ATM THEFT DETECTION, AUTO ARRESTING AND INTIMATION SYSTEM

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ABSTRACT

A major step forward in ATM security technology is the "ATM Theft Detection, Auto Arresting and Intimation System" project. Incorporating a DC motor, PIR sensors, vibration sensors, and an Arduino UNO, this system provides a proactive method of detecting theft attempts, taking prompt action to thwart them, and notifying authorities by SMS. There is an urgent need for improved security measures, and our project meets that demand. ATM theft is a major worry. The system uses a mix of PIR and vibration sensors to keep an eye on the ATM at all times. The technology is designed to respond instantly in the event that it detects any kind of tampering or illegal activity. In the case that the system detects an attempt to steal from the ATM, it will trigger a DC motor to lower the shutter, so blocking access to the machine. In the meanwhile, the system is informing the appropriate authorities about the occurrence in real-time through SMS alerts. Technology has the ability to improve public safety and protect financial assets, as seen in the "ATM Theft Detection, Auto Arresting and Intimation System" project. A safer banking environment is created by its real-time monitoring, automatic reactions, and rapid notifications, which greatly decrease the dangers of ATM theft.

Keyword: arduino uno, GSM, ATM theft.

1. INTRODUCTION

As the number of people living in urban areas has grown at an exponential rate in recent decades, so too has the number of cars on the road. Despite an increase in the number of cars on the roads, the infrastructure has remained largely unchanged and is failing to deal with developments such as congestion,

unpredictable travel delays, and the alarming rise in road accidents. Efforts to alleviate and decrease traffic congestion have not gone unnoticed by major cities in recent years. It has become one of the most significant obstacles to sustainable city design that developers face in metropolitan regions. The traffic in developing nations, such as India, is notoriously noisy and disorderly. In order to define the congestion and identify suitable actions, it is vital to identify the degree of the congestion. Understanding the recurrent urban congestion, how to assess it, preventative measures, and potential remedial measures are the primary goals of this study. Whether we expand our current roadways or construct brand-new ones, the upshot will be more traffic, which will keep climbing until we reach our prior level of peak congestion. There isn't a lot of room to build roads, trains, and other forms of public transit in the city. In place of the more conventional approach of expanding roadways, the article proposes the use of mobile traffic dividers as a means to alleviate traffic congestion in urban centers. By assisting with the layout of road capacity, the adjustable traffic divider allows them to maximize the value of highway utilization on the current route.

1.1 Objective

Highlighting its cutting-edge capabilities and how it meets the urgent need for improved ATM security via proactive measures and real-time monitoring, the "ATM Theft Detection, Auto Arresting, and Intimation System" is a significant piece of technology. Internet of Things (IoT) technology plays a crucial role in protecting financial assets, and the material also highlights how the system aligns with the rising need for better security in the banking sector.

2. LITERATURE SURVEY

To make the ATM more secure, a lot of research has been done. Researchers from all around the world have been flocking to study ATM security and surveillance during the past decade. Detecting certain items, such as helmets, knives, firearms, daggers, etc., was the extent of ATM environment security in the beginning. A discussion about Machine-to-Machine (M2M) communications was had between Anitha Julian and Raj M. They used Raspberry Pi to build an inexpensive, standalone Embedded Web Server (EWS) running Linux on an ARM11 CPU.

Provided over the internet, it is a powerful networking solution with many potential uses. (IEEE ICCPCT 2015)One thing that Jacinha V and Jamuna Rani S said In order to keep ATMs safe, security cameras and emergency sirens are installed. The implementation of low-cost embedded internet servers is another area of investigation. Using device-to-device and RFID technology, an anti-theft device is implemented. (2017 IEEE ICONSTEM)[2].

A system that can detect the number of people in an ATM booth and their faces was proposed by Sambarta Ray and Sauvik Das. Plus, it has the ability to discern if someone is donning a mask or not. (2015 IEEE INDICON)[3] S. Shriram and Swastik B. Shetty introduced the use of specific sensors for the detection of certain parameters.

The system's proactive actions include a siren, a visual alarm at the ATM kiosk, and notification to officials using GSM. IEEE

ICCPCT 2016 A biometric and radio frequency identification (RFID) system was put into place by Prachi More and S. Markande [4]. Two modules are installed: one in the entrance and one within the ATM center. According to IJARCE (2016).

This chapter will focus on the study and research findings that are crucial to the project's overall worth and contribution. Additionally, it provides a theoretical background and some foundational knowledge, which are essential for accomplishing the major objectives. The majority of the literature comes from scholarly publications, books, journals, and articles that are relevant to the same topics. Then, these literatures are gathered and utilized to direct the project's activity. People make transactions using ATMs. Funds may be transferred, balances can be deposited and withdrawn, and a wide variety of other things can be considered transactions. Improvements in ATM security have been achieved throughout time. The original intent of automated teller machine security was to physically safeguard the money during the era when bank robberies were conducted with large firearms and ammunition.

