter door locking system prevents the escape of thief from the ATM premises or location.

3.1. Vault Drop Mechanism

The cash in an Automated Teller Machine is stored in the vault of the ATM machine. No such system is proposed system gives a proper solution for the cash security in the vault. The vault drop mechanism is activated using the Vibration sensor. The vibration sensor is placed on the sides of the Automated Teller Machine (ATM). The Vibration sensor goes on or will be high when cutting operations or drilling operations are carried out during the time of the theft. Once when the vibration sensor is activated this actuates the vault drop mechanism. The vault drop mechanism is employed using two dc geared motors. These motors are driven using the motor driver for providing corresponding output voltage for specific motor to be activated. The vault drop is activated using slider crank mechanism. This mechanism works on the reciprocating motion. This enables the vault to be moved down and isolated from the machine. The flapping mechanism then hides the vault from the machine. The below figure 1 is the vault drop model with associated sensors.

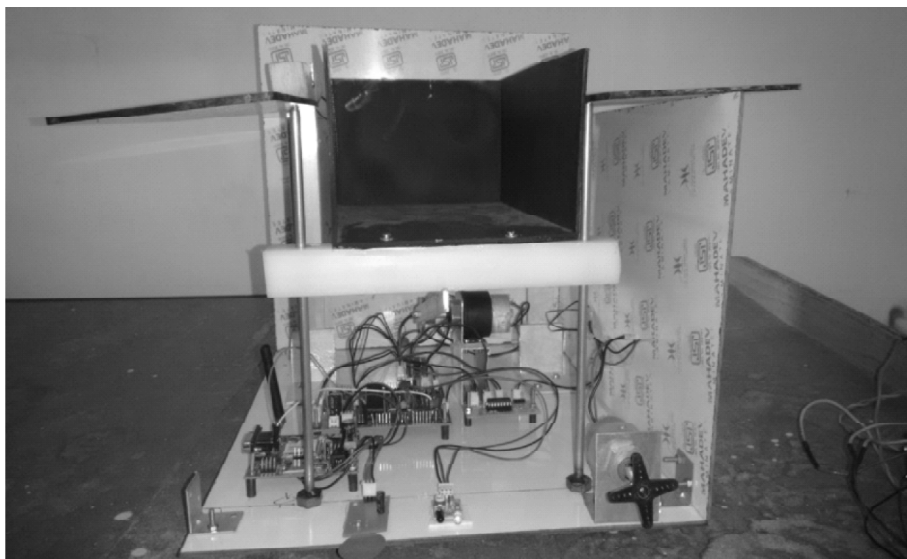


Figure 1: Vault Drop with Slider Crank Mechanism

3.2. Theft Alert System

The figure 2 theft alert system consists of GSM SIM900 module integrated with vibration sensor and the PIC microcontroller. The connection is achieved using an UART cable to the GSM and the PIC microcontroller. The GSM SIM900 module is a special type of communication module which enhances its communication by sending and receiving the calls and SMS. The important aspect of using GSM SIM900 module is that it has capability of storing minimum of 15 contacts and the maximum of 20 contacts. The vibration sensor senses any physical change during the cutting, drilling, and breaking of the ATM machine. During this when the vibration sensor value exceeds the set point then Microcontroller compares the analog signal generated and the stored data value then generates a signal to the GSM SIM900 module enabling to send the event of theft to the officials in order to take the preventive action to safeguard the cash in the ATM location.

