

Design And Implementation Of ATM With Theft Detection, Prevention, Protection and Tracking

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ABSTRACT

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. In today's Modern World, Autonomous Systems play an important role in our day to day life. Most civilians use ATMs regularly. The idea of designing an implementation of security based ATM Theft Project is born with the observation in our real life incidence happening around us. This project deals with prevention of ATM theft from robbery, so to overcome the drawbacks found in existing technology in our society. In order to enter the ATM room, the user will have to show the ATM card having inbuilt RFID tag to the RFID reader attached to the ATM door. Once the card is read, the ATM door will open and the user will enter the room. Within 20 seconds the ATM door will close automatically. The movement of ATM door is in turn controlled by a DC motor. If the ATM is tampered, vibration sensor senses vibration produced from ATM machine. This system uses arduino 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. Servo motor is used to leak the gas inside the ATM to bring the thief into unconscious stage. GSM sends the message that "THE ATM IS TAMPERED" to respective bank and nearby police station. GPS sends the exact location of the affected ATM

KEYWORDS: *Automatic teller machine, Radio frequency identification, DC Motor, Vibration sensor, Buzzer, Servo motor, GSM, GPS.*

MOTIVATION

An automated teller machine, also known as automatic teller machine is an electronic telecommunication 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. ATM'S offer a real convenience to those on the run, but at the same time offer an element of risk. Using a bank ATM machine safely requires awareness and a little planning just because a bank ATM machine is open and available 24 hours a day

doesn't mean it is always safe to use it. Most bank ATM robberies occur at night between 7 pm and mid night when the machine only produces 10% of the daily transactions. Between 1 pm and 4 am the ATM'S handle only 11% of the total daily transactions but suffer 60% of crime. Almost every second day we see the news channels flashing the news about ATM robberies this whole scenario of increasing ATM robbery motivated us to develop a system which minimizes such often incidences and consequently enhance the security of the ATM'S

LITERATURE REVIEW

An ATM is used by people for making transactions. Transactions can be cash deposits and withdrawals, transferring money, balance equity and many more. Time and now, developments have been made to enhance the ATM security. Back when robbers were still wielding big guns and ammunition to rob banks the initial focus of ATM security was to physically protect the money. This made perfect sense and was accomplished by a number of preventive measures. These measures include;

1. Securing the ATM's in place (for example build them into the wall).
2. Storing the money in a vault.
3. Using small ink bombs inside the cash cart ridges to render stolen money useless

Throughout the years these measures were further optimised resulting in a low no of successful physical ATM heists. Given the low success rate, attacker started moving away from the physical attack scenario and got a little smarter, by attacking the customers directly by obtaining pin codes. To use an automatic teller machine, a plastic smart card is provided by the bank to the card holder this smart card contains the specific information of the user. Also with the smart card pin code is also provided to the card holder by the bank to access the account. attackers would now attempt to clone customer cards and obtain valid pin codes to later retrieve the money from other ATM'S

OBJECTIVE

In order to enhance the security of ATM's further, we have designed a model which can reduce ATM robberies to a large extent. Our project consists of various components like RFID, GSM, GPS, vibration sensor, LCD, keypad and a servo motor. This System stops any sort of robbery by taking vibration sensor as its input functional block. Keypad is also used as an input block in this project It is used to make the system capable to differentiate between the thief and employee. In order to enter the ATM room, the user will have to show the

ATM card having inbuilt RFID tag to the RFID reader attached to the ATM door .Once the card is read, the ATM door will open and the user will enter the room. Within 20 seconds the ATM door will close automatically. The movement of ATM door is in turn controlled by a DC motor. The concerned bank employees have a master card which enables the closing and opening of the door once the theft has occurred. It's the vibration sensor that is activating the total project by identifying the movement caused by the thief during breaking down the ATM machine. When the vibration sensor detects any movement of ATM ,it sends a signal to the Arduino Mega 2560, whenever the received signal level is greater than the threshold value . Once the vibration is sensed, the beep sound will occur from the buzzer. Servo motor pushes the knob of the cylinder and consequently releases the gas, bringing the thief into an unconscious state. GSM sends the message that "THE ATM IS TAMPERED" to respective bank user and nearby police station. GPS sends the exact location of the affected ATM. In this way, our project will help in minimizing the ATM robberies to an appreciable extent

METHODOLOGY

The 'Proposed System' aims to enhance the security system of present existing ATM machine. This System stops any sort of robbery by taking vibration sensor as its input functional block. . Keypad is also used as an input block in this project It is used to make the system capable to differentiate between the thief and employee. In order to enter the ATM room, the user will have to show the ATM card having inbuilt RFID tag to the RFID reader attached to the ATM door .Once the card is read, the ATM door will open and the user will enter the room. Within 20 seconds the ATM door will close automatically. The movement of ATM door is in turn controlled by a DC motor. The concerned bank employees have a master card which enables the closing and opening of the door once the theft has occurred.

