

# ADVANCE ATM SECURITY SYSTEM

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**Abstract-** Nowadays ATM Machines are one of the most important and useful thing. Millions of transactions take place on regular basis, ATM not just make our daily work easy but also provide safe, efficient and better service. They help in saving our valuable time, it is better to use ATM instead of directly reaching to bank for withdrawing money which is a total waste of time and resource. So, It is important to take care of ATMs by providing security to the machine is our responsibility, protecting it from unauthorized access, tampering or any kind of robbery.

Advance ATM security system is basically a way of enhancing the surveillance of ATM Machine or the ATM cabin. So, it becomes possible for public to use ATM safely. Advance ATM security system is a Node MCU ESP 8266 based project with other different sensor like IR sensor for Motion Detection, Servo Motor for closing and opening of the cabin gate, LCD display, Alarm/Buzzer for alerts and many other sensors.

All these sensors combined will improve the security of ATM and make it safer to use. The project overall provides the surveillance and protect the ATM from intruders.

**KEY WORDS:** ATM: Automatic Teller Machine, MCU: Microcontroller unit, IR: Infrared, LCD: Liquid Crystal Display.

## 1. INTRODUCTION

Automated teller machine (ATM) has become one of the essential services nowadays as one can withdraw cash through ATM without even going to a bank. It was in 1987, that HSBC introduced concept of atm in India. The idea of designing and implementation of advance ATM security system project is introduced by observing our real-life incidents. In our project, IR sensors are used, which detects movement of the person entering the cabin. The Node MCU is an open-source software and hardware development enrollment. It is used to store and implement the programs or codes written in different machine understandable programming languages. This system process real-time data collected using IR sensors. Once the suspicious movement is detected, the buzzer starts producing buzzing sound and the node MCU send the tempering message to the nearby police station. For message to be displayed in police station, to display the information an LCD display is used. A servo motor is used to close and open the door immediately. Whenever more than two persons try to enter the ATM cabin at the same time, the door will automatically close. Apart from this the solar panels are used for storing and supplying power to the ATM in case of no electricity. We placed piezoelectric sensors nearby ATM to add more electricity options.

Through this we can easily prevent ATM theft and the criminals can also be caught.

The overall objective of the project is to create a public friendly environment and decrease the rate of theft and robberies.

## 2. LITERATURE REVIEW

ATM security is major issue these days, not just physically but also virtually. it is really hard to create a safe environment out there, so artificial neural network-based fingerprint scanner is implemented which helps in accessing the data of user and in making transaction.[1]. Camera is one of the most important equipment in the ATM surveillance, but due high resolution camera quality it is hard to track and recognize the intruder doing unusual activity. So to prevent it a super resolution technique is used to enhance the camera quality and provide good quality of low resolution video [2]. The goal of the project is to improve and enhance the surveillance of ATM using embedded system and other advance technologies. The project proposed the idea of RFID card instead of ATM cards, IR sensors to detect the motion of the user and automatically off and on the lights as well as AC; this will help in saving electricity [3]. The current methods of identifying the threat and unusual activities are not enough and accurate, so overcome the issue a live threat detection system is implemented through which the

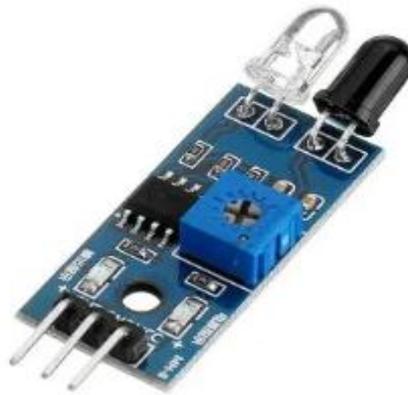
live updates will be send to the police or center in case of any malicious or unauthorized access [4]. The new way of recognizing the user is proposed in the project. Facial recognition improves the security of the ATM, the ATM only allow access to the user when he/she face is matched with the database records [5]. The project helps in taking immediate action in case when more people enter the cabin than the allowed limit, it also helps in recognizing whether the person is wearing a mask/helmet or not. It will generate a warning which reduced manpower or continue supervision by a human [6]. The technology of GSM module communication is introduced in the project so that if any mishappening occurs in the ATM cabin the SMS and call service will be available to contact to the control center or police station. some other sensors are implemented to improve the overall security [7]. This project proposes a centralized private server for monitoring all the ATM in the city, the system provide real time information and updates which helps in improving the security of the ATM. The information is recorder, processed and delivered to the control center in the real time. [8]. to enhance the security of ATM surrounding, this project provides 3 layered ATM security it includes the GPS system. The system allows only single person to enter in the ATM cabin Vibration sensors helps in recognizing any kind of tampering attempt in the ATM machine and alarm are also implemented to improve the security [9]. The system is based on IoT and GPS technology, cameras are implemented to provide real time update while buzzer gives the alert to the control room and the officials in the control room lock the gate of ATM cabin and inject Chloroform inside the cabin so that the thief cannot escape [10].

