



Smart Mall Automation and Security System using Arduino and GSM

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ABSTRACT: With the advancement of technology and more dependency of people on smart phone and increasing demands of easy and quick way of solving Daily life task, it has become very important to have a technology which can control over the domestic and industrial applications using GSM. Our paper ‘Sensing and controlling’ describe saving of wastage of electricity widely done in home/malls use. In this system we can use arduino and sensors like smoke sensor, temperature sensor, motion sensor, GSM.

In this paper we present a mall automation and mall security technique. The sensors will be interface with Arduino. The status of our mall appliances will get uploaded to a cloud platform through gsm module. Our system and mobile should be connected over same gsm network. Our sensors will be able to enable or disable the sensors which will be in control of the user. This paper will serve as an example of how GSM applications can make our life easier.

KEYWORDS: Arduino , flame Sensor, GSM , Temperature sensor, solar panel ,motion sensor

I. INTRODUCTION

This project temperature Monitoring and control system, intensity based light control system, motion based light control system and smoke sensor with pump sprayer is a very innovative system which will help to keep the mall automation and security. This system monitors the temperature and show on LCD. For this the system uses temperature sensor placed near cooling system. LDR for sensing light intensity, motion sensor to sensor motion and flame sensor to sense smoke. The system makes use of arduino uno board/ atmega 328 microcontrollers, LCD screen, and MOSFET to control devices. The system is powered by a 12V(10W) solar panel with 12V 7.2 Ah battery backup . The LCD screen is used to display the status of the temperature or respective sensor information.

Arduino fundamentals and some sensor to ease the way we control our mall appliances. This is achieved by interfacing sensors like smoke sensor, motion sensor, temperature sensor with microcontroller based system like Arduino UNO. In this paper we present a mall automation and mall security technique. The sensors will be interface with Arduino. The status of our mall appliances will get uploaded to a cloud platform through gsm module. Our system and mobile should be connected over same gsm network. Our sensors will be able to enable or disable the sensors which will be in control of the user. This paper will serve as an example of how GSM applications can make our life easier.

II. WORKING

Here circuit requires 5V and 12V regulated DC supply. We used here 12V (10Watt) solar panel. The output energy of solar panel is stored in battery. Now the out of capacitor is DC 12V-13.4V according to solar and battery voltages ratings given to the circuit, which is required to convert in 5V regulated for microcontroller and other devices, here we have used LM7805 regulator for getting 5V regulated DC.

12V DC connected with all devices like LED light, pump, Fan and its –Ve controlsignal gets from MOSFET and MOSFET triggered via microcontrolller.