A multitude of precautionary steps were employed to achieve this, and it was quite logical. One of these steps is ensuring the ATMs are permanently installed (by, for instance, embedding them into the wall). Putting the funds in a secure location. Third, making the stolen money unusable by placing tiny ink bombs inside the ridges of the cash register. Physical ATM heists have become far less common as a result of these safeguards' gradual but steady improvement.

Attackers, seeing that physical attacks weren't working too well, became a bit cunning and began targeting consumers directly by stealing their PINs.The bank issues a plastic smart card to the cardholder so that they may access the ATM. This smart card holds the user's personal information. In addition, the bank will supply the cardholder with a PIN so that they may access their account while using the smart card. Next, the perpetrators would try to duplicate the customer's card in order to get their valid PIN, which they could then use to withdraw funds from other ATMs.

3.Block diagram

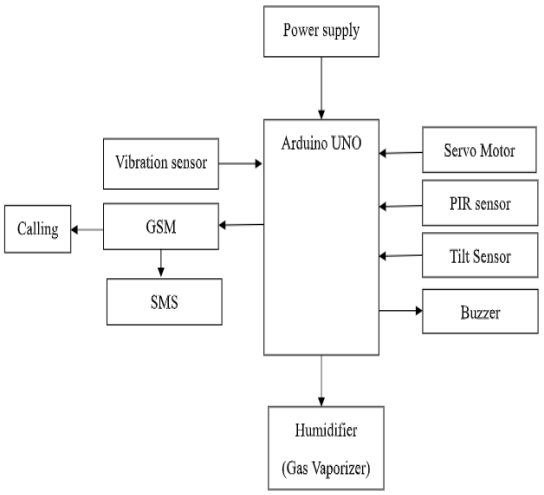

Fig 3.block diagram

3.1 Arduino uno

One open-source microcontroller board that Arduino produced is the Arduino Uno. It's based on the Microchip ATmega328P microprocessor. The software and hardware are user-friendly. The Arduino platform can receive data from a wide range of sensors and then provide the necessary output for devices like motors and actuators. Anyone with a rudimentary understanding of electronics and the C programming language should have no trouble using it. A hardware board known

as an Arduino Board and an integrated development environment (IDE) are the fundamental components of the Arduino platform. Extra components such as motors, sensor modules, an Arduino UNO, and the Arduino IDE version 1.0. The Uno is an ATmega328P-based microcontroller board. A 16MHz quartz crystal, an ICSP header, a power connector, a USB connection, six PWM outputs, six analog inputs, fourteen digital input/output pins, and a reset button make up an Arduino. An embedded programming language software, the Arduino Integrated Development Environment (IDE) works on Windows, Mac, OS X, and Linux, among other platforms. The Arduino board may be heated from room temperature with the help of this tool, which is utilized for programming and loading. When the output voltage changes, the sensors are able to detect it since they have converted the result.

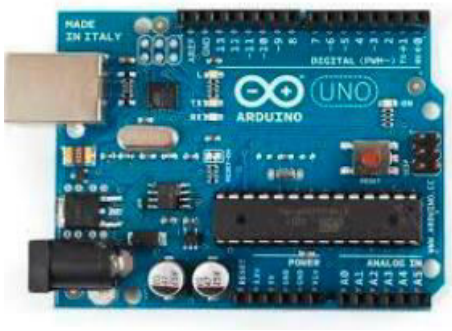

Fig.3.1 arduino uno

3.2 SIM800l GSM/GPRS module

Miniature cellular GSM modem SIM800L GSM/GPRS module from Simcom may be readily interfaced with any microcontroller to provide GSM functionality and GPRS transmission. The microcontroller may make and receive phone calls, send and receive text messages (SMS), and connect to the internet using GPRS, TCP, or IP with the help of this module, which links it to the mobile network. It also has the added benefit of being compatible with any global location because to its quad-band GSM/GPRS network capability. Incorporating this module into a wide variety of Internet of Things (IoT) applications is a breeze, and its tiny size and affordable price tag make it ideal for any endeavor requiring long-range communication.

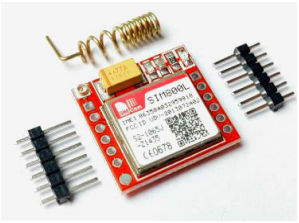

Fig.3.2 GSM

3.3 Tilt Sensor

One tool for making these estimations is the inclinometer. You may get a wide variety of them in stores and online. Having said that, the function of nearly all tilt sensors is same. They provide a signal to the load device if they detect a change from a horizontal to a vertical plane. Working with them is a breeze. Thus, "Tilt Sensor with Arduino UNO" is the topic of this guide. Two conducting poles and an internal rolling ball make up the sensor. At a perfectly vertical position, the ball will touch the conductive poles at the base of the sensor. Because of this, the flow of current is enabled. Now the ball can't touch the poles while the sensor is inclined. This allows current to pass across the open circuit.