### 3. METHODOLOGY

#### 3.1. IR SENSOR

IR stands for Infrared sensor; it sends some signal or light which when colloid with any obstacle it reflect back to the receiver. The LEDs used here are the IR LEDs. It works as the transmitter the component next to the IR LED is a photo diode that works as a receiver. The transmitter emits IR light, and the receiver keeps checking for the reflected light. If the object is present in front of the IR sensor the lights get reflected after hitting the object and the receiver detects it. The IR sensor is the digital sensor, and its output will be either one or zero. The IR sensor only detects infrared radiation.

The working of this IR sensor is like the sensor which detects objects around it.



**Fig: 1**

#### 3.2. Node MCU ESP 8266

It is an open source wi-fi module used for establishing the communication between different devices. It allows transfer of data using wi-fi protocol. The device is used to store program and implement them in the circuit/working model using its IDE.

In the project we use it to communicate and provide interface between the transmitter and receiver end. It also stores the program in which the project works. Node MCU is basically the backbone of the project.



Fig: 2

### 3.3 - Alarm/Buzzer

Alarm/Buzzer is basically a hardware device that is used to produce sound when the supply is given to it. The main purpose of the device in the project is to alert the police or control room officials but producing sound. The device is used in the receiver end to display alert to the control room officials and continuous supply is given to it.

### 3.4 - LCD display

The full form of LCD is Liquid Crystal Display. LCD is used to display the character in two lines, where each line is capable of displaying 16 characters. LCD is basically flat panel display which uses liquid crystal to give output.

The main purpose of using a LCD in our project is that it displays the warning when someone tampers any system or ATM. The data is stored in Node MCU and when the tampering happens it shows the alert in control room that this ATM is being tampered.



Fig: 3

### 3.5 - Servo Motor

Servo motor is basically a simple motor work under the principle of servo mechanism.

The main aim to use a servo motor in the project is, it helps in closing and opening the door. When more than 2 people enter the cabin it automatically closes or whenever someone is tampering with the ATM, the system send the message and the door will automatically close.

The only way to open the door is by using the pin-code which is a unique code and only police or the control.



Fig: 4

#### 4. EXPERIMENTAL SETUP AND BLOCK DIAGRAM

The below fig. shows the final proposed model of the project Advance ATM Security system in which all the components are connected in the following manner:-

The model is divided into two parts: -

1. Transmitter End – It consists of the main power supply, IR sensors, Node MCU (Tx), Solar Panel, and all the other minor components.
2. Receiver End – It consists of the Node MCU (Rx), Buzzer and LCD.