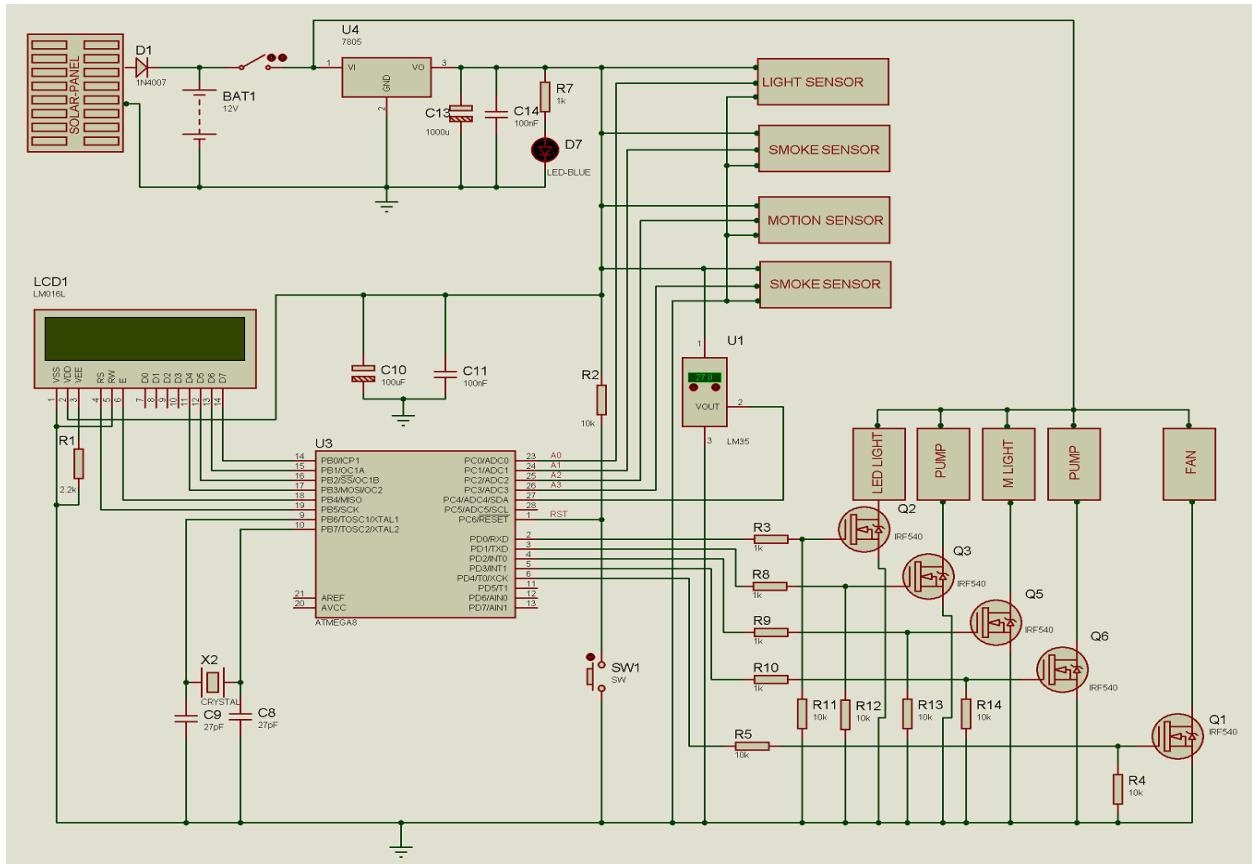


Fig.1 Circuit diagram

In this arduino board (microcontroller) works with 16MHz frequency used for (timer configuration), the unwanted frequency produced is bypassed by the capacitor of 27pf capacitor. Reset pin is connected to resistor of 10K whenever reset requires the reset switch (2 lead push to ON switch/ micro push to switch) required to press.

LCD data pins (AD4 to AD7) is connected to the pin 10, pin 11, pin12, pin 13 to send the data for the LCD display. The control pins of LCD display is connected to pin 8, pin 9, respectively take action as RS, E. Variable resistor of 10K (or fixed 2.2K) is connected to the adjust contrast of 16X2 LCD display. 10uf capacitor is used to cancel loading effect and 0.1uf is used to bypass the unwanted spikes produced in the circuit.

Light sensors is connected to A0, Smoke sensor is connected with A1, motion sensor connected with A2, smoke 2 sensor connected with A3 and temperature sensor is connected with A4. by sense physical parameter by sensor microcontroller takes action to control devices with MOSFET IRF540 N channel MOSFET.

All capacitors of 0.1uf near analog/ digital/ microcontroller Ics are connected to reduce spikes in the circuit, spikes produced by inductive load/ sparking contacts of loads and capacitor of 1000uf/25V at regulator output is connected for the cancel loading effect in the circuit while driving the high current source.

III. COMPONENT SPECIFICATION

A.ARDUINO UNO BOARD

The Arduino expansion was emerged in ITALY to build up low cost hardware for communicating design. This Arduino UNO s an excellent choice for any IOT applications design and, one can expect and carve programs according to the needs. The Arduino UNO board acts as a control unit in this experiment

