GAS LEAKAGE DETECTION AND ALERTING SYSTEM, AUTOMATIC REGULATOR OFF SYSTEM USING ARDUINO

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ABSTRACT

The presence of hazardous LPG gas leakage in a domestic, work place, also, stored gases container gas which exhibits ideal characteristic is use. The alarm unit is used to vibrate an alarm which is buzzer. The Buzzer gives an audible sign of the presence of LPG gas. MQ5 sensors are widely used to detect essence of propane, iso-butane, LPG. MQ5 sensor has an advantage to combine a sensitivity response time. If the LPG MQ5 sensor senses gas leak from work place or home, sensor output goes to active low condition. Arduino UNO used in the project low signals are overlooked by the Arduino uno and gas leakage is been noticed by the Arduino. The Arduino UNO turns on the buzzer and cut of gas connection. Arduino turns on the GSM modem after that, it continues to send messages SMS to mobile number specifically mentioned in the program of the source code for alerting danger to the people.

Keywords: Arduino UNO; MQ5 Gas Sensor; GSM Module; Buzzer.

I.   INTRODUCTION

The it is usage of the gas brings great problems in the domestic as well as working places. The inflammable gas such as LPG gases, which is excessively used in the house and at work places. The leakage of the gas like LPG causes destructible impact to the lives and as well as to the heritage of the people. The concept of the project we have determined to develop an examining system which finds the leak of gas like LPG and protects the work places by taken correct precaution at correct time. This Project provides the information such as when a gas leakage is noticed, sensors of in the project are used to notice the gas leakage and immediately turns ON the buzzer for the danger indication. Buzzer is a used to clear indication of gas leakage. By the detection of the hazardous gas the alerting message reached to the person who has control over it from the GSM Module. The Detection of the gas leakage is important and halting leakage is important equally. The main objective of this System is that it is extremely accurate with a least cost, this project system is best to detect gas leakage and also warn people around by buzzer beep sound and an SMS through GSM module is been send to the responsible person for preparatory safety.

II.   METHODOLOGY
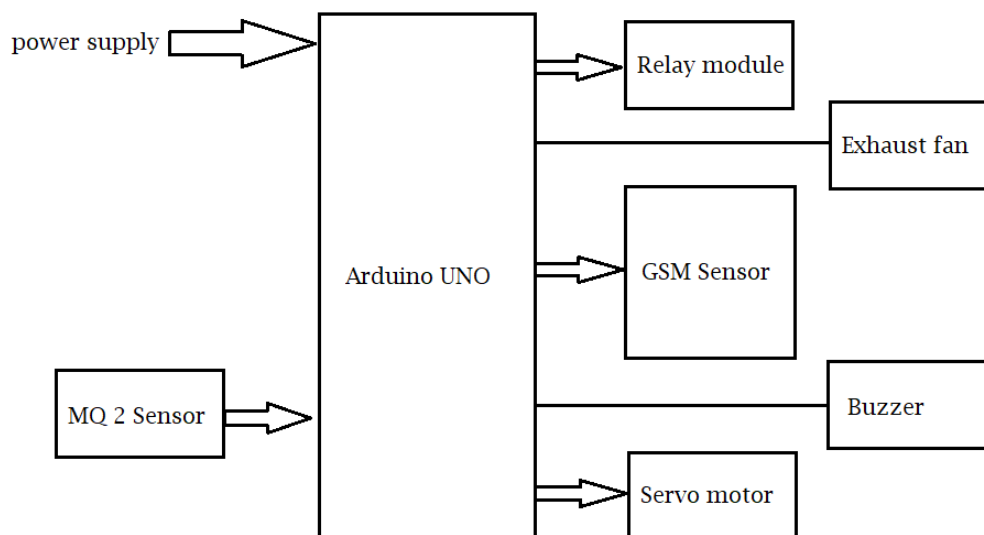
Figure 1: Block Diagram of gas leakage detecting and alerting system, automatic regulator off system.

III.   SOFTWARE REQUIREMENTS

1) Arduino

Figure 2: Ardunio

The Arduino is an open-source platform used for building electronics projects. Arduino UNO consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your Personal computer, used to write and upload computer code to the physical board.

The Arduino UNO platform has become quite popular with people just starting out with electronics, and for good reason. The Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board you can simply use a USB cable. The Arduino IDE uses a simplified version of C++, C, etc making it easier to learn to program.

IV.   HARDWARE REQUIREMENTS

1) MQ5 sensor

Figure 3: MQ 5 Sensor

The gas sensing material used in the MQ-5 gas sensor, which has a low conductivity in clean air. When there is flammable gas like LPG in the environment where the sensor is located, the conductivity of the sensor increases with the increase of the flammable gas like LPG concentration in the air. The MQ-5 gas sensor has high sensitivity to butane, propane and methane, and can take into account both methane and propane, etc.

2) Servo motor

Figure 4: Servo motor

A servo motor is an electromechanical device that produces torque and velocity based on the supplied current and 5 volt voltage. A servo motor works as part of a closed loop system providing torque and velocity as commanded from a servo controller utilizing a feedback device to close the loop(0°-90°).