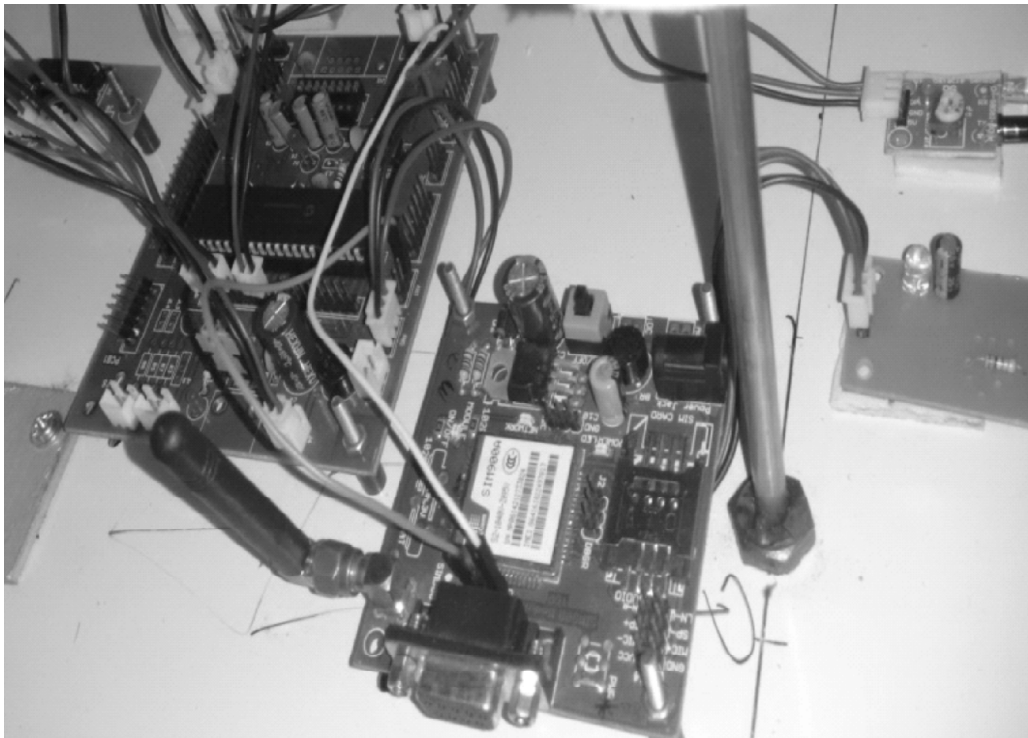


Figure 2: GSM SIM900 Module

3.3. Automated Shutter Door Locking System

The Automated shutter door locking system consists of the dc geared motor and the Infrared sensor (IR). The Infrared sensor working concept can be explained as an obstacle detection sensor. The Infrared sensor consists of an IR transmitter and an IR receiver. The transmitter transmits an Infrared radiation which cannot be seen by a human eye, but once it gets reflected from the obstacle surface it is received by an IR receiver which is a photo diode. Based on the reflection the output is produced from the IR sensor. This Infrared sensor is housed on the sides of the vault drop or the cash deposit. This provides an additional security to the system. This key system actuates an automated dc geared shutter door when the thief tries to steal the cash. This system prevents the escape of thief from the ATM premises or location by locking the shutter door.

IV. PROPOSED SYSTEM

The above figure 4 shows the scheme of connection for the proposed system which employs a PIC16F877A Microcontroller interfaced to the vibration sensor and two motor driver circuits for providing desired PWM

