CNG Status Indicator with Security

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Abstract— The vehicles using gas instead of fuel like petrol, diesel having the problem of Gas leakage and that is one of the big problem with gas functioning vehicles like CNG (Compressed Natural Gas) in buses, cars etc .One of the contraceptive methods to stop accidents associated with the gas leakage is to install a gas leakage detection device at vulnerable places. In this research, An alert is provided to the user, sending an SMS to the programmed mobile number, produces the alarm, displays the gas leakage detection on LCD, and open the windows of the vehicle automatically after gas leakage. This research mainly focuses on security as Cases of gas related fire has been on the rise and this can be avoided using a gas leakage detection system and thus the need for development of a CNG STATUS INDICATOR WITH SECURITY. This research enables development of a high accurate and fast response detection system.

Keywords: CNG, LCD, GSM

I. INTRODUCTION

The system detects the leakage of the CNG using a gas sensor and uses the GSM to alert the person about the gas leakage via SMS. When the concentration of CNG in air exceeds a certain level, the sensor senses the gas leakage and the output of the sensor goes LOW. The detection is done by the gas sensor, through the microcontroller the LED and buzzer are turned ON simultaneously. As an engineer, it is a lifesaving task to design a CNG gas detector capable of raising an alarm and showing the concentration of the gas leakage. Thus we have designed a microcontroller based CNG gas detector. The detector incorporate MQ-6 sensor (with gas detection range of 300-10000ppm) as the CNG gas sensor, ATmega 328 Arduino microcontroller as the control unit, LCD for displaying gas concentration, a buzzer as an alarm and a number of LEDs to indicate the gas leakage status. The microcontroller senses the presence of a gas when the voltages signal from the MQ-6 sensor goes beyond a certain level and gives an audiovisual alarm. The microcontroller is programmed using PIC assembly language and all the peripherals connected to it through it pins. When the system is powered on the microcontroller lit a green LED to show the absence of a gas leakage CNG gas is released and the sensor voltage signal monitored using a digital multimeter. Below 2.0V, the green LED is kept lit and when the voltage is more or equal to 2.0V, the microcontroller blinks a red LED and set off an alarm to show the presence of a gas. The detector has a button with which the alarm can be acknowledged. The sensor as a high resistance in clean air. In the presence of CNG gas, the sensor conductivity increases and the characteristic of the sensor is that at 2.0V output from the sensor, the gas concentration is 300ppm, thus the trigger level is 2.0V. Therefore, the microcontroller based gas leakage detector based on PIC16F690 microcontroller and MQ-6 sensor is able to detect gas leakage concentration from 300ppm and give an audiovisual signal. The servo motor used in the system is to open the windows of the vehicles automatically if sensor detects any gas leakage.

II. BLOCK DIAGRAM

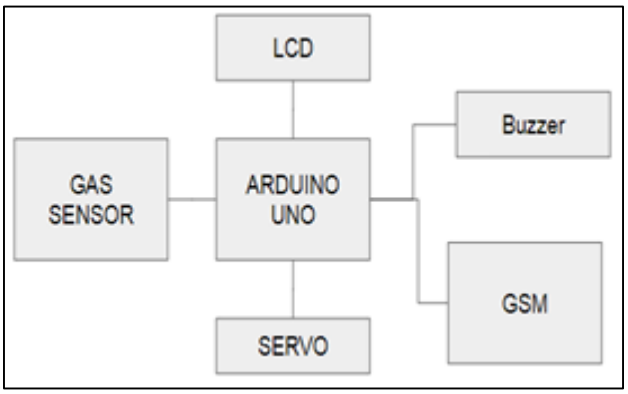
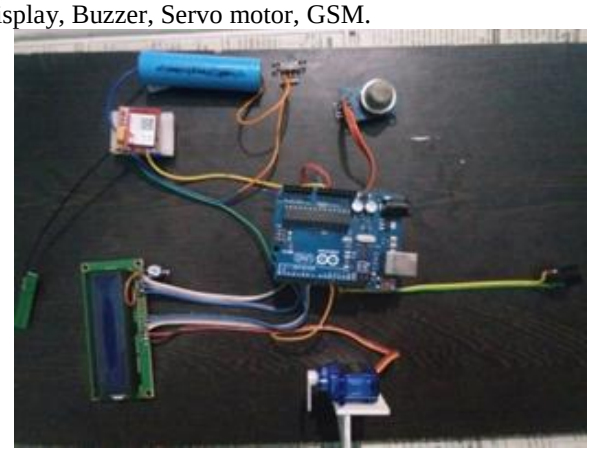


