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IOT Based CNG LPG Gas Detection and Prevention with GSM Alert

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ABSTRACT: Gas leakage is a major problem with industrial sector, residential premises and gas powered vehicles like CNG buses, cars. One of the preventive methods to stop accident associated with the gas leakage is to install gas leakage detection kit at vulnerable places. The aim of this project is to present such a design that can automatically detect and prevent. In particular gas sensor has been used which has high sensitivity for propane (C3H8) and butane (C4H10). Gas leakage system consists of GSM module, which warns by sending SMS. However, the former gas leakage system cannot react in time. This project provides the design approach on both software and hardware

KEYWORDS: Detection and prevention of LPG/CNG gas

I. INTRODUCTION

Gas leakage are common problem in households and industries. If not detected and corrected at the right time, it can also be life threatening. The idea behind our solution is to detect the leakage gas by sensor. In addition to this, a message is sent to an authorized person informing him about the leakage. There are mainly three units, in this circuit, sensor unit, microcontroller unit and GSM modem. For detecting dangerous & flammable gas leaks in any closed environment such as a car , house , service station or storage tank , a gas sensor is used which detects natural gas , LPG and coal gas. This sensor can also be used to sense other gases like iso-butane, propane and even cigarette smoke. This unit can easily be incorporated into an alarm unit to sound an alarm.in addition to these we use wifi module for get direct values at the web page.

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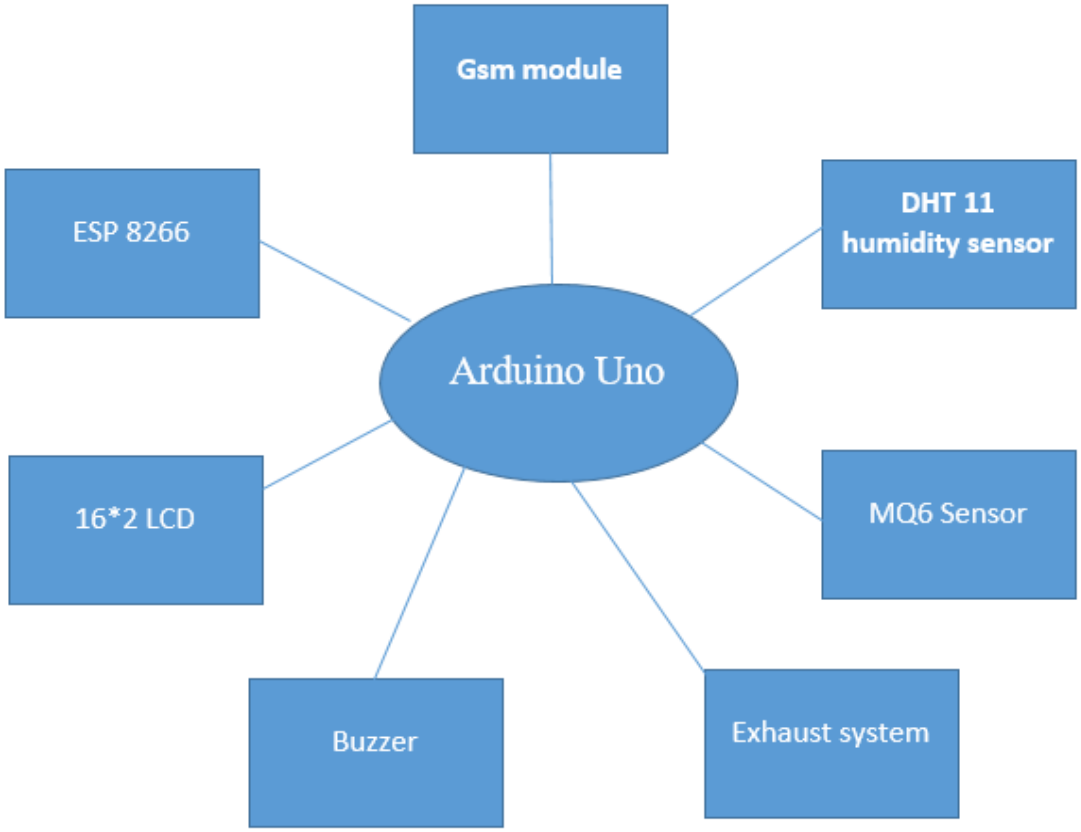

II. HARDWARE DISCRIPTION

The MQ6 is a simple-to-use liquefied petroleum gas (LPG) sensor. It can be used in gas leakage detecting equipment in consumer and industry applications, this sensor is suitable for detecting LPG, iso-butane, propane, CNG. ESP8266 is a very low cost Wi-Fi enabled chip. ESP8266 offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. The ESP8266 Wi-Fi chip is full TCP/IP stack and microcontroller unit capability. It runs on 3.3V and gives our system access to Wi-Fi or internet. Arduino Uno is a microcontroller board based on the ATmega328P It has 14 digital input/output pins 6 analog inputs, a 16 MHz quartz crystal, a USB Connection, power jack, an ICSP header and a reset button. Gsm module is a based on sim 800 processor.GSM module requires one sim and is capable to accept any type of network. It works with 12v dc supply. It has a unique identity number like our mobile phones have. With the help of GSM we can send sms and also send a voice message. These messages are saved to microcontroller. The DHT11 is a basic, ultra-low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin, The motor is using for the purpose of exhausting requirement. For the purpose of gas leakage in room we used exhausting method for securing from gas. In exhausting method the air will become free from gas leakage. By exhausting method the gas will moves outside from which is dangerous for human being. The LCD is used for display humidity, temperature and gas leakage status.