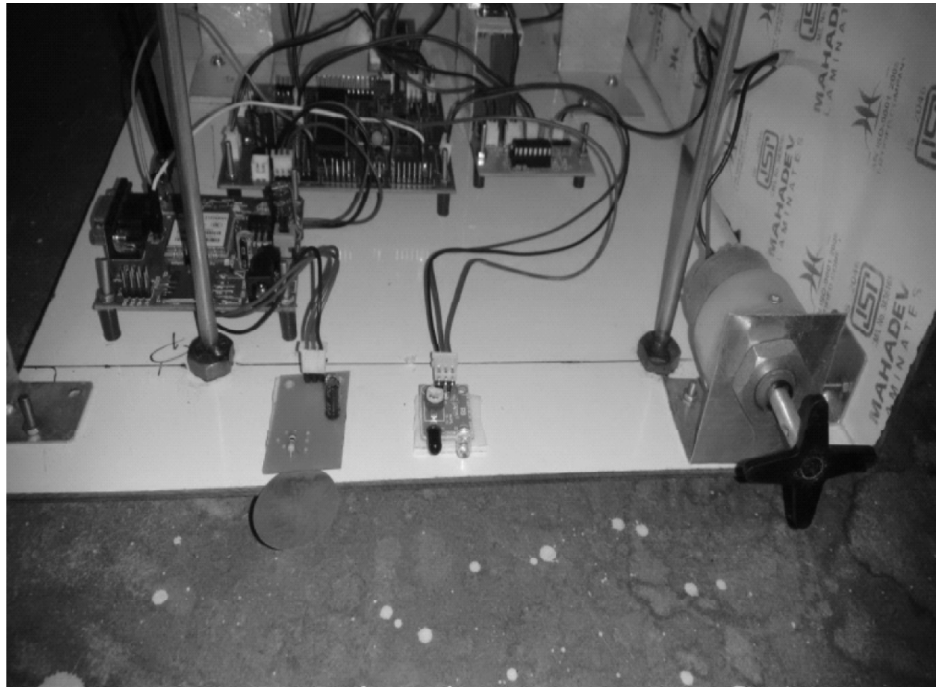


Figure 3: Automated Shutter Integrated with IR Sensor

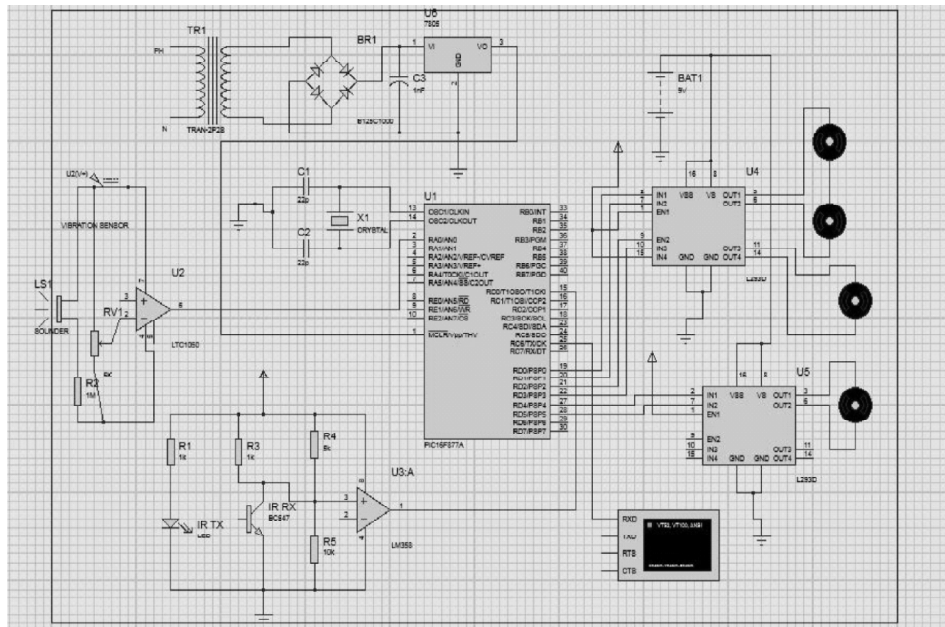


Figure 4: The Overall Connection Scheme of the System

output signal for the DC geared motors actuating flipping mechanism to hide the vault and the DC motor for actuating vault drop mechanism so as to isolate the vault box from the ATM when the vibration sensor senses the exceeded set point of force. This proposed system also involve the interfacing of infrared sensor to the PIC16F877A Microcontroller so as to activate shutter motor mechanism employing a DC motor to prevent the escape of the thief from the ATM premises when the infrared sensor senses the intruder close to its proximity.

This system also involves the interfacing of GSM SIM-900 Module to the PIC16F877A Microcontroller so as to alert the concerned authorities regarding the event of theft by sending SMS text message.

V. CONCLUSION

ATM Anti-Theft System will greatly help in curbing the occurrence of theft attempts which cause great monetary loss to the bank maintaining the facility of the ATM service. The Automated Vault Drop system will help in isolation of the cash deposited in the cash tray present in the Vault section of an ATM machine during the time of theft using a Slider crank mechanism which employs a DC geared motor driving the vault box to the underground level by means of a connecting rod linking the Shaft of the DC geared motor at one end (driving end) and the vault box at the other end (driven end). Hence, the Automated Vault Drop system will act as a key system in safeguarding the cash deposited in an ATM machine during the occurrence of theft.

This anti-theft system also has an additional feature of sharing the information regarding the event of theft attempt to the nearby police station as well as to the concerned bank authorities so that necessary action could be taken. This system also has an added level of security along with the Automated Vault Drop System which incorporates another system namely, Automated Shutter Locking System which prevents the escape of thief from the ATM location during the time of theft by initiating the locking of roller shutter present in an ATM location so as to catch hold of the thief within the ATM premises. Hence, this system of ATM Anti-Theft System as a whole will greatly help in securing the ATM location/premises from theft attempts and at the same time help the banks to maintain their ATM services hassle free without being worried of theft attempts made by thieves to steal the cash from an ATM.

VI. ACKNOWLEDGEMENT

Arvind J, Nitesh C and Mrs.N.Deepa acknowledge and thank SRM University for providing the required resources and our department Head, the teaching staffs for their support which was helpful in executing this project.

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