INTERNET OF THINGS BASED ADVANCED SECURITY SYSTEM FOR ATM

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ABSTRACT

This paper proposes an advanced security system for ATM using internet of things. Nowadays, especially in rural areas, ATM machines are not fully protected due to shortage of man power or negligence by the bank authorities. This will push the safety of the ATMs in jeopardy. Even though ATMs are monitored by the CCTV still burglar are involved in theft. This is because of absence of control action implemented at the site of ATM. An advanced safety system has been designed to not only safe guard the money in the ATM and also catch burglar in red handed and inform it to the bank authorities by means of SMS and GPS based tracking through internet of things. Hardware has been designed and tested with the sample prototype to verify the efficacy of the system.

Keywords: Internet of Things, ATM, SMS, GPS and Arduino microcontroller.

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1. INTRODUCTION

In a country like INDIA, more number of ATMs are available than the banks. So people are entitled to depend upon the ATM to address their immediate needs. However ATM machines are not fully protected, though these are monitored by CCTV, especially in the rural area, due to shortage of man power or negligence of the bank authorities. This will make the safety of the ATMs to be vulnerable for theft and other illegal activities. An advanced safety system has been designed to not only safe guard the money in the ATM and also catch burglar in red handed and inform it to the bank authorities by means of SMS and GPS based tracking through internet of things.

2. ADVANCED SECURITY SYSTEM FOR ATM

An advanced safety system, as shown in Fig. 1, has been designed to not only safe guard the money in the ATM and also catch burglar in red handed and inform it to the bank authorities by means of SMS and GPS based tracking through internet of things. it uses two mechanism.
Firstly, an auto shutter locking system and secondly, GPS based ATM containment tracing system to zero on the location of the culprit. The purpose of our project is to protect money from the ATM machine. Now a day the most of the rural area ATM machines are not fully protected. Because the thief was easily take the ATM machine from the ATM center and take the cash from the ATM machine in some other location. So we can’t easily find the ATM machine location and thief. In order, to avoid these kinds of culprit activities in the ATM center our project is help to lock thief inside the ATM center and catch thief easily by using the automatic shutter locking system. If, thief breaks this automatic shutter locking system. The microcontroller continuously receives data from the sensors or switches and GPS module, takes decision on the basis of the readings collected onto the microcontroller. On intrusion the microcontroller will generate a message to the bank manager or to a set of predefined numbers stating the current location of the vehicle and what sort of an intrusion has been made, has it been made with doors, body and cash box. On reception the message the user will have the option to prompt an action from a far-off place like locking the doors, seize the engine, or cut the supply line. A message from the owner will be collected on to the microcontroller via GSM module, Based on the message collected a relay will be switched to take an action like locking the doors, seize the cash box or cutting the supply line. If thief breaks this automatic shutter locking system and take the ATM machine from the ATM center means, we can easily trace the thief location by using the GPS inside cash of the ATM machine.

**Figure 1** Schematic diagram of Advanced Security System.

3. EXPERIMENTAL SETUP

In this work, it consists of an interface of different sensors, GPS module, and GSM module is being developed with a microcontroller as shown in fig. 2. The communication between the microcontroller and other components of the system takes place serially. The microcontroller continuously receives data from the sensors or switches and GPS module, takes decision on the basis of the readings collected onto the microcontroller. On intrusion the microcontroller will generate a message to the bank owner or to a set of predefined numbers stating the current location of the vehicle and what sort of an intrusion has been made, has it been made with doors, body and cash box. On reception the message the user will have the option to prompt an action from a far-off place like locking the doors, seize the engine, or cut the supply line. A message from the owner will be collected on to the microcontroller via GSM module, Based on the message collected a relay will be switched to take an action like locking the doors, seize the cash box or cutting the supply line. If, thief breaks this automatic shutter locking system and take the ATM machine from the ATM center means, we can easily trace the thief location by using the GPS inside cash of the ATM machine.
Figure 2 The connection diagram of advanced security system with components

The microcontroller AT-89S52 Port-0 pins are used to check the vibration sensor and the IR sensor. IC LM324 act as a comparator unit here we used two comparator units one for vibration sensor and other for IR sensor.

Figure 3 The complete circuit diagram

LM324 Pin 5 is connected to the output pin of the vibration sensor, Pin 12 is connected is connected to the IR sensor output pin. LM324 Pin 6,11 both are connected (0-5)v variable potentiometers. Microcontroller Port 0 pins 6,7 are used to drive the relay units. Microcontroller Pins RX,TX are connected to MAX 232 input side TX pin, RX pin and MAX 232 output side RX pin is connected to GSM TX pin and TX pin is connected to GPS RX pin. Both relay coil NO contacts are used to close the DC gear motor circuit shown in Fig. 3. The algorithms of the ATM Centre security system as shown in Fig. 4 are as follows. When vibration sensor or IR sensor output are equal to 1, Microcontroller Activate the Rely units and close the ATM Centre shutter. It will Set the GSM ready to operate mode by using AT+GMGF=1 command by using AT+GMGS “MOBILE NUMBER” Load the mobile number in the GSM. The Longitude and latitude value from the GPS via the Microcontroller Buffer register and send as a message to the given mobile number in the GSM and again keep on Getting the Longitude and latitude value from the GPS when the location of the thief to be founded. IF vibration sensor or IR sensor output are not equal to 1, Microcontroller keep on checking the status of the vibration sensor and IR sensor output
A sample prototype has been designed to protect the cash in the ATM machine and catch thief as shown in Fig. 5. It consists of two mechanism, One is auto shutter locking system and other is to avoid late of tracking the location of the culprit from the police department, we can use GPS in our project this will help for the police investigation and easily find the thief quickly.

5. CONCLUSION
In the present work IoT based advanced security scheme for ATM is proposed. An advanced safety system has been designed to not only safe guard the money in the ATM and also catch burglar in red handed and inform it to the bank authorities by means of SMS and GPS based tracking through internet of things. Hardware has been designed and tested with the sample prototype to verify the efficacy of the system.
REFERENCES


