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Enhanced Security System for ATM services using sensor and GSM Modem

V. Nagasumathi

Lecture, Department of ICE, Government polytechnic college for women, Madurai-625011, Tamilnadu.

Abstract: In the era of digitalization, everyone needs money without interaction with bank at any time. So the ATM (Automotive Teller Machines) are installed everywhere in the localities. As the number of ATMs increased, prevention of theft and security of customer is the prime objective. At present, security systems are not highly secured as they are only provided with alarm system. This project deals with design and implementation of ATM security system using vibration sensor and GSM Modem. The prime objective of this project is, to secure the ATM system using vibration sensor and GSM modem. In this project, when a thief enters and tried to harm the machine, the vibration sensor which is attached to the machine get vibrated and sends the signal to the ARDUINO microcontroller. Once the controller receives signal, it locks the door of ATM room by sending signal to the dc motor and sprinkler sprinkles the chloroform to make the thief unconscious. The buzzer will also be getting activated at the same time to alert the nearby people of ATM system. Simultaneously, the controller will send a message to an authorized person of the bank through GSM modem and The door is made to open only after entering the password by the bank staff. The project is implemented and worked successfully.

Keywords: Automotive Teller Machine, Vibration Sensor, GSM modem, ATmega328 Micro controller & Matrix Membrane Keypad.

I. 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.

The Idea of Designing and Implementation of Security Based ATM Security Alert project is born with the observation in our real life incidents happening around us. In this project we are going to design system that will help in catching the thieves when an attempt is made to stole the ATM. This system will also act as a security barrier for the ATM facility.

The proposed project consists of an idea of implementing Vibration Detection sensors. These sensors will generate a signal whenever someone tries to forcefully open or damage the ATM machine. After detection of such signal immediately an SMS will be sent to the authorized person of the bank, making him/her aware of the situation.

Also we are using a wireless camera, so that in such cases, the authorized person can have a live footage of the ATM facility onto his/her mobile phone.

II. BLOCK DIAGRAM AND WORKING

In the proposed project, we are offering more security for ATM machines and also to identify the robbery quickly by implementing an embedded system. Whenever someone tries to make damage or want to lift the ATM machine from its place, automatically vibration sensor attached to the ATM machine will be activated and sends a signal to controller. Once the controller receives signal, it locks the door of ATM by the rotation of motor, and send a message to concerned authority about the theft occurring through GSM modem.

After this the sprinkler (DC Pump) installed inside the ATM will get activated and it will spray the chloroform chemical to make the person unconscious and at the same time buzzer will be activated. The door is made to open only after entering the password by the bank staff.

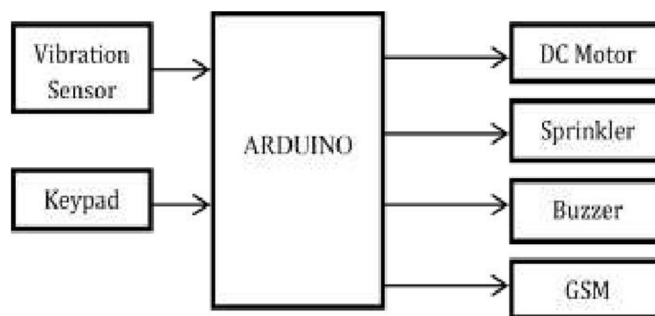


Fig-1 Block Diagram of ATM security system

A. Vibration Sensor

Vibration sensors can be useful for monitoring the condition of rotating machinery, where overheating or excessive vibration could indicate excessive loading, inadequate lubrication, or bearing wear. Such sensors are also utilized in geophysical and applications requiring accelerometers. Piezoelectric vibration sensors used for detecting vibration from various vibration sources are generally classified into two large types, resonant type and non resonant type.

B. Arduino Microcontroller

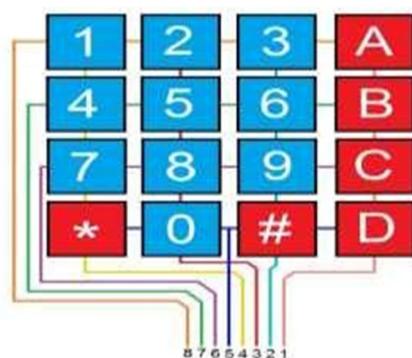
The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.



Fig-2.2.1: Arduino Microcontroller board

C. Keypad

Matrix keypads use a combination of four rows and four columns to provide button states to the host device, typically a microcontroller. Underneath each key is a pushbutton, with one end connected to one row, and the other end connected to one column. These connections are shown in Figure 2.3.1.



2.4 Global System for Mobile Communications (GSM):

A GSM network is composed of several functional entities, whose functions and interfaces are defined. The figure shows the layout of a generic GSM network



The GSM network can be divided into three broad parts. The Mobile Station is carried by the subscriber. The Base Station subsystem controls the radio link with the Mobile Station. The Network Subsystem, the main part of which is the Mobile services Switching Center (MSC), performs the switching of calls between the mobile and fixed network users.

III. FLOWCHART

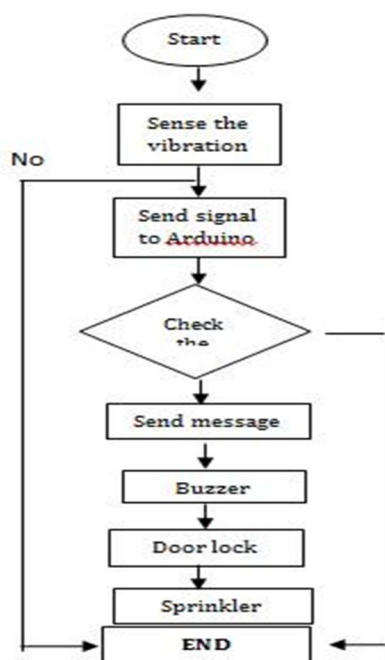


Fig.3.1- Flowchart of ATM security system

IV. EXPERIMENTAL SET UP & RESULTS

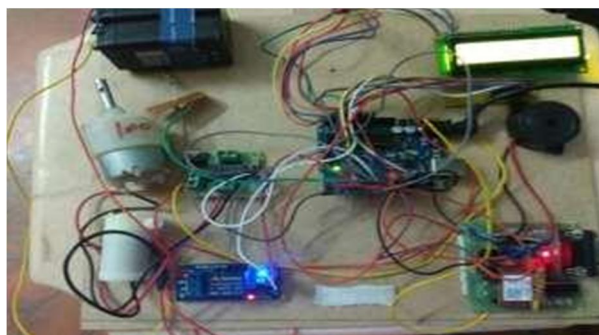




Fig.4.2- Results

V. CONCLUSION

Based on the results obtained, the objective of implementing ATM security system using GSM & vibration sensor has been achieved. This project is used to provide security to ATM. Whenever a person tries to distract the ATM, the sensor which senses the vibrations & send a signal to the microcontroller. Once the controller receives signal, it locks the door of ATM room by sending signal to the dc motor and sprinkler sprinkles the chloroform to make the thief unconscious. At the same time, the buzzer also gets activated. Simultaneously, the controller will send a message to an authorized person through GSM modem and the door is made to open only after entering the password.

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