# Modern ATM Security System

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**Abstract:** *The Idea of Designing and Implementation of a Security-Based ATM  theft project is born by observing our real-life incidents.  This project deals with preventing ATM theft from robbery to overcome the drawback found in existing technology in our society.  Whenever robbery occurs, a Vibration sensor is used here, which senses vibration produced from ATM. 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. DC Motor is used for closing the door of the ATM.  A Stepper motor is used to leak the ATM gas to bring the thief into an unconscious stage. The camera is always processing and sending video continuously to the  PC, and it will be saved on a computer. RTC is used to capture the robber's time and send the robbery to occur time with the message to the nearby police station and corresponding bank through the GSM. Hear LCD board using showing the output of the message continuously. This will prevent the robbery, and the person involving in the robbery can be easily caught. Here,  Keil tools are used to implement the idea, and results are obtained. Keil tools are used to run the DC motor and stepper motor for automatic door lock and leak the ATM gas.*

## I. INTRODUCTION

In the modern world, many people are dependent on computers for keeping a major record of data. Data are transferred cost-effectively across a wide area network. ATM is one of the automatic systems being used since 1967 by many of us. John Shepphardbaren invented the ATM in June 1967 in the United Kingdom. It first came to India in 1968. Today, many people have PINs and passwords for operating multiple devices like car, mobile, ATMs herein; using PIN without safety results in customers' major difficulty like usability, memorability, and security.

Some people used to write their PIN and password on some paper or diary that is not secure. As it can be easily attacked and hacked by someone, resulting the Account holder can suffer. With the growing banking sector, everyone uses ATMs as these machines are located in different places, and the customer can access his account anytime, anywhere. A customer holding a bank Account can access the Account from ATM systems by getting a PIN or password confidentially from the bank. By scratching the ATM card into the machine and entering the PIN, one can easily perform the transaction, transfer money, etc. The PIN is a crucial aspect used to secure information of customer's account, thus should not be shared with others.

In some literature, various biometric techniques like- fingerprint, eye recognition, retina and iris recognition, etc., have been devised as an authentication method for ATMs; still, there is a need to enhance the security in ATM systems to overcome various challenges.

This paper focuses on the security of the ATM system, i.e., how to augment the security of transactions using vibration sensor and temperature sensor with the sudden action of door locking and sprayer inside the ATM room. The GSM alerts are also included for an efficient alerting system.

## II. RELATED WORKS

N.Choudhury et al. (2009) proposed developing an application for automation of video surveillance in ATMs and detected any potential criminal activities that might be arising with the system, which would considerably decrease the inefficiency that exists in the prevalent systems.

M. Kiran et al. (2017) proposed the tracking object in the low-resolution video is a stimulating task due to the loss of distinctive aspect in the outward visual look of moving target object. The present-day approaches are typically involved in the enhancement of Low Resolution (LR) video by super-resolution techniques.

Melo et al. (2015) described the growing demand for automated teller machines (ATMs) in the cities. Due to the large concentration of banknotes, these devices have been targets of theft using explosives.

Ragade et al. (2017) proposed the embedded-based home security system designed using smart sensors like pyroelectric infrared sensor (PIR), ultrasonic sensor to detect an intruder in the home. The ultrasonic sensor is used to detect objects,

and the PIR function to detect changes in humans' temperature in infrared radiation.

Hirakawa et al. (2013) proposed a text-password entry interface known as mobile authentication. Every selectable text is arranged in a square with their method, with each text having its background color.

Badalet al (2013) proposed the most prominent issues concerning the daily users and the not-so-frequent ones. This paper emphasizes the hypothetical yet possible scenario of an individual's ATM card falling into the wrong hands. The PIN is cracked by a theft perpetrating entity.

### III. PROPOSED METHODOLOGY

In this section, the proposed system is described as a Functional Block diagram. Arduino controller is interfaced with a vibration sensor, force sensor, PIR sensor, GSM Modem, Stepper Motor, buzzer, Sprayer, and LCD.
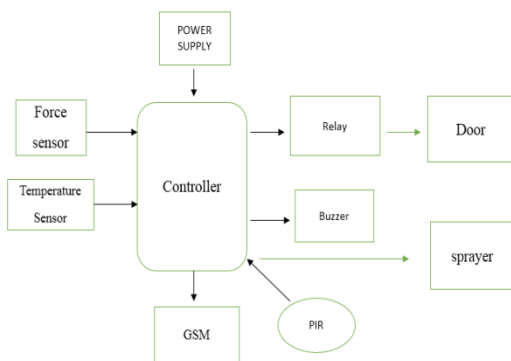


**Fig.1 Proposed Block diagram**

From the block diagram, an ATM system is initially embedded with high-security alerts, as shown in fig 1. When the thief hits the ATM for robbery, the Force sensor detects the force applied. The vibration sensor detects the exceeding vibration caused in the machine where the threshold limit is already programmed in the controller.

Therefore, the PIR sensor detects human presence in the ATM room, and the DC motor closes the door, which is locked automatically, and then the spray is applied to the thieves presented inside the ATM room. The buzzer is started to alert with its sound alarm, and the GSM is used to send an SMS to the authority. By this high alerting security, the theft cannot do any further that will be easily caught and punished. This advanced system security is much more beneficial than the existing and simple and low cost compared to the prior models.

### IV. HARDWARE DESCRIPTION

**Power supply circuit:** The main building block of any electronic system is the power supply to provide the required power for their operation. LCD, RTC,

GSM, and +5V are required for the microcontroller keyboard & for driving buzzer +12V. The power supply provides a regulated output of +5V & non-regulated output of +12V. The hardware part consists of the components and the sensors used in the system. This part mainly collects the status of the sensors and stores it into the micro controller's EEPROM.

Arduino Microcontroller: The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

**Vibration sensor:** Vibration sensors are sensors for measuring, displaying, and analyzing linear velocity, displacement, and proximity, or acceleration.

**Temperature sensor:** This sensor's advantage has more memory, processing, and communication capabilities than other sensor nodes. The LM35 series are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.

**DC Motors:** For Closing the ATM door, we are using DC motors. A 12VDC power supply operates it. In an electric motor, the operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when and to the external magnetic field's strength, we are placing DC Motor for closing the ATM door while thief's are trying to break the ATM.

**GSM modem:** A GSM modem is a specialized type of modem that accepts a SIM card and operates over a mobile operator subscription, just like a mobile phone. From the mobile operator's perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many can also be used to send and receive SMS and MMS messages.

**Driver ULN2003D:** The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads and switching power transistors. To simplify use as two bridges, each pair of channels is equipped with an enable input.

### V. CONCLUSION

In this paper, effective implementation of a security system that can monitor ATM centers is implemented, with vibration and temperature sensors. This system is used to implement the system which is

more secure by using the GSM module. It sends the alert message to the authenticated person. The thief tries to open the machine; the MEMS is activated; this gives the signal to the Arduino microcontroller, which shuts the door and alerts the vigilance system. This system also demonstrates how automation of "ATM THEFT" prevention from robbery (or) thief can be implemented using LCD and buzzer. The security of the system will be performed well with the comparison of the previous system

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