

GSM Based College Security and Management

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Abstract—Nowadays Security plays an important role in our life. Security in terms of theft, gas leakage, fire etc. In real life application there is a requirement of safety. In today's life we want to control all applications remotely and using that application provide a security. Basic idea of our project is to provide security using the GSM based technology even if the owner is away from the particular area. In wireless communication there are many methods but we selected GSM technology in our project. Because as compared to other methods, GSM is an efficient and cost effective. It is easily available and we are familiar with the GSM. This project presents a model that will provide security to their office or cabin etc. via SMS using GSM technology.

Keywords-Arduino Uno, GSM, sensors

I. INTRODUCTION

In real life application there is requirement of safety. The basic idea of this system is to provide security using GSM based technology. This system consists of Arduino Uno, Arduino Uno software, GSM, fire sensor, PIR sensor, door lock sensor, and pressure sensor. Arduino Uno is another type of microcontroller board based on ATmega328. It contains built-in circuits. We have to simply connect it to a computer using USB. In this system we are using GSM (SM900A). It delivers data, SMS with low power consumption. It is easy for integration and direct to RS232. A passive infrared sensor is an electronic sensor that measures infrared light radiating from objects. Magnetic door sensor is a combination of magnet and reed switch. Magnet placed on the door and reed switch is on the frame. Operation is performed on opening and closing of the door. For fire sensor we used LM35 is an analog linear temperature sensor. In LM35 the output varies linearly with change in temperature. For measuring pressure sensor BMP180 is used.

II. SYSTEM DESIGN

The system design of this project is divided into following main parts:

1. Arduino
2. GSM
3. PIR sensor
4. Door lock sensor
5. Fire sensor
6. Pressure sensor

A. Arduino

The Arduino Uno is one of the types of microcontroller boards which is based on the ATmega328. Arduino Uno has 14 digital input/output pins, power jack, crystal oscillator

(16MHz), 6 analog inputs, USB connection, power jack, an ICSP header. Arduino Uno contains built-in circuits which are needed to support the microcontroller [5]. We have to simply connect it to a computer using a USB cable to get started. Figure 1 shows the front view of Arduino Uno.

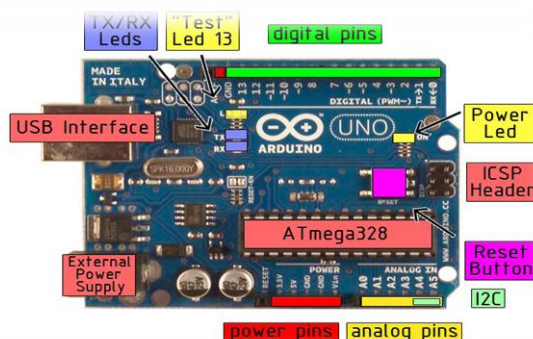


Figure 1. Front view of Arduino Uno

B. GSM technology and modem

GSM means Global system for mobile communication. It is used for transmitting data service and voice. GSM operates on bands 900 MHz and 1800 MHz [1]. Firstly, GSM digitizes the input data then compresses it. The compressed data is sent to the other device using a channel. GSM works on the wireless network. A GSM modem accepts a SIM card and operates, just like a mobile phone.

SIM900A: This module is reliable and ultra-compact. The SIM900A delivers 900/1800 MHz performance for data, SMS, voice etc. with low power consumption. Using GSM we can send and receive messages just like a mobile phone. SIM900A

GSM modem for easy integration and direct to RS 232 applications. It supports features like Data, SMS, Voice, and GPRS. Figure 2. Shows GSM module.



Figure 2. Shows GSM module

III. WORKING PRINCIPLE

The working principle describes the overall functionality of the sensors and their output. The block diagram is shown in figure. Firstly, all the sensors are initialized by supplying the required power of +5v. Using USB port the Arduino is communicate with computer and the data recorded is stored in a text file. Figure 3 shows overall design system

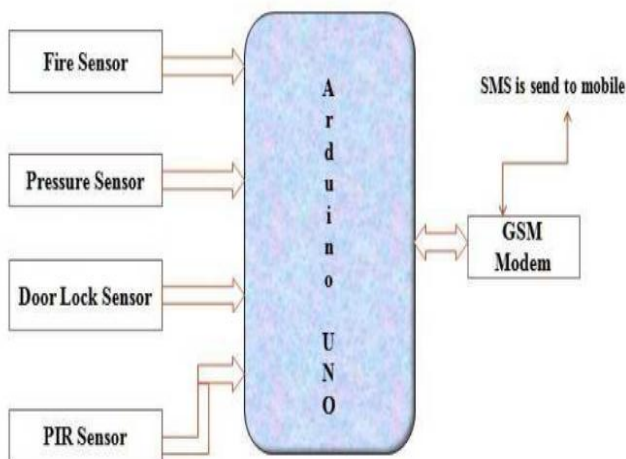


Figure 3. Overall design system

The fire sensor we are using to get an accurate value of temperature reading and fire detection. The LM35 DZ gives out analog output and is connected to the analog input of the Arduino micro-controller and it shows result of temperature in “Degree Celsius”. The PIR sensor gives digital output which is connected to Arduino input pin. As the motion is sensed by PIR sensor the Arduino input pin goes at logic high. The Arduino takes necessary action and sends SMS via GSM as “Motion Detected in the room”. The next sensor we have used is magnetic door sensor. Here we are using simple reed switch is “Normally Open” type. The case when the door opens the circuit gets close and the Arduino pin is at logic high. The Arduino continuously monitors the status

of respective pin, if goes high the SMS is send using GSM as “Door is opened”.

