ATM THEFT DETECTION BY INTEGRATING LDR WITH GSM

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Abstract— **Going through the ATM theft strategies, there are possibilities of physical damage of the ATM machines, which involves in breakage of the machines and scrapping out the whole machine itself with heavy machineries. Thieves also threaten to hand over money from the victims at an ATM and in rural area cutting off the power to the cameras and to spray paints that can help them to keep their identity hidden; this seems to prevail among most of the thieves. Thefts, accounting for more than Rs.18.48 crore lost across India, according to information released by Reserve Bank of India (RBI) in 2017.**

I. INTRODUCTION

In this modern world, every possible field has become so much advanced and enhanced that has made the necessity for its security an important aspect. Security equipments differ in their use with each other. Based on the need one has to use suitable equipment to handle the security.

1. *Standard Security System Equipment*

    Control Panel, Keypad, Alarm Siren

2. *Security System Entry Detection Sensors*

    Motion, Glass Break, Vibration Sensors

3. *Security System Threat Detection Sensors*

    Smoke, Heat, Freeze, Flood Sensors

4. *Security System Cameras*

    Wireless Cameras, Image Sensor

Innovation in the project is to identify when the camera not performs and automatically alerts by sending a message through GSM Module. Going through the ATM theft strategies, there are possibilities of physical damage of the ATM machines, which involves in breakage of the machines and scrapping out the whole machine itself with heavy machineries. Thieves also threaten to hand over money from the victims at an ATM and in rural area cutting off the power to the cameras and to spray paints that can help them to keep their identity hidden, this seems to prevail among most of the thieves. Thefts, accounting for more than Rs.18.48 crore lost across India, according to information released by Reserve Bank of India (RBI) in 2017.

II. OBJECTIVE

A. Scenario

To provide a solution that particularly addresses when there is a scenario when power is cut off to the cameras in the ATM room.

B. Solution to the Scenario

The solution would focus on reducing the number of ATM thefts and Crime caused by the malfunction or disabling the camera by the thieves.

III. DESIGN OF COMPONENTS

In order to come up with a solution that could indicate the police or the authority in charge, through a Message when there appears to be any malfunction of the camera at any instant. This system is an optional accessory to ATM and an external battery back powers it up that could keep it in function all the time. This system is for the cameras only installed in the ATM rooms and not in the ATM itself.

A. GSM Sim 900 A:

- GSM module (*Fig 1*) is a compatible Quad-band cell phone.

- It works on the frequency of 850-1900 MHz and which can be used not only to access the internet but also for oral communication.

- It is used in the project to send messages to a person in charge in case of any mal function in power supply to the security camera in the ATM. It plays an important role in this project to alert the officials with a text message (i.e.) SMS.

Fig 1 Photo of GSM module

B. *Arduino UNO:*

- Arduino UNO (*Fig 2*) is an open-source hardware and software that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices.

- It interacts with objects that can sense and control objects in the physical and digital world. It works on the frequency of 850-1900 MHz and which can be used not only to access the internet but also for oral communication.

- It is used to give needed commands to the GSM sim 900 A. All the commands given to the GSM are AT commands which are specified in its datasheet.

- It also receives the analog voltage from the LDR circuit and converts into digital values using its inbuilt 10bit ADC. It gives AT command to the GSM sim900 a when there's an increase in the LDR's digital output above the Threshold value.

Fig 2 Photo of Arduino UNO

C. *Light Dependent Resistor:*

- A photo resistor (*Fig 3*) is a light-controlled variable resistor. The resistor of a photo resistor decreases with respect to increasing incident light intensity.

- A photo resistor can be applied in light-sensitive detector circuits and light activated and dark activated switching circuits.
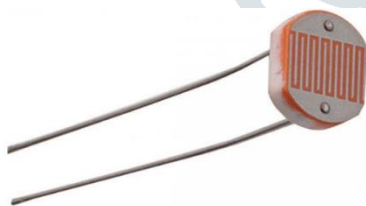

Fig 3 Photo of Light Dependent Resistor

D. *Transistor- BC547:*

- BC547 (*Fig 4*) is an NPN bipolar junction transistor. A transistor, stands for transfer of resistance,

- It is commonly used to amplify current. A small current at its base is to controls a larger current at collector and emitter terminals.

- Transistor such as BC 547 is used to amplify the output signal from LDR and drive the emitter to the Arduino and collector to drive the Buzzer.
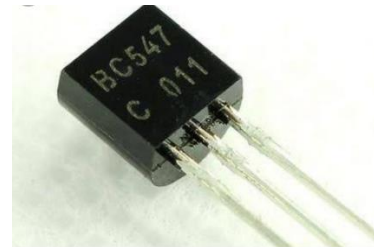

Fig 4 Photo of BC547

E. *Buzzer:*

- Buzzer (*Fig 5*) is an audio signalling device, which may be mechanical, electromechanical or piezoelectric.

