

S.M.A.R.T

Smart Monitoring of ATM Related Theft

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Abstract--In today's Modern World, Autonomous Systems plays an Important Role in our day to day Life. As the Social Computerization and Automation have drastically increased, it can be seen evidently where the number of ATM Centers increases rapidly.

Most Civilians use ATM's regularly. A good example can be a financial transaction, ease of money exchange etc. So there exists an important factor called security. The Crime rates involved in Financial Organizations have increased tremendously.

Over past few years – “90 % of Crimes in ATM centers in the form of Robbery”. This issue poses a serious threat to both Bank Management and Civilians.

Therefore this Study proposes a Solution to minimize the ATM Robbery in real time by means of Embedded Systems and GSM technology.

The Main motive of this design is to Prevent ATM theft. Many real time Incidents around us has been the main motivation of this Project.

I. EARLIER SECURITY SYSTEMS

Theft monitoring system in ATM:

In this security system, whenever threat occurs, the ALARM (BUZZER) goes OFF and hence the thief gets alerted and hence he may escape. It is one of the major drawback present.

Enhanced ATM security system using Biometrics:

Nowadays there are number of techniques found to fake or dupe other's finger identity. This again fails to give complete security to the ATM. The failure of the two systems can be seen quite evidently that, there is no stoppage of ATM robbery. Incidents such as “Money snatching inside the ATM and breakage of ATM's”, are increasing in numbers.

Till now, no security systems can assure or provide cent percent protection to the ATM.

II. EXPLANATION (PROPOSED SYSTEM)

The Proposed System here achieves safety through Embedded Systems and GSM technology.

Here whenever a thief tries to snatch money from the Customer inside the ATM, the Sound detection Sensor senses the scream (or) sound produced by the Customer easily and these signals are driven to Arduino microcontroller.

Then Arduino does following actions (Door Lock, Chloroform Spray), so that a great mishap is prevented.

Whenever a robber tries to break the ATM, vibration sensor captures the vibration and sends a digital pulse to ARM controller.

Further the controller takes following actions (Door Lock, Chloroform Spray) to prevent the theft incident. It also tightens the security of ATM room, such that the thief is trapped inside.

From our proposed System, we can easily save both Human Life and Money inside the ATM.

A. Technology Used:

Major components employed here are:

Sound detecting sensor, Vibration Sensor, Arduino microcontroller, ARM controller (LPC 2129), GSM module, DC motor, Stepper motor.

- A Sound detecting Sensor is plays a vital role here. Whenever a theft occurs, customer screams and the sound is sensed by this sensor. It is interfaced with Arduino Uno Microcontroller.
- Arduino Uno Microcontroller is interfaced with sound detecting sensor. If a customer undergoes money transaction inside ATM, and whenever a thief gets inside the ATM to rob, the sound sensor identifies or senses the scream (Sound) produced by the Customer. Digital signals produced by the sensor

are passed to Arduino and the Security System is alerted and following actions are taken (Message Alert, Door Lock, gas Spray).

- Vibration sensor plays a dominant role here. Once a theft attempt (breakage of ATM) takes place, this sensor senses the vibration and produces a digital signal.
- An ARM controller is used here, which is an Embedded System based one, which is used to collect data and process the real time data from the Vibration Sensor. Once the Vibration is sensed, digital signals are sent to the controller from the sensor. The controller signal makes the DC motor to lock the ATM door and Stepper Motor releases the gas so that thief goes to unconscious state. An RTC (Real time Clock) is used to capture the time of the theft and this information is sent to nearby Police station and the Bank Management.
- GSM module is used here to send messages to both Police station and bank management. It receives a direct signal from both the controllers. It functions immediately.
- DC motor is used for automatic door locking at the time of theft. It receives input either from ARM controller or Arduino microcontroller.
- Stepper motor is used to release Chloroform gas at the time of theft. It receives input either from ARM controller or Arduino microcontroller.

B. Problems in Existing Systems

- Lack of cooperation among banks in the fight to stem the incidence of ATM frauds
- Indiscriminate issue of ATM card without regard to the customer's literacy level.
- Customers are careless with their cards and PIN numbers as well as their response to unsolicited e-mail and text messages to provide their card details.
- The location of ATM is a high determinant to fraud or crime carried out at ATM point.
- Over 75% of the respondents affirm that the location of ATM in secluded place contribute to the fraud perpetuated at ATM point (ATM's located inside the Bank Premises are precisely safe)
- Major form of ATM fraud is PIN theft which is carried out by various means; skimming, shoulder surfing, camera, key pad recorder etc.

C. Real Incidents:



HOME » CITY

Security at ATMs remains a sore point

K M Sree, TNN | Apr 25, 2014, 03.48AM IST

Text resize: A A A

KOZHIKODE: Security continues to be a serious concern at the automated teller machine counters even after the Bangalore incident in which a woman was attacked inside an ATM.

Though no incidents of physical assault has been reported at ATMs in Malabar, attempts to tamper with the key pad of the ATMs and to cheat customers by tactfully collecting their pin numbers have been reported in the past couple of months.