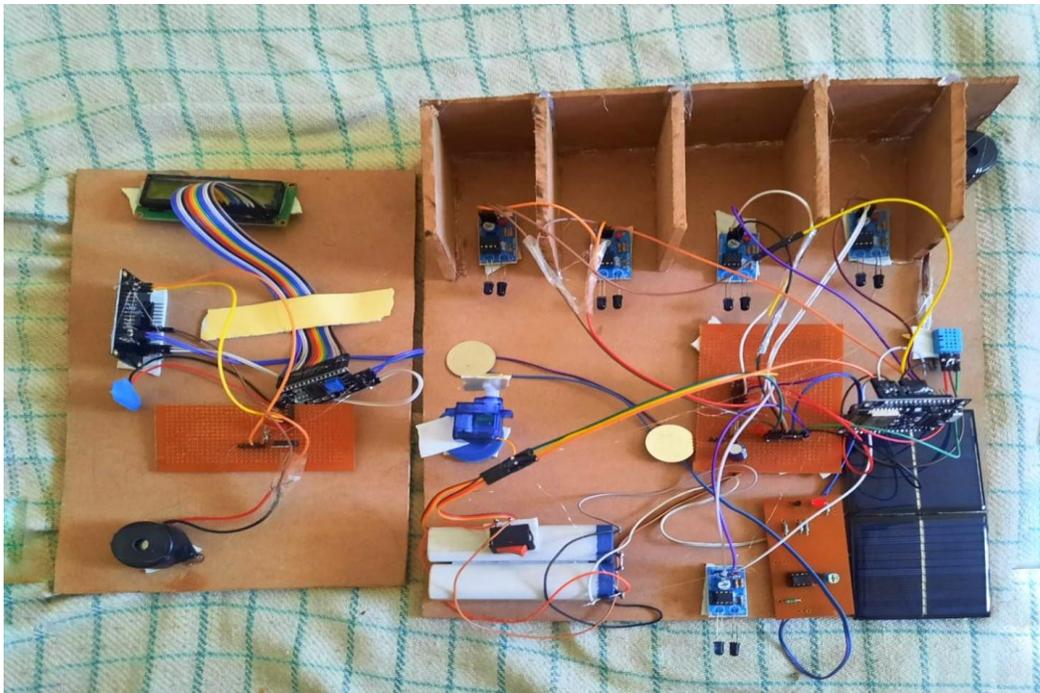


Fig: 5 Working Model

The given Fig shows the block diagram of the transmitter side circuit which consists of an encoder, IR sensors which are connected with encoder. Encoder is connected to transmitter, so that if tampering occurs it send signal to the receiver end.

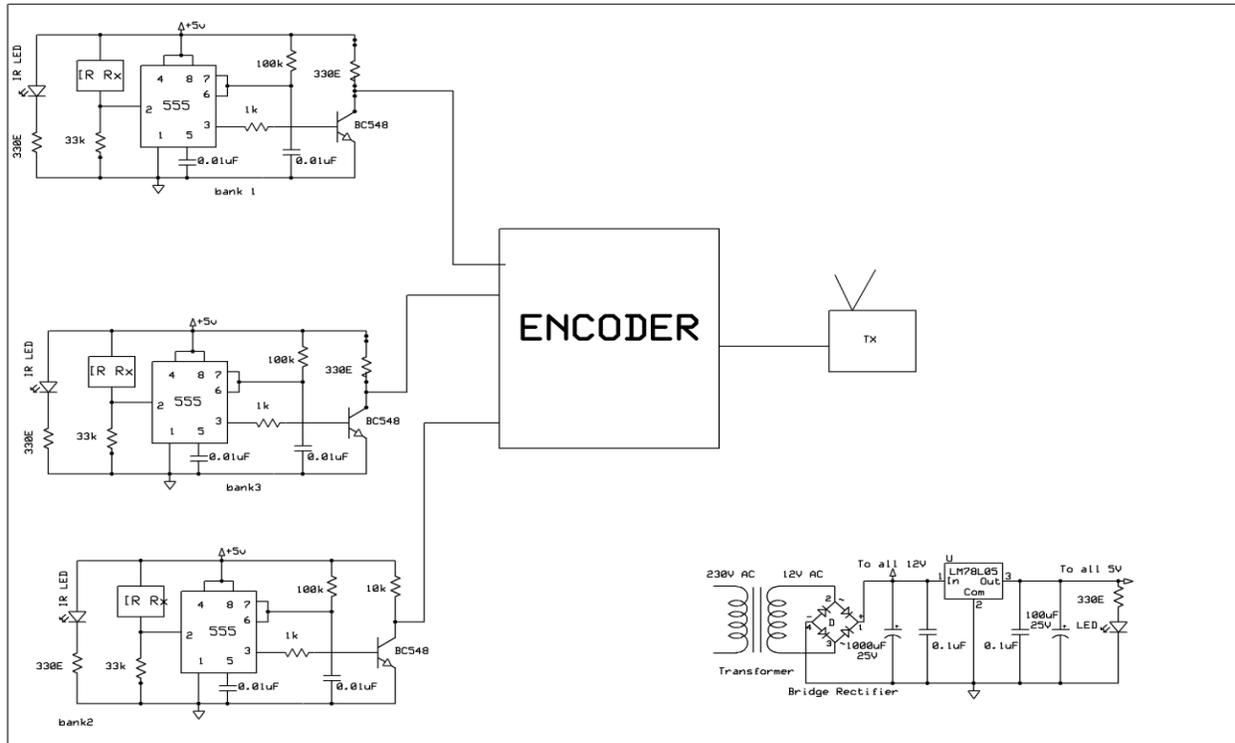


Fig: 6 Block Diagram

## 5. RESULT AND CONCLUSION

Based on the results, the main objective of implementing Advance ATM security system using Node MCU and IR sensors has been achieved. This purpose of the project is to provide security to ATM and surveillance. Whenever someone tries to tamper the ATM, the sensor which senses the motion & send a signal to the microcontroller. Once the controller receives signal, it locks the door of ATM room by sending signal to the dc motor. At the same time, the buzzer also gets activated which alert the officials in the control room.

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