III. SOFTWARE DISCRIPTION

The Arduino Integrated Development Environment (IDE) is a cross platform application that is written in functions from C and C++. It is used to write and programs to Arduino compatible boards, but also, with the help of third-party

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cores, other vendor development boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures.

IV. SYSTEM OPERATION

4.1 Step by Step Operation of System

Step 1. We have use MQ-6 sensor as an input to device to detect the flammable gases like CNG, LPG gases. When sensor sense the gases it will give logic 1 to Arduino.

Step 2. The ARDUINO UNO is a microcontroller board based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, USB connection, a power jack, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. All devices are connect though Arduino, when logic 1 get from sensor Arduino perform next operation, it gives instruction to LCD, GSM, exhaust and buzzer.

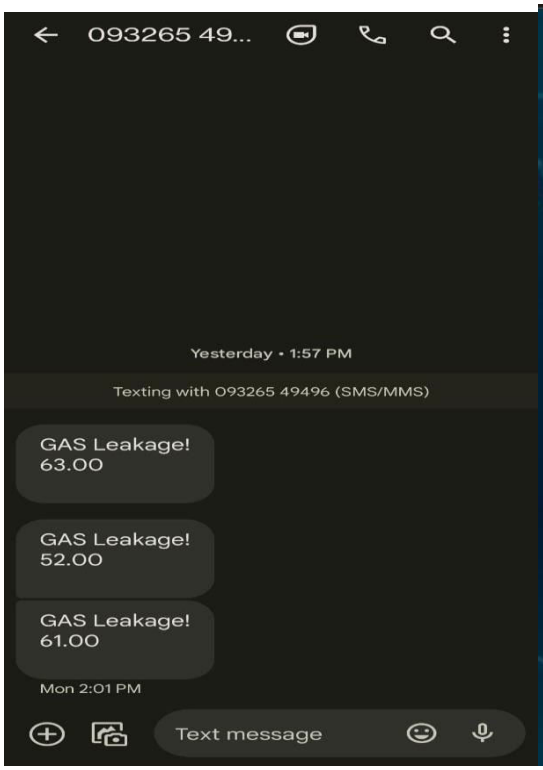
Step 3. We are used 16*2 LCD display which means it can display alphabets along with numbers on 2 lines each containing 16 characters.

Step 4. A GSM module is used to send a sms to the user cell phone, when the gas leakage is detected by the gas sensor. Arduino sends a signal to the GSM module in which one of the tasks is to send the text sms

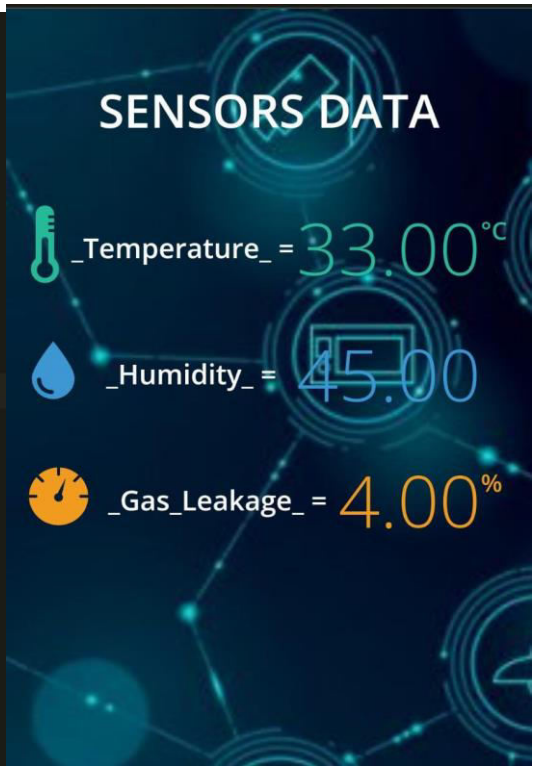
Step 5. The Wi-Fi module send data continuously to the web page.

Step 6. Exhaust system is used to exhaust the detected gas.

V. RESULT



5.1 MSG from GSM module



5.2 All Sensors value at web page

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At the output we get MSG at the register mobile number from GSM module and by using wifi module we get all values at the web page.

VI. CONCLUSION

- The system consists of mainly three components is a Arduino Uno, Gas sensor & GSM Module.
- Gas sensor play key role in sensing gas and automatically start buzzer sound with the help of Arduino Uno.
- Arduino based gas leakage detection project helps the user to detect gas leakage in house/industries. This projects send SMS alert to the user and it helps in prevention from blasts, fire hazards, property damage and most vitally deathly injuries or death.

Gas leakages in households and industries cause risk to life and property. The present project provides a solution to prevent such accidents by monitoring the system. The solution provided can be further enhanced by displaying in the LCD. The gas leakage data can also be interfaced to the internet for further analysis

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