D. Causes of Robbery

- Most robberies occurs mostly during Midnight to 4 a.m.
- Most robberies take place whenever the ATM location is isolated
- Mostly after the cash has been withdrawn
- Takes place against single victim with help of a weapon

Other Patterns of Robbery are:

- Offender forces the victim to withdraw cash and reveal his PIN number
- Illegal Usage of Other's card without their Knowledge
- Breaking of ATM's whenever the surrounding is Isolated and Silent

III. HARDWARE DETAILS

a) ARDUINO UNO CONTROLLER:

- The Arduino Uno is a microcontroller board based on ATmega328.
- It's Special features includes producing Digital Output, receiving Digital and analog input, interfacing with complex sensors, interfacing with other software and hardware etc.

b) ARM CONTROLLER:

LPC2129 is an ARM7TDMI-S based high-performance 32-bit RISC Microcontroller with Thumb extensions 256KB on-chip Flash ROM

c) SOUND DETECTION SENSOR:

Sound sensor uses a small microphone and amplifier to detect sound.

When the loudness (decibel level) of the sound exceeds a preset value, a digital HIGH output (5 volts) is obtained.

d) GSM MODULE:

- GSM is one of the wireless networks which is low-power, low-cost and convenience to use Global System for Mobile Communication.
- The modem can either be connected to PC serial port directly or to any microcontroller.
- It can be used to send and receive SMS or make/receive voice calls

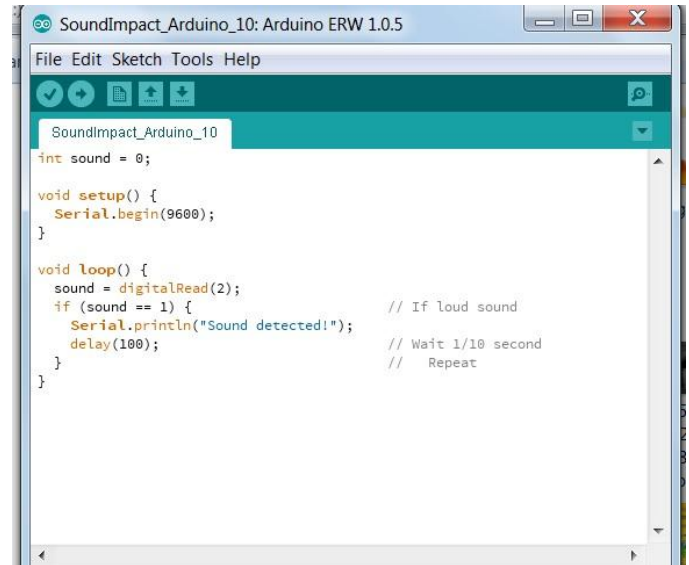
VIBRATION SENSOR:

This sensor is a Piezoelectric Transducer. As the transducer is displaced from Mechanical axis, a strain is produced due to Piezo-electric effect, which in turn is converted into voltage.

IV. SOFTWARE DETAILS

ARDUINO SOFTWARE:

The Sound Impact sensor is interfaced with Uno Microcontroller whose programming is done by Arduino software.



KEIL SOFTWARE:

This version of Keil combines project management, make facilities, source code editing, program debugging, and complete simulation in one powerful environment.

Here both editor and debugger are integrated in same environment, which helps to develop a seamless embedded program.



V. SOCIAL RELEVANCE

Security plays an important role in our day to day life and it is need of the hour for all of us.

Due to lack of employment, poverty, some of the people are forced to involve in Robbery.

Burglary in ATM centers is nowadays increasing evidently. So providing Security to ATM centre is a must, in-order to safeguard both human lives and money.

Our Design will turn out to be the perfect solution to prevent Robbery in ATM centers.

We have reduced the disadvantages and our design allows to safeguard the money and the thief can be easily caught by quick delivery of information to nearby Police Station.

VI. NOVELTY IN THE IDEA USED

In earlier security systems developed for ATM centres, there exists only automatic locking of door, a Sound Alarm (Buzzer) and a message is passed to Police station which is nearby. So the thief gets cautioned and he easily escapes by breaking the Glass door of ATM.

Here we have a new Idea of releasing Smoke gas, which leads the Robber to an unconscious state. Also we have thought of a new idea that, by passing electric current through a series of Steel Bars (Usually Iron Grills) which are placed inside the ATM behind the door. So that thief cannot escape from ATM centre.

If he tries to escape or makes an attempt, he might get electrocuted.

Thus both the ATM centre and people's lives can be easily prevented from Burglar attempts easily.

VII. ADVANTAGES OF PROPOSED SYSTEM

- Highly secure in comparison to previous security systems
- An RTS is used here, which records the exact time of theft
- A CCTV camera is continuously in sync with a PC through TV adapter, which monitors the Human Activity continuously.

- GSM module is used to alert the cops for timely action in case of a theft.
- Electrocutation and spraying of Chloroform prevents the robber to escape from the ATM centre

VIII. CONCLUSION

- Security plays an important role in our day to day life and it is need of the hour for all of us.
- Due to lack of employment, poverty, some people are forced to involve in Robbery.
- Burglary in ATM centres is nowadays increasing evidently. So Security to ATM centre is a must, in-order to safeguard both human lives and money.
- Our Design will turn out to be the perfect solution to prevent Robbery in ATM centres.
- We have reduced the disadvantages and our design ensures security for both human life and money.

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