Figure 3.3: Tilt sensor.

3.4 Vibration sensor

A piezoelectric sensor is another name for the vibration detector. Adaptable and multi-purpose, these sensors measure a wide range of operations. By converting mechanical stress into an electrical charge, this sensor measures acceleration, pressure, temperature, force, and strain via piezoelectric effects. This sensor is also employed for determining airborne aromas by instantaneously gauging capacitance and quality. A vibration sensor is a device that can detect vibrations in a system by using various optical or mechanical principles.

Fig. 3.4: vibration-sensor-module

3.5 Servo Motor

When it comes to precise rotation, servo motors are the way to go. Servo motors often have a control circuit that gives feedback on the motor shaft's location; this feedback enables the motors to rotate with a high degree of accuracy. Servo motors are useful when you need to rotate an object by a precise amount of time or at an angle. A servo mechanism powers the one and only motor that makes it all. An AC servo motor is one that runs on alternating current (AC), whereas a DC servo motor is one that runs on direct current (DC). The operation of DC servo motors is the exclusive focus of this guide. Servo motors can be further classified according to their working characteristics and the kind of gear arrangement, in addition to the primary categories mentioned above. The gear arrangement common to servo motors makes it possible to obtain compact, lightweight servo motors with a high torque output. Toy cars, radio-controlled helicopters and aircraft, robotics, and many more uses benefit from these characteristics. The majority of hobby servo motors have ratings of 3kg/cm, 6kg/cm, or 12kg/cm, the unit of measurement for servo torque. The mass-to-distance ratio of a servo motor is expressed in kilograms per centimeter. To illustrate: If the load is hanging 1 cm from the motorshaft, a 6 kg/cm servo motor should be able to lift 6 kg; however, the greater the distance, the smaller the weight bearing capability. The electronics for a servo motor sits next to the motor, and an electrical pulse determines the motor's position.

Fig. 3.5: Servo motor.

3.6 PIR sensor

It is critical that we set up alarm systems to guarantee the protection of our homes and other places. One of the most important parts of such systems are motion detectors. Passive infrared (PIR) sensors can also be used for this purpose. The HC-SR501 is an affordable PIR sensor that can pick up on the infrared radiation emitted by living things, such as humans and animals. It has an inbuilt signal conditioning circuitry, a Fresnel lens to enhance its field of vision, and a sensitivity control potentiometer to alter its sensitivity. It has several uses,

such as in alarm systems, motion-activated lighting in rooms and hallways, and more.

Fig 3.6 : PIR Sensor

4. Flow chart

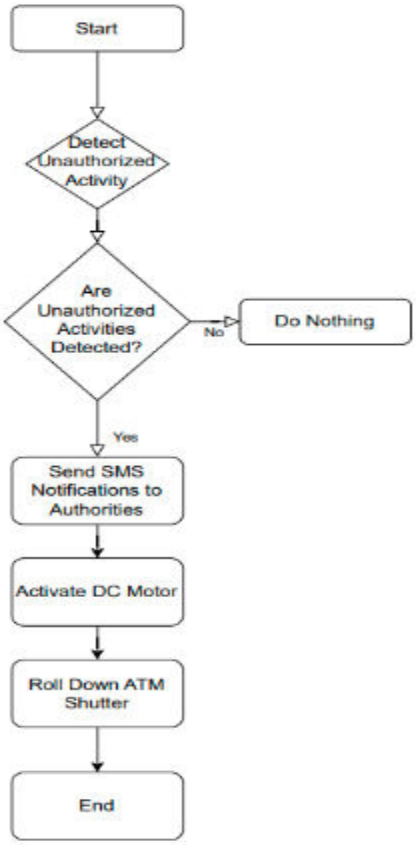

Fig.4.1 flow chart

5. RESULT AND DISCUSSION

The "ATM Theft Detection, Auto Arresting and Intimation System" is a giant leap forward in ATM security technology. It incorporates a DC motor, PIR sensors, vibration sensors, and Arduino UNO. Reducing the dangers connected with ATM thefts, the system takes a proactive approach by monitoring in real-time, taking rapid actions, and notifying authorities via SMS. In line with the increasing need for sophisticated security measures in the banking industry, this project demonstrates how technology, particularly the Internet of Things (IoT), can help keep important assets safe and make banking a more secure place overall.