3) Buzzer

Figure 5: Buzzer

A buzzer is an audio signaling device to alerting. It have 2 pins. Mostly buzzers and beepers are used for alarm devices, timers. Piezo buzzer is an electronic device commonly used to produce sound and alerting to user.

4) Breadboard
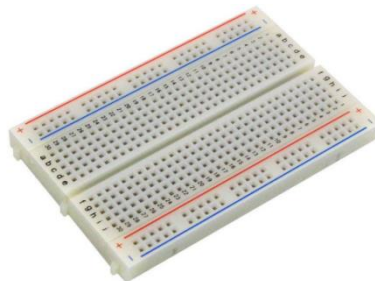
Figure 6: Breadboard

This Bread Board is a development base for prototyping of electronics. It is most reusable. It is very easy to use for designing a temporary project. It is not good tool when designing circuits with high voltages. Similarly the boards will have difficulty in keeping up high current applications so here we are using this bread board for our temporary testing purpose.

5) Jumper wires

Figure 7: Jumper Wires

A connecting jumper wires is an electrical wire, or a bunch of cables with a leads or pin named as male-male and male-female pins is normally used to interconnect the components with bread board without soldering.

6) GSM Module

Figure 8: GSM Module

The GSM module plays a crucial role in the communication between devices and the user. It is responsible for establishing and maintaining the communication link between the device and the network of user. The GSM module also handles the encryption and decryption of data, which ensures the security of the communication.

V.   PROJECT IMPLEMENTATION
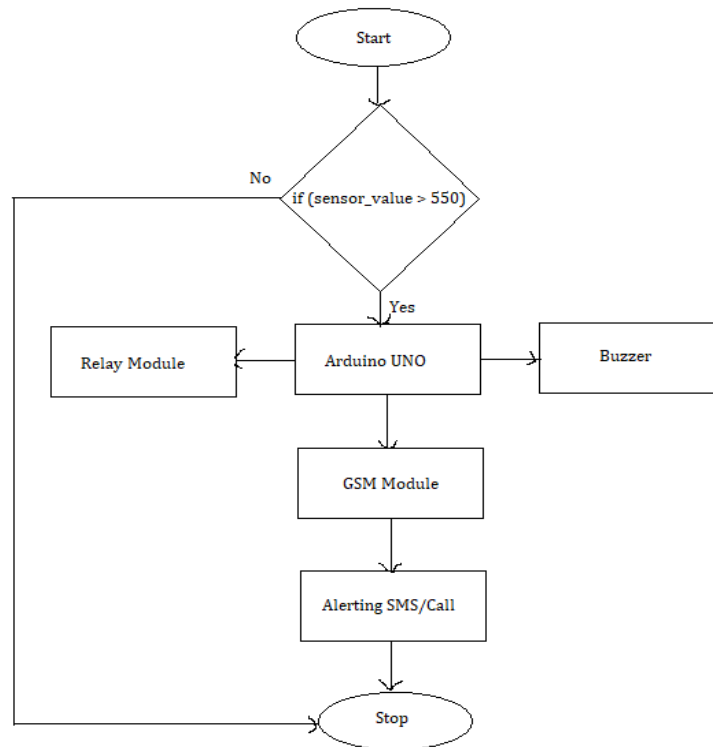
Figure 9: Flow Chart of project

Step 1: Assemble the Hardware:

Connect the gas sensor to an analog pin on the Arduino.

Connect the servo motor to a digital pin on the Arduino and the gas regulator.

Connect the GSM module to the Arduino (usually via Software Serial) and insert the SIM card.

Wire the relay module to control the gas supply.

Connect the buzzer and fan to appropriate pins on the Arduino.

Step 2: Write the Arduino Code:

Use the Arduino code provided earlier in this conversation to create the program for gas leakage detection, SMS alerts, and regulator control. Customize the code to suit your specific components and threshold values.

Step 3: Test the System:

Upload the code to the Arduino and power up the system. Test it by exposing the gas sensor to gas to simulate a leak. Ensure that the buzzer sounds, the fan operates, the gas supply is turned off, and you receive an SMS alert on the specified phone number.

VI.   RESULTS AND DISCUSSION

Here the MQ5 sensor flammable gas like LPG is assigned in this channel. The given figure shows the demonstrates the trial setup of the framework. The setup gives brief data about the interfacing of segments to the Raspberry pi. This model gives the sign in less time contrasted with the best strategies. . Figure 9: Overall Hardware Setup. When gas discharge is on the far side the edge worth Buzzer rings. An Alert message is sent on user mobile.

Figure 10: Overall Project Setup

VII.   CONCLUSION

This project ability to warn its stakeholders about the leakage of the LPG gas. The future aspects of this detector include the GSM module and a tripper circuit which increases the efficiency of the system and provides more safety to the users. This detector is implemented successfully and is easy to use and also a low cost product. Another advantage of this device is that the even though if no one is there in the house and then gas leaks occurs, GSM module is there to send immediate messages to the stakeholders regarding the gas leak and cut of gas connection thus it lowers the intensity of accidents. GSM module in this device ensures better safety regarding/alerting the gas leaks.

VIII.   REFERENCES

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