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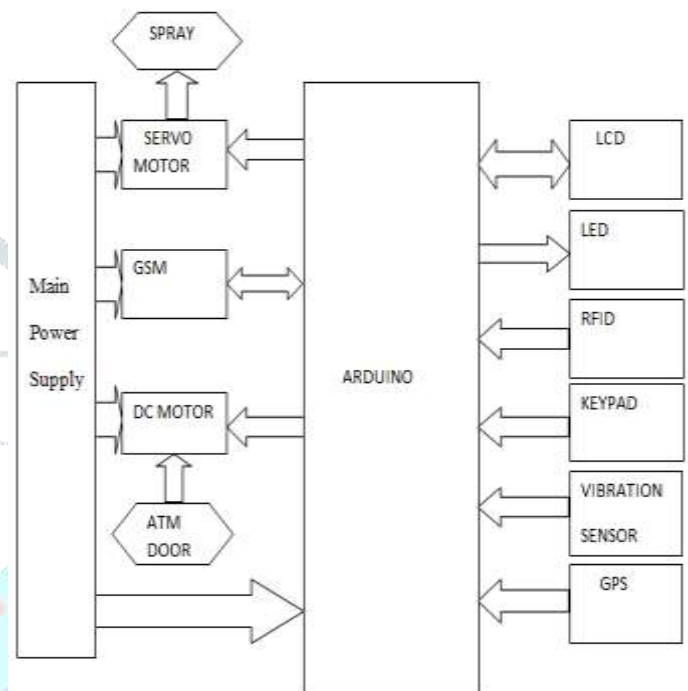
When the Arduino Mega 2560 receives valid input from vibration sensor then the following sequence of events takes place..

- (i) DC motor closes the door of the ATM.
- (ii) Buzzer gives continuous beep sound.
- (iii) Servo motor emits the gas which brings the thief into unconscious state.
- (iv) An SMS "ATM IS TAMPERED" will be send to the nearest police station.
- (v) GPS sends the exact location of the affected ATM

HARDWARE REQUIREMENTS

1. Power supply
2. Arduino
3. RFID

4. GPS Module
5. Vibration sensor
6. GSM Module
7. DC Motor
8. L293D
9. Servo Motor
10. LCD
11. Keypad
12. Buzzer



A. ATM

The ATM system is the project which is used to access users bank accounts in order to make cash withdrawals. Whenever the user needs to make cash withdrawal he can enter his pin number and it will display the amount to be withdrawn in the form of 100s, 500s, 2000s. Once his withdrawal unsuccessful, the amount will be debited in his account. The ATM will service one customer at a time.

B. RFID

Radio Frequency Identification uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from nearby RFID readers interrogating radio waves. Active tags have a local power source such as battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader.

C. ARDUINO Mega2560

The Arduino Mega is a microcontroller board based on the Atmega 328. It has 54 digital input/output pins (of which 15 can be used as PWM output), 16 analog inputs, 4 UARTs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It is simply connected to

computer with a USB cable or powered with a AC to DC adapter to get started. It features Atmega2560 programmed as a USB to serial converter.

D.BUZZER

A buzzer or beeper is an audio signaling device which may be mechanical, electromechanical or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

E.GSM

GSM/GPRS Modem-RS232 is built with dual band GSM/GPRS engine-SIM900A, works on frequencies 900/1800MHz. GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. It is a mobile communication modem and stands for Global System for Mobile communication.

GSM is an open and digital cellular technology used for transmitting mobile voice and data services.

F.GPS

To locate the exact location of ATM, GPS module has been used. This module includes high precision surface mount technology to provide both high accuracy and very compact size. A series of standard NMEA messages are provided to give position, satellite information, latitude, longitude, time, etc. The module can be easily connected directly to a microcontroller to display and record this information.

G.LCD

It stands for liquid crystal display and this project has 20x4 LCD for display. It is actually a combination of two states of matter—the solid and the liquid. They have both the properties of solids and liquids and maintain their respective states with respect to another. A liquid crystal cell consists of a thin layer of a liquid crystal sandwiched between two glass sheets with transparent electrodes deposited on their inside faces. The LCD has the distinct advantage of having low power consumption.

H.VIBRATION SENSOR

The arduino vibration sensor module is based on vibration switch component which can detect the weak vibration signals. The vibration law works for vibration related modules. The conductive pin will make an instant turn on (ON) state when touched by the outside force to achieve the proper vibration force or an appropriate speed from the (partial) energy^[3].

I. SERVO MOTOR

A servo motor is a closed loop servomechanism that uses position feedback to control its motion and its final position. The output to its control is a signal either analog or digital representing the position commanded for the output shaft. The motor is paired with some type of encoder to provide speed feedback. Here we are placing this servo motor at a rotation of

0 to 70 degrees to leak the gas inside ATM room to bring the thief into unconscious state.

J.DC MOTOR

For opening and closing the ATM door, we are using DC motors. A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic to periodically change the direction of current flow in part of the motor. A DC motor's speed can be controlled over a wide range using either a variable supply voltage or by changing the strength of current in its field windings^[2].

K. 4x4 MATRIX KEYPAD

A keypad is a set of buttons arranged in a block or pad which has digits, symbols or alphabetical letters. Numeric keypads are found on alphanumeric keyboards and on other devices which require mainly numeric inputs such as calculators.

SOFTWARE IMPLEMENTATION

THE ARDUINO INTEGRATED ENVIRONMENT (IDE)

The Arduino IDE supports the languages C and C++ using special rules to organize code. Arduino programs may be written in any programming language with a compiler that produces binary machine code. Atmel provides a development environment for their microcontrollers, AVR Studio and the newer Atmel Studio.

The Arduino project provides the Arduino Integrated Development Environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

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