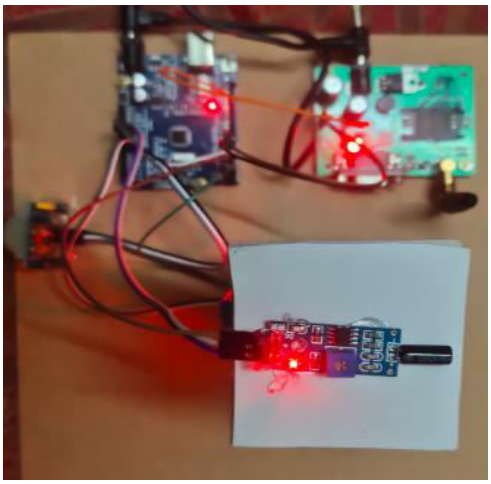

Fig. 5.1: Kit is in ON position

The "ATM Theft Detection, Auto Arresting and Intimation System" is a complete security kit that significantly improves ATM security when implemented. This state-of-the-art kit offers a preventative security solution by combining state-of-the-art technologies including a DC motor, PIR sensors, vibration sensors, and an Arduino UNO. Vibration and infrared sensors can identify illicit activity or theft attempts early on, allowing for a rapid and strong response, thanks to their continuous monitoring capabilities. An example of the kit's effectiveness in real-time threat thwarting is the activation of a DC motor to physically prevent ATM access, one of its instant countermeasures. On top of that, a GSM module is included to make sure that specified authorities are notified by SMS

of any security events, which provides important information quickly.

Fig. 5.2: The SMS received to mobile.

Crucial to the kit's ability to enhance security are its fast reaction capabilities. In the event that the DC motor senses an attempt at theft, it will immediately lower the ATM's shutter, blocking entry and reducing the likelihood of harm. Concurrently, a GSM module allows for quick communication through the transmission of SMS notifications to authorized individuals, providing vital real-time details on the security event.

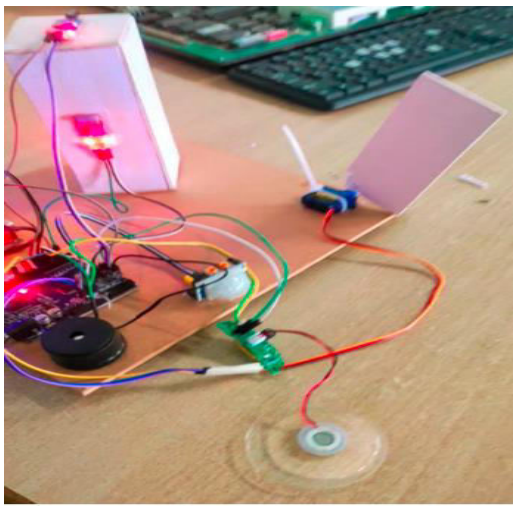

Fig. 5.3: The Movement of Shutter is open.

The dangers of ATM theft are greatly reduced by this multi-layered response mechanism, which not only discourages would-be thieves but also guarantees that authorities can act quickly. This equipment is designed to respond quickly to any unlawful actions.

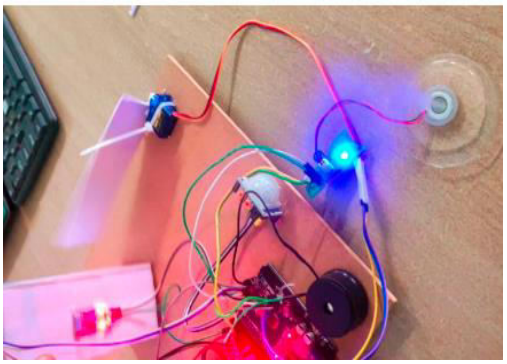

Fig. 5.4: The Movement of Shutter is closed

6. CONCLUSION

Technology that can identify theft attempts, trigger fast replies, and transmit notifications is offered by the "ATM Theft Detection, Auto Arresting, and Intimation System." This real-time security solution greatly reduces risks and enhances ATM security.There will be a state-of-the-art anti-theft mechanism for ATMs thanks to the suggested technology. An innovative and economical method for protecting ATMs has been suggested in this research. It may be discreetly inserted in the ATM to prevent unauthorized access. While current ATM theft and intrusion control systems are either prohibitively costly or useless when viewed remotely, the proposed solution offers several advantages over these alternatives. Reliability, affordability, and suitable design are its strong points. GSM and GPS module for ATM theft detection and position tracking. Using vibration sensor input, the prototype identifies the movements of the cash box, alerts the buzzer in abnormal conditions, and, using an actuator DC motor, the embedded control unit shuts the main

door. An SMS alert is sent to the registered police station, along with a link to the geographical location of the robbery. New ATMs can further benefit from this prototype model's incorporation into their design.

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