The BMP 180 is used as pressure sensor. The output of pressure sensor is analog one that’s why connected to Arduino analog input pin. The output voltage by pressure sensor is

calibrated in terms of pressure in Pascal. If this pressure value in Pascal exceeds 97800 Pa then GSM sends SMS as “Somebody opened the cupboard”.

IV. EXPERIMENTAL RESULT

Fire sensor:

The serial monitor shows the result of LM temperature in *C. As he temperature exceeds beyond 45*C the SMS“THERE IS FIRE” is send using GSM.

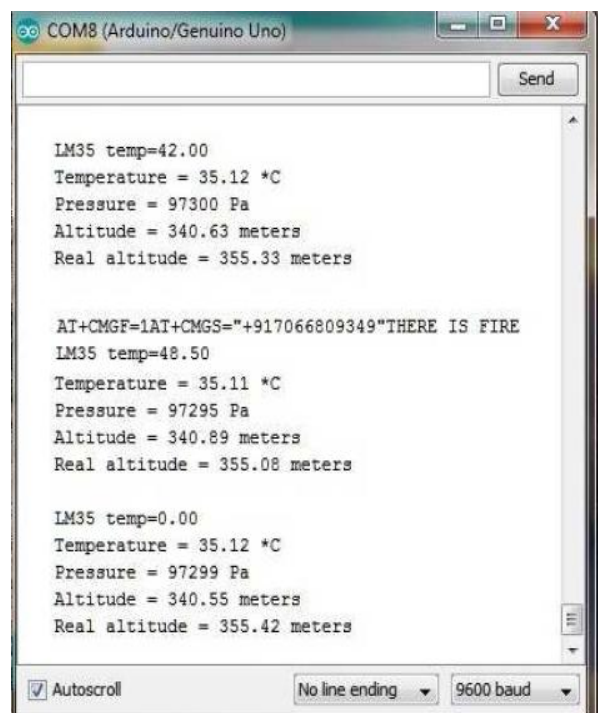


Figure 4. Output of fire sensor

Door sensor :

When door opens the SMS “Door is opened: is send using GSM

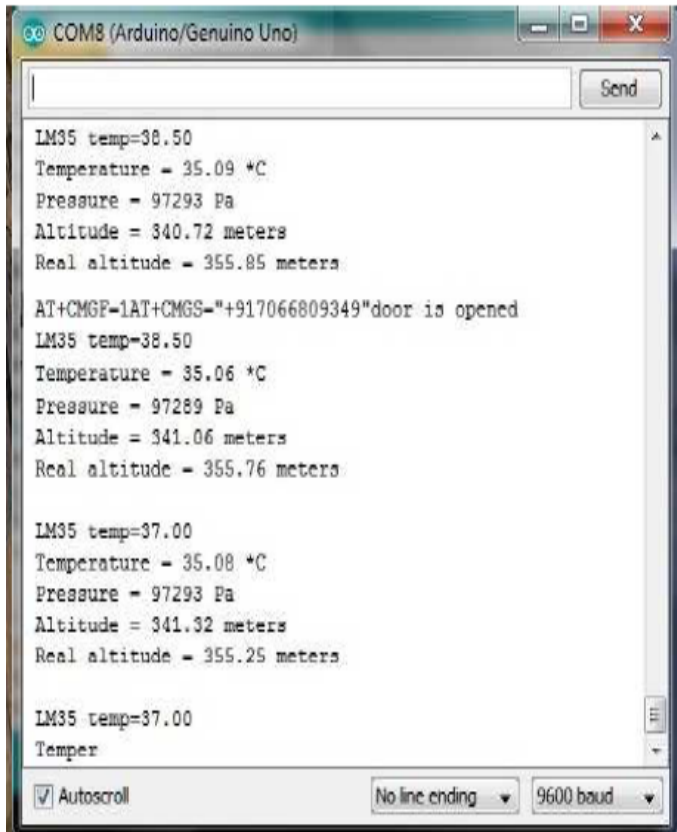


Figure 5. Output of Door sensor

PIR sensor:

When motion is detected the SMS “Motion detected in Room” is sent using GSM.

