



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 5, Issue 2)

Available online at: www.ijariit.com

IoT based ATM monitoring using cloud data with sensors

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ABSTRACT

In this system, we are using sensors like IR sensor, LDR sensor, Temperature sensor, smoke sensor, and the vibration sensor. The IR Sensor is used to monitoring the person IN/OUT in the ATM room. If more than 2 person enters the ATM, then it gives an alert to the user. LDR sensor is used to monitor the light intensity inside the ATM room. If the LDR output values are lower than the threshold value, then the ATM room light will automatically switch ON. Temperature Sensor is used if the temperature inside the ATM room goes below the specified limit, then the AC can be switched off, thus we can have a power saving. Smoke Sensor is to monitor the smoke level in the ATM room. If the smoke sensor value crosses the threshold value, the buzzer will get ON automatically. The Vibrator Sensors used to monitor the ATM when try to break. This will lock the door and send the message to the police station. The whole system relates to the IoT. So the user can monitor the ATM (like temperature level, Smoke) from anywhere and also can control the loads (Like AC, light, door) from the long distance.

Keywords— IR-Infrared, LDR-Light Dependent Resistor, ATM-Automated Teller Machine, IoT-Internet of Things

1. INTRODUCTION

Automated Teller Machines (ATM) today have become areas of the target due to their easy and readily available cash at everyone's convenience. The attacks on ATM's are steadily rising and this is a serious problem for law enforcement and banking sectors. So there has to be a system developed and put into place that will make sure the ATM is safeguarded and also gives customers the confidence when using the ATM. Currently, to provide protection to the ATM and to the customers using it, there are CCTV security cameras and emergency sirens. Other measures that are being researched include a system that implements a low cost standalone embedded web server, Machine to Machine (M2M) and RFID to implement an anti-theft system. In this system, it uses diverse sensors which include Passive infrared sensor, pressure sensitive Resistor, ADXL335 Accelerometer. Famous ATMEGA328 microcontroller became used on this system. It senses and video display units the modifications in temperature, pressure and orientation of ATM gadget constantly.

2. RELATED WORKS

Currently, to provide protection to the ATM and to the customers using it, there are CCTV security cameras and emergency sirens. Other measures that are being researched include a system that implements a low cost standalone embedded web server, Machine to Machine (M2M) and RFID to implement an anti-theft system [1]

In case there is an intruder in the ATM kiosk a system with image processing capabilities proves it's worth in identifying the intruder [2], but this kind of systems doesn't function up to expectations when the facial features extracted from the front face don't give us a proper ID of the intruder, in this case, a system with image processing capabilities using silhouette image finds its application [3] [4] [5].

But the need of the hour is implementing a system which prevents the physical attacks made on the ATM which is rampantly increasing, using hardware devices [6].

Going a step further and implementing an Omni Directional Vision Sensor (ODVS) can provide high intelligence and robustness for preventing financial crimes in ATM's [7].

Biometrics like fingerprint watermarking can also be used to encrypt a numeric digit [8] [9].

3. SYSTEM ANALYSIS

3.1 ATM system architecture

The ATM system architecture is given in figure 1.

3.2 Existing System

- In the existing system, there are much other safety systems is existing, where the system can do some failure while it is in an unsafe condition.
- ATM security consists of a camera and an alarm system. But this is one of the new concepts that monitoring the ATM using a different type of sensors.
- By doing this we can give extra security for the ATM and also the data sent to the server or to the control room through IOT modem.

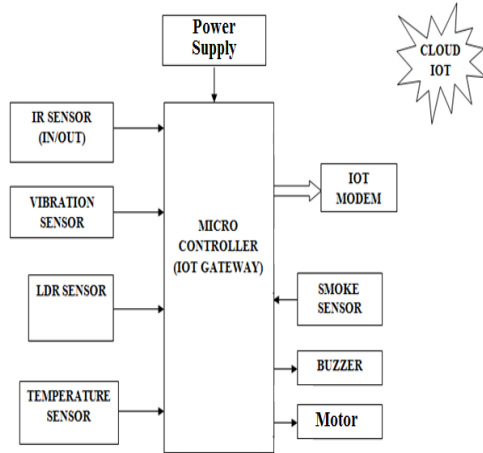


Fig. 1: ATM system architecture

3.3 Drawbacks of the existing system

- Manual Monitoring.
- We can monitor from the short range only.

3.4 Proposed System

Vibration Sensors used to monitor the ATM when try to break. This will lock the door and send the message to the police station.

- IR Sensor (IN/OUT) to monitoring the person IN/OUT in the ATM room if more than 2 person enters then give an alert.
- Temperature Sensor is used if the temperature inside the ATM room goes below the specified limit, then the AC can be switched off, thus saving power.
- Smoke Sensor is to monitor the smoke level in the ATM room. If the smoke sensor value crosses the threshold value, the buzzer will get ON automatically.
- LDR sensor will monitor the light intensity, this will automatically switch ON the light of the ATM Room.
- IoT MODEM: To send data and control through server. Emergency Lock from IoT Auto or Manual.

3.4.1 Advantages

- Automatic Operation.
- Smoke Sensor, Temperature Sensor, LDR Sensor, IR Sensor are used to monitor the environment.
- Message alert is provided.