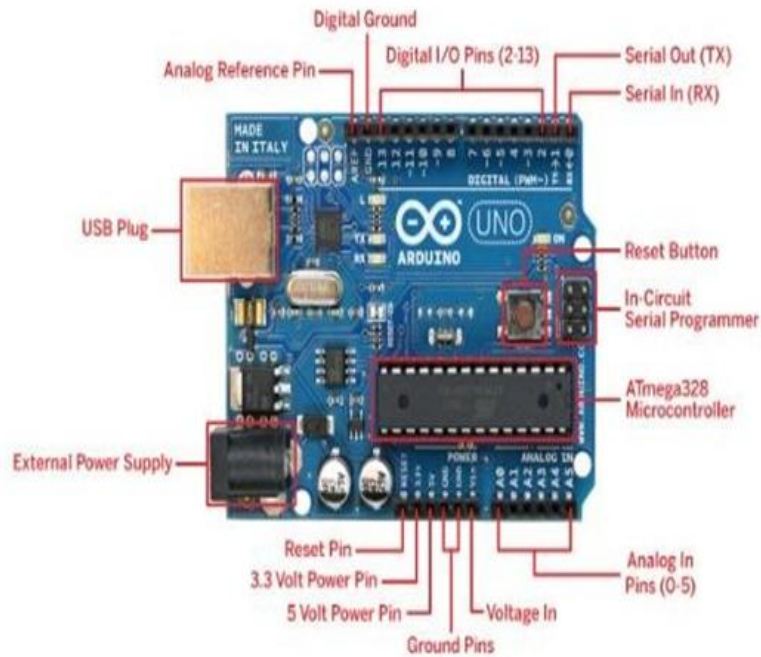


Fig.2 arduino board

B. SOLAR CELL

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.



Fig.3 solar cell

C.DC PUMP

Smaller electric water pumps, such as the kinds used in homes, usually have small DC motors. The DC motor is contained in a sealed case attached to the impeller and powers it through a simple gear drive. In the center of the motor is a rotor with coils around it. Around those coils are magnets, which create a permanent magnetic field that flows through the rotor



Fig.4 -DC pump



D. PIR MOTION SENSOR

The main purpose of motion detection is to sense an intruder and send an alert to your control panel, which alerts your monitoring center. Sensors work when you are not there. Some security systems can be programmed to record events via a security camera when motion is detected.

Motion sensors stand guard, ready to react to various situations, such as movement in your living room, windows or doors being opened or closed, or a broken window. In our project it detects motion in front of motion sensor.

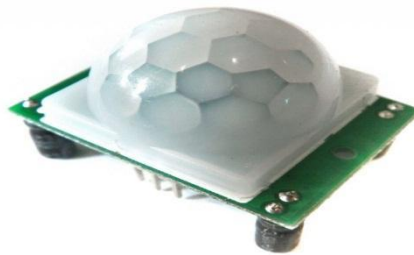


Fig. 5 Flame sensor

E.GSM

SIM900A module is one of the smallest Quad-band 850/900/1800/1900 GSM/GPRS surface mounted modules in the world. With LCC package technology, SIM900A provides the ultra tiny configuration of $19.9 \times 23.6 \times 2.6$ mm and can be embedded in customer applications, offering the highest reliability and robustness.

Featuring an industry-standard interface, SIM900A delivers GSM/GPRS performance for Data, Voice, and SMS with extremely low power consumption, extended temperature and compact profile. With extremely compact size and integrated protocols, SIM900A can almost meet all the M2M requirements, including VTS, Personal Tracking, Wireless POS, Smart Metering, Industrial PDA and many other M2M applications.



Fig.6 GSM module

F.LCD DISPLAY

A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of a LCD.

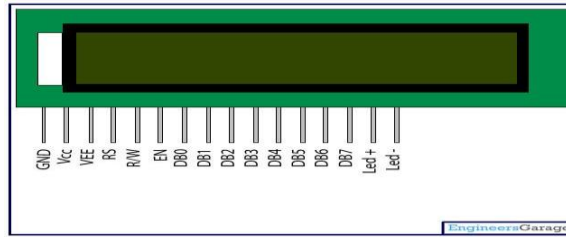


Fig. 7 LCD display

G.LM35 TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55°C to 150°C temperature range. Lower cost is assured by trimming and calibration at the wafer level. The low-output