- It includes the uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as mouse click.

- It is placed in the ATM to give alarming sound when there's a malfunctioning of the security cameras.

Fig 5 Photo of Buzzer

TABLE I.

S.NO	COMPONENTS USED
1.	GSM Sim 900 A
2.	Arduino UNO
3.	Transistor BC-547
4.	LDR
5.	Resistors
6.	Buzzer
7.	12V dc Adapter ,LED, wires, Jumpers

IV. IMPLEMENTATION
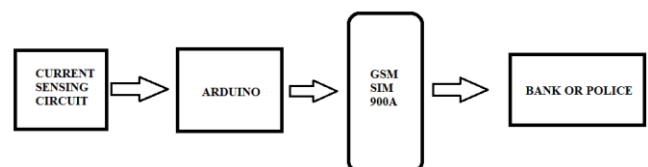
A. *Block diagram*

Fig 6 Simple Block diagram

The block diagram (*Fig 6*) that represents the entire circuits used in the project. Here the current sensing circuit, which uses LDR to sense current, using the light source, As the current sensing circuit indicates then the logic becomes one and the GSM module gets activated through the

Arduino and the alerts can become acquired to the respective officials and Police station.

B. *The Automatic ON/OFF LDR Circuit.*

A light source is placed in line with the camera in which the light source is kept closer to the LDR in another circuit. As any change in the light source get happen then LDR suddenly reflects its consequences. The LDR circuit is designed to give output when the light intensity to the LDR becomes nil.

C. *Current Sensing Circuit*

This circuit (*Fig 7*) connection consist of LDR, Transistor (BC547), Buzzer and Resistors (10 kΩ).
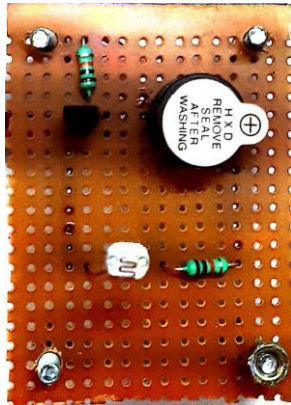
Fig 7 Current Sensing Circuit

• Emitter of the transistor is connected with the negative terminal of LDR and they are grounded.

• Positive terminal of the LDR is connected with the resistor and given to Buzzer. Other terminal of Buzzer given with collector of the transistor.

• Base of the transistor is given to Arduino pin 3 through resistor for enabling them.

• This circuit senses darkness and gives the output.

• The current sensing circuit is implemented in PCB-DOT board.

D. *Arduino and GSM module circuit.*

The module (*Fig 8*) is connected with the light source along with the camera. The external circuit, which consists of LDR and Arduino, interfaced GSM module. The GSM module, which requires 12 volts DC voltage to power up externally. As the camera wire, get interrupted the loss of current supply takes place. When there is, no current flowing through a camera's line it sensed by LDR where LDR has the ability to acquire high resistance at the darkness and the LDR placed in another circuit, in which the output drives the GSM module through Arduino.
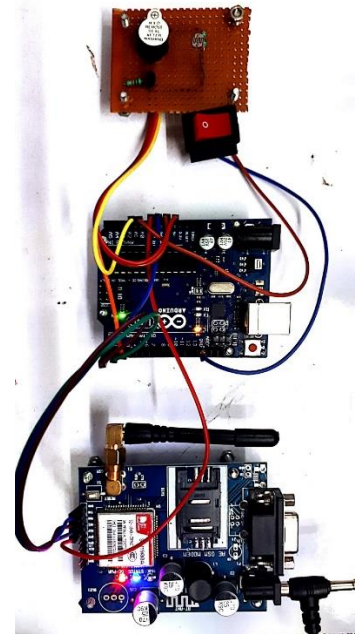

Fig 8-Interfaced Circuit

E. *focus on reducing the number of ATM thefts and Crime caused by the malfunction or disabling the camera by the thieves.*

V. RESULT

A. *Message Alert*

• First message in *fig(9)* which indicates when the GSM signal to the port gets activated and represent by sending a indication message that the GSM module is ready to perform the operation

• The second message in *fig(9)* is the required alert message that indicates that the LDR dark environment arise due to the occurrence of null current flow.

Fig (9) Message box of GSM

B. *Buzzer Alert*

When the Digital value obtained from LDR exceeds the given threshold value, Buzzer alarms with a loud noise with the voltage from the Arduino.

VI. FUTRE ASPECTS

This System can be enhanced using a pitch black detector with the help of Image Processing techniques such as open CV and Numpy in Python which could help in case of spraying black paints and other substrates to cover the lens of the camera completely so that it shows only a blank screen.

This system could be improved with Emotional sensing AI which could differentiate between a normal person and a thief with their face expressions.

ACKNOWLEDGMENT

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