Fig. 1: Block diagram of proposed method

The figure 1 illustrates the block diagram of proposed method, MQ5 sensor detects the CNG gas molecules in the air. And gives respective voltage output to the Arduino. In clean air, the sensor has a high resistance and in presence of a gas the sensor conductivity increases. The important and the most useful part of the system is Arduino Uno. All the output devices are controlled by Arduino. At the same time it reads and manipulates the input from sensor. LCD Display receives various messages from Arduino. User receives SMS indication with the help of GSM modem connected to the Arduino Uno board. LCD Display is used to show various informative messages to the user like sending sms, sms sent. A piezoelectric buzzer is connected to the system using a transistor circuit. This buzzer gives warning signal to the user.

III. HARDWARE IMPLEMENTATION

The specifications of the gas leakage detector are being to detect a CNG gas leakage and give a buzzer and SMS warning. The device is powered from a 5V supply from a 9V battery. Therefore, the following components are required to make the gas detector; MQ-6 Sensor, Arduino MCU, LCD Display, Buzzer, Servo motor, GSM.



IV. PROJECT OUTPUT IMAGE

– Figure 2 shows the LCD displaying the massage of gas detection.

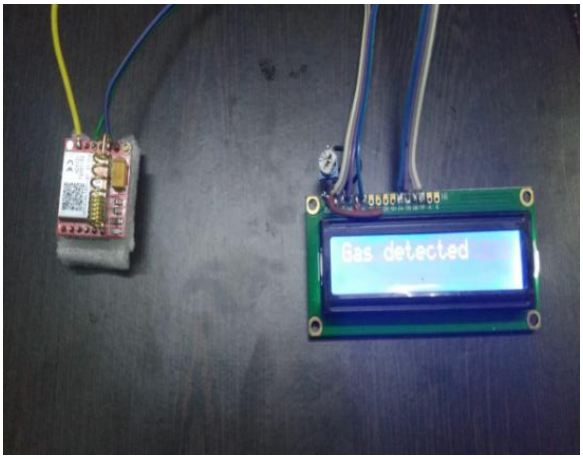


Fig. 2: Display of Gas Detection on LCD

– Figure 3 shows message conveyed to the user of detection of gas through GSM.

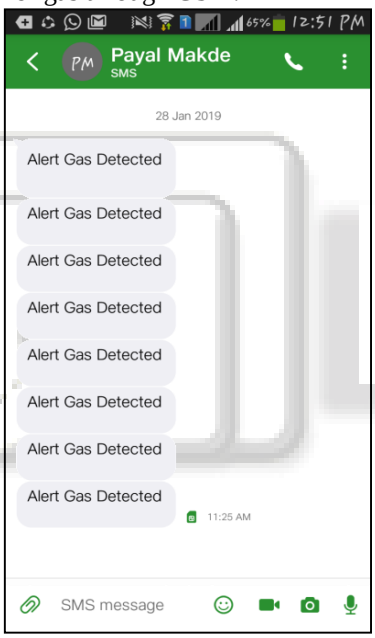


Fig. 3: Message conveyed to user through GSM

V. RESULT AND CONCLUSION

In this research, we have described a sytem that detect a CNG gas if any leakage will be there in car or in bus or in any vehicle. And for security purpose it produces the alarm through buzzer, it will display on LCD display if any gas has been detect, produce sms through GSM, and open the windows of the car automatically using servo motor.

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