4. COMPONENT DETAILS

4.1 Temperature sensor

The LM35 series area unit exactness integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Centigrade temperature. The LM35, therefore, has a bonus over linear temperature sensors mark in Kelvin because the user isn't needed to cypher an outsized constant voltage from its output to get convenient Centigrade scaling. The LM35 doesn't need any external standardization or trimming to produce typical accuracies of $\pm 1/4^\circ\text{C}$ at ta emperature and $\pm 3/4^\circ\text{C}$ over a full -55 to $+150^\circ\text{C}$ temperature vary. Low value is assured by trimming and standardization at the water level. The LM35's low output resistance, linear output, and precise inherent standardization create interfacing to readout or management electronic equipment particularly simple. It will be used with single power provides, or with and minus provides. Because it attracts solely $60\mu\text{A}$ from its provide, it's terribly low self-heating, but zero.1 $^\circ\text{C}$ in still air. The LM35 is rated to work over a -55° to $+150^\circ\text{C}$ temperature vary, whereas the LM35C is rated for a -40° to $+110^\circ\text{C}$ vary (-10° with improved accuracy). The LM35 series is on the market pack aged in tight TO-46 semiconductor packages,

whereas the LM35C, LM35CA, and LM35D are on the market within the plastic TO-92 semiconductor package.

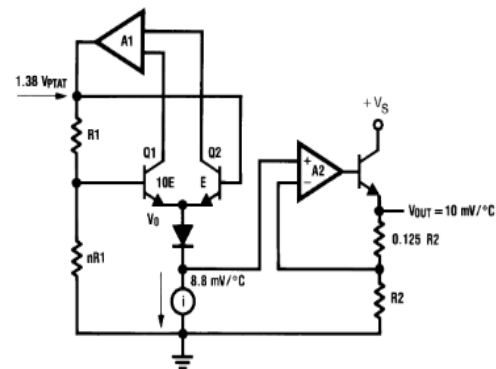


Fig. 2: Block diagram

4.2 LDR sensor

A light-weight dependent resistor works on the principle of exposure conduction. Exposure conduction is associate degree physical phenomenon during which the fabrics conduction is enhanced once light-weight is absorbed by the material. Once light-weight falls i.e. once the photons fall on the device, the electrons within the valence band of the semiconductor material area unit excited to the conductivity band. These photons within the incident light-weight ought to have energy larger than the band gap of the semiconductor material to create the electrons jump from the valence band to the conductivity band. Thus, once light-weight having enough energy strikes on the device, a lot of and a lot of electrons area unit excited to the conductivity band which ends up in a sizable amount of charge carriers. The results of this method is a lot of and a lot of current starts flowing through the device once the circuit is closed and thus it's aforesaid that the resistance of the device has been attenuated.



Fig. 3: LDR sensor

4.3 IR sensor

IR transmitter and receiver LEDs are around for an extended time, therefore, the technology is already seen in thought society (i.e. watersides in bathrooms/toilets/hand dryers). The Sharp IR vary Finder works by the method of triangulation. A pulse of sunshine (wavelength vary of 850nm 70nm) is emitted so mirrored back (or not mirrored at all). Once the sunshine returns it comes back at associate degree angle that's keen about the space of the reflective object. Triangulation works by detective work this mirrored beam angle by knowing the angle, the distance will then be determined as shown below in figure 4.



Fig. 4: IR sensor

The IR vary finder receiver includes a special exactness lens that transmits the mirrored light-weight onto an interior linear CCD array supported the triangulation angle. The CCD array then determines the angle and causes the measuring device to then provide a corresponding analog worth that may be browsed by a microcontroller. Extra to the current, the Sharp IR vary Finder electronic equipment applies a modulated frequency to the emitted IR beam. This go methodology is sort of proof against interference from close light-weight and offers wonderful indifference to the color of the thing being detected. In alternative words, the sensing element is capable of detective work a black in close full daylight with nearly zero noise.

4.4 Smoke gas sensor MQ-2

In current technology situation, observation of gases created is incredibly necessary. From home appliances like air conditioners to electrical chimneys and safety systems at industries observation of gases is incredibly crucial. Gas sensors ad libitum react to the gas gift, therefore keeping the system updated regarding any alterations that occur within the concentration of molecules at volatilized state. The gas sensing element module consists of a steel skeleton below that a detector is housed. This detector is subjected to the current through connecting leads. This current is understood as the heating current through it, the gases coming back on the point of the detector get ionized and area unit absorbed by the detector. This changes the resistance of the detector that alters the worth of the present going out of it. The connecting leads of the sensing element area unit thick in order that sensing element will be connected firmly to the circuit and enough quantity of warmth gets conducted to the within half. They cast from copper and have tin plating over them.



Fig. 5: Smoke gas sensor MQ-2

4.4.1 Applications

- Domestic gas run detector
- Detect smoke
- Industrial flammable gas detector
- Portable gas detector

5. RESULTS AND DISCUSSION

The projected system has been designed to support the principle of multi-layer security. We are going to ought to demonstrate

however uncommon event detection takes Place. With the projected system internal security has been stressed and thence we will stop doable unwelcome person or entry within the ATM or perhaps if unwelcome person gains entry, so immediate action is taken. Security officers will take up immediate actions whenever such a doable intrusion within the ATM happen. Thus, the projected system works well sort of a security device together with the traditional operation.

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