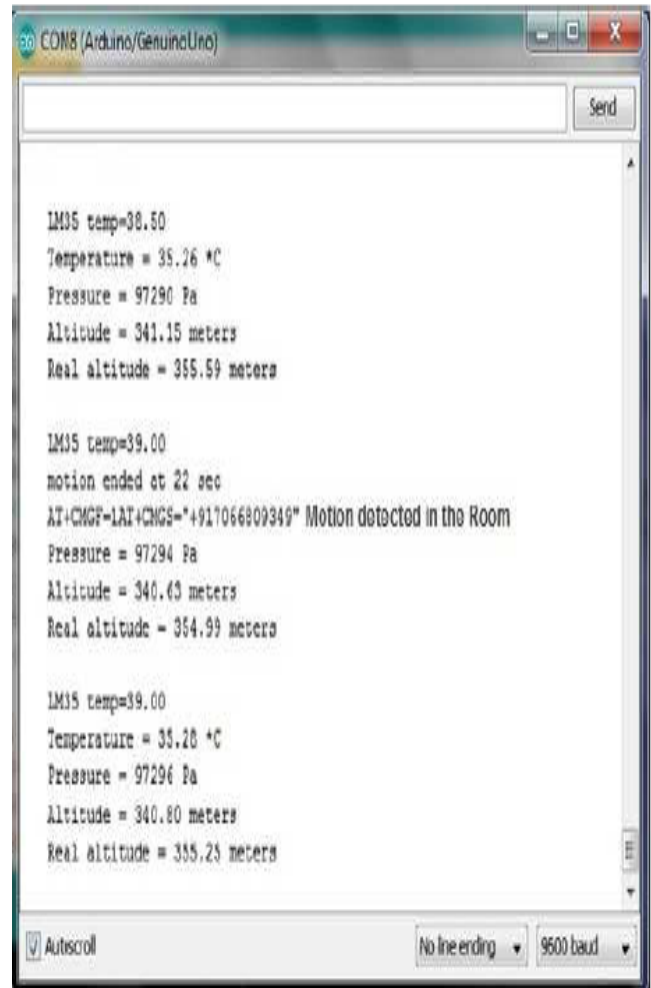


Figure 6. Output of PIR sensor

Pressure sensor:

The pressure calculated by BMP180 in the form of Pascal. When we open the cupboard the pressure inside cupboard changes, as this pressure increases or decreases in respect to specified value then SMS “somebody opened the cupboard” is sent using GSM.



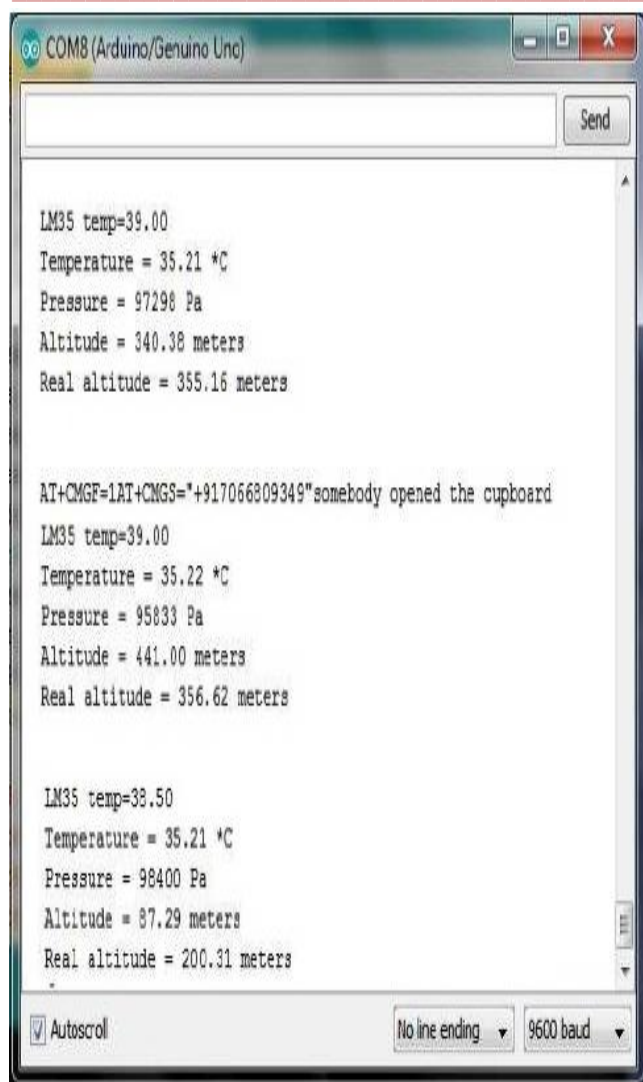


Figure 7. Output of pressure sensor

A. Advantages

1. No need of extra circuitry to transmit SMS.
2. For transmission mobile networks are used.

3. Components are easily available.
4. It is cost effective
5. It is easy to design

B. Disadvantages

Where the mobile network is not established, so no connectivity of mobile phones in that area. Therefore, SMS cannot be delivered.

C. Application

1. Used for Temperature Detection
2. Automobile Industry
3. Provide security to home, cabin and office etc.
4. Weather forecasting

V. CONCLUSION

This project is designed and implemented for college security and management. System based on GSM along with Arduino. The system is intelligent enough to monitor the secure environment. The system provides the reliable operation within reasonable cost and remove the system complexity.

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