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DESIGN AND IMPLEMENTATION OF ADVANCED SECURITY-BASED SYSTEM FOR ATM

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ABSTRACT

The idea of Designing and implementing a Security-Based Automated Teller Machine (ATM) theft project was born with the observation of real-life incidents happening around us. This project deals with the prevention of ATM theft from robbery, to overcome the drawbacks found in existing technology in our society. Whenever a robbery occurs, the laser LDR is used here which senses the motion of the ATM. This system uses an AT-Mega controller-based embedded system to process real-time data collected using the laser LDR. Once the motion is sensed the beep sound will occur for the buzzer. The DC motor is used for closing the door of the ATM. A smoke generator is used to leak the gas inside the ATM to bring the thief into the unconscious stage. The camera is always processing and sending video continuously to the PC and it will be saved on the computer. RTC is used to capture the robber occur time and send the robbery to occur time with the message to the nearby police station and corresponding bank through the GSM. LCD Display board which will show the output of the message continuously. GPS is used to track the location of ATMs continuously. This will prevent the robbery and the person involved in the robbery can be easily caught.

Keywords- ATM, GSM module, DC motor, Laser LDR, Smoke generator, GPS module.

I. INTRODUCTION

Automated Teller Machines (ATMs) have become an integral part of modern banking, providing convenient access to cash and other banking services around the clock. However, their widespread presence also makes them vulnerable to various forms of criminal activity, including theft. One of the most brazen and audacious forms of ATM-related crime is the theft of the entire ATM itself, often carried out by organized criminal gangs using sophisticated methods.

In recent years, instances of ATMs being stolen directly from their booths or locations have garnered significant attention due to their dramatic nature and the financial losses incurred by banks and businesses. These thefts typically involve criminals employing a range of tactics, from brute force methods such as using vehicles to ram into ATM booths to more covert approaches like cutting through security measures with power tools.

The repercussions of ATM theft extend beyond the immediate financial losses incurred by banks and ATM operators. Such incidents also pose a threat to public safety, as they can result in structural damage to buildings and endanger the surrounding community.

Additionally, the stolen ATMs often contain large sums of cash, leading to concerns about the potential funding of further criminal activities.

EASE OF USE

The paper deals with avoiding the robbery of ATMs. Whenever robbery occurs laser LDR is used to detect the movement of ATM.

The laser LDR sensor gives the signal to the AT-Mega. The microcontroller is used for the processing data and the GSM module sends the message to the nearby police station and the nearest bank server. The paper deals with avoiding robbery using a laser sensor and catching the theft inside the ATM center using DC MOTOR. A laser sensor is used to sense the movement and gives the signal to AT-Mega. AT-Mega takes controlling action according to the input signal.

If the signal disturbance is more than the set value then the DC motor activates to lock the door and the smoke generator is used to leak the gas inside the ATM booth.



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II. HARDWARE SYSTEM

Block Diagram :



Block Diagram

Circuit Diagram :



AT-Mega328P:

The AT-Mega328P is an 8-bit microcontroller chip developed by Atmel, now a part of Microchip Technology. It belongs to the AVR family of microcontrollers and is widely used in various embedded systems and DIY electronics projects due to its versatility, ease of use, and robust feature set. AT-Mega328P IC comes with internal protections and multiple programming methods.



LCD Display(16X2):

A 16x2 LCD is a compact display that shows 16 characters on 2 lines, with each character formed by a 5x7 pixel matrix. It can display 32 characters in total. The display is named 16x2 because it has 16 columns and 2 rows. These displays are widely used for text-based information in electronics, robotics, and embedded systems. They operate at 4.7-5.3V and interface with microcontrollers.



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Buzzer:

A buzzer is a device that is used to generate of sound signal in an emergency for gathering attention. When the buzzer is activated it produces a long beep sound for security purposes.

SIM800L GSM Module:

GSM is an open and digital cellular technology used for mobile communication. It uses 4 different frequency bands 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz. It uses the combination of FDMA and TDMA. It is a wireless system.

SIM28ML GPS :

GPS stands for Global Positioning System. It's a satellite-based navigation system that provides location and time information anywhere on Earth where there is an unobstructed line of sight to four or more GPS satellites. It works by calculating the distance between the GPS receiver and multiple satellites, using the signals transmitted by those satellites.

Laser LDR :

Laser LDR refers to a combination of a laser and an LDR (Light Dependent Resistor).LDRs, also known as photoresistors, are light-sensitive devices whose resistance decreases with increasing incident light intensity. Combining an LDR with a laser could be a part of a system where precise light sensing or detection is required.

III. RESULT AND DISCUSSION

The Laser LDR detector detects any obstruction or movement in the vicinity of the ATM using laser technology. It triggers an alarm or activates security measures when unauthorized activity is detected. The Laser LDR detector adds a layer of security by detecting physical disturbances around the ATM. It helps in identifying and responding to potential theft attempts or unauthorized access. The fog sensor detects the presence of fog or smoke near the ATM. Upon detection, it triggers an alarm or activates security measures to prevent theft. Fog sensors enhance security by detecting environmental conditions that could aid thieves in concealing their activities. By triggering alarms or security measures, they help mitigate the risk of theft during adverse weather conditions. The buzzer is an audible alarm that activates when unauthorized access is detected or triggered remotely. It alerts nearby individuals to the theft and deters further tampering. Its loud sound attracts attention and may discourage thieves from continuing their attempt to steal or tamper with the ATM. The GSM system enables communication with the stolen ATM via cellular networks. It facilitates remote monitoring and control, allowing for status updates and commands to be sent to the ATM. The GSM system complements the GPS tracking by providing communication capabilities. This allows for two-way communication with the stolen ATM, enabling authorities to remotely monitor its status and take necessary actions. The GPS provides realtime location tracking of the stolen ATM. It continuously updates the ATM's coordinates, allowing authorities to monitor its movements accurately. The GPS serves as the primary means of tracking the stolen ATM. Its ability to provide precise location data is invaluable for law enforcement to swiftly locate and recover the stolen asset.



Figure 1: Hardware Working Image



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Figure 2: ATM Security Alert 7:00 PM 0.8KB/s 🍄 🛜 🕅 ⁴⁰ıılı (59) +918669545256 ← India Alert! ATM Underisk, Location: http://www.google.com/maps/place /0.000000,0.000000 Alert! ATM Underisk, Location: http: //www.google.com/maps/place/18 .457588,73.826988 Alert! ATM Underisk, Location: http://www.google.com/maps/place /0.00000,0.000000 Alert! ATM Underisk, Location: http://www.google.com/maps/place /0.00000,0.000000 Alert! ATM Underisk. Location: http: //www.google.com/maps/place/18 .463003.73.824134 Alert! ATM Underisk, Location: http: //www.google.com/maps/place/18 .463003,73.824134 Text message

Figure 3: GPS locations received on mobile phone

IV. CONCLUSION

By combining multiple security measures, including both tracking and deterrent systems, the project offers a comprehensive approach to ATM security. It addresses various potential vulnerabilities and threats, enhancing overall security levels. The GSM system enables remote monitoring and control of the stolen ATM, allowing authorities to assess the situation and take appropriate actions from a centralized location. This capability is crucial for managing theft incidents efficiently and minimizing potential damage. While the project demonstrates significant advancements in ATM security, there is room for continuous improvement and optimization. Regular updates and enhancements to the system can further strengthen its effectiveness and adaptability to evolving security threats.

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