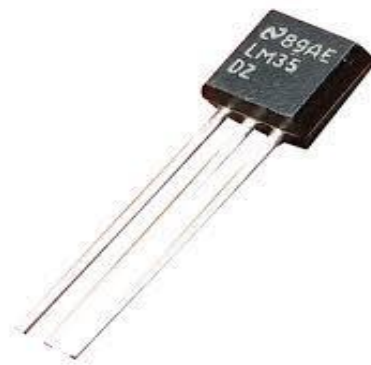


Fig. 8 Temperature sensor

IV.EXPERIMENTAL SETUP FOR MALL AUTOMATION

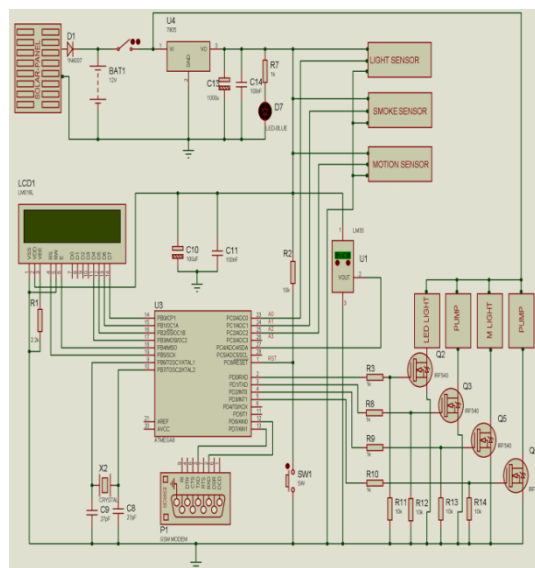


Fig. 9 Setup



This paper basically consists of three important parts i.e. sensing, monitoring, and controlling system. The first part sensing is done by sensors like motion sensor, temperature sensor etc. the monitoring task is done by the cloud platform and the controlling part is done by our microcontroller unit i.e. is Arduino UNO.

The sensors, appliances and GSM module are interfaced with Arduino UNO. This project temperature Monitoring and control system, intensity based light control system, motion based light control system and smoke detector with pump sprayer is a very innovative system which will help to keep the mall automation and security. This system monitors the temperature and show on LCD. For this the system uses temperature sensor placed near cooling system. LDR for sensing light intensity, motion sensor to sense motion and smoke sensor to sense smoke. The system makes use of arduino uno board/ atmega 328 microcontrollers, LCD screen, and MOSFET to control devices. The system is powered by a 12V (10W) solar panel with 12V 7.2 Ah battery backup. The LCD screen is used to display the status of the temperature or respective sensor information.

V.ADVANTAGES

- 1)The circuit required power supply for its operation is very less. (12V, 500mAh)
- 2)We can implement up to 6 sensor with this microcontroller by implementing little Other hardware.
- 3)The circuit is compact in size, so small space is required can be fit in small box or can be fit in board also.
- 4)Show the resulting output on LCD display so it is user friendly.

VI. APPLICATION

- 1)It can use in industries as automatic control.
- 2)It can be used in automation system also, to control lights or any electrical appliances by physical conditions.
- 3)It can be used in home use also, to control temperature and lights.
- 4)It can be used to security purpose by implementing little other hardware.
- 5)It can be used as temperature meter.
- 6)This system save energy .the wastage of energy is avoid
- 7)this system is secure and easy for use

VII.RESULT

Thus our group actively coupled with project, and we develop this project named as “MALL AUTOMATION”.

In this project we have used multiple sensors like light sensor, smoke sensor, motion sensor and temperature sensor. As respective condition detected microcontroller takes action to control it, And shows result on LCD display. This whole system is operate with solar power and backup is used using 7.2Ah battery. It can operate 4 hours for continuously use.

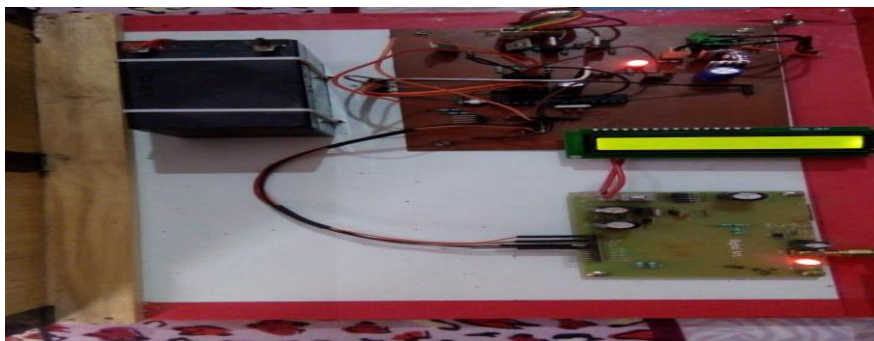


Fig.10 Result

At a final note, we conclude that GSM leads to become universal in every aspect. This paper will be very beneficial in our normal day to day life and will bring much needed innovation in his fast changing world of technology where people prefer to have control over things using the smartphones which will bring ease to their routine life.

VIII.CONCLUSION

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