LPG GAS LEAKAGE DETECTION AND MONITORING SYSTEM USING IOT

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Abstract—Inworking area is to provide a device that gives alert about the gas leakage. LPG Gas leakage detector and monitor which detects gas leakage and gives anolog output to the Arduino. LPG gas may leak from the gas cylinder, this may cause the cylinder blast that damage the house and risk to the living people in the house. The flame touches off can be happened because of numerous reasons, for example, an electrical short circuit, While LPG is a fundamental need of each household, its leakage could lead to a disaster. This LPG Gas Leakage Detector can be utilized as a remote Gas leak detector in home security system. LPG Gas leakage detector which is used in our home for residential reason.

Keywords: GSM (Global System for Mobile Communications), Gas Sensor MQ6, LPG (Liquefied Petroleum Gas).

I. INTRODUCTION

The objective of the system is to detect gas leakage in kitchen where human interaction is not present in the house. It delivers buzzer alarm, GSM message alert, Open kitchen window and Automatic power off can take place. The scope of the system is to improve the IOT Application to detect the gas as early as possible by measuring the level of gas density and to prevent the occupants by alerting through buzzer, sending SMS, open kitchen window and switch off power supply. Gas leakage detection is a most important thing. This broadside provides a cost effective and extremelyprecise system, which not only detect gas leakage but also alert (Beep) and turn off highest power and gas deliveries, and send a SMS [8]. GSM module is used which aware the user by sending a SMS [2].High precision gas sensor MQ-6 has been used.LPG and Gas sensors are castoff in a wide range of applications in the fields of protection [4].

II. LITERATURE SURVEY

Meenakshi Aishwarya.A1, Meghana Rao B.N2, Krishna Prasad.R3 [1]. LPG Gas Leakage Detection and Prevention System.Manaswi Sharma1, Diksha Tripathi1, Narendra Pratap Yadav1, Parth Rastogi1 [2]. Gas Leakage Detection and Prevention Kit Provision with IoT.A. Mahalakshmi, R. Shamile, J.Swathy, K.Gayathri, M.Mala [3]. Design andImplementation, Design and Implementation of Gas Leakage Monitoring &Detection Alarm System Using Arduino Module.Onengiye M. Georgewill #1, Chukwunazo J. Ezeofor *2 # Rector, Ken Saro-Wiwa Polytechnic Bori, Rivers State, Nigeria [4].Design and Implementation of SMS-Based Industrial/Homes Gas Leakage Monitoring &Detection Alarm System . Shiyana1, Mrs. R. Deepa2 [5]. SMS Based Gas Leakage Monitoring in Residential and Industrial Area. Zhao Yang1*, Mingliang Liu, Min Shao, Yingjie Ji Department of Thermal Engineering, Tianjin University, Tianjin, China[6].Research on Leakage Detection and

Analysis of Leakage Point in the Gas Pipeline System.Ashish Shrivastava, Ratnesh Prabhaker, Rajeev Kumar and Rahul Verma 1Associate Professor, Galgotias College of Engineering and Technology, Greater Noid [7]. GSM Based Gas Leakage Detection System.

III.METHODOLOGY USED

In the early step, the gas leakage is detected by the gas sensor MQ-6. This detects the gas leakage and gives the signal to the microcontroller with the assistance of ADC. After that in the microcontroller receive the signal, send by gas sensor. It sends activation signal to other outside devices attached with it. Two stepper motor IC, buzzer, LCD (Liquid crystal display), GSM (Global System for Mobile)module and RF link. Several tasks have been completed such as buzzer triggers simultaneously message display on liquid crystal display screen, GSM module initiated, which send warning SMS to the user. Stepper motor IC (ULN 2003A) to drives the stepper motor committed it, as a result main power and gas supplies turn off. At the end, when the gas leakage is successfully stopped then with the help of retune button the whole system reached to the initial stage [8]. It defines that the Arduino UNO was connected with 5V power supply and gas sensor as input, it gives emergency intimation, safety modes like alarm and automatic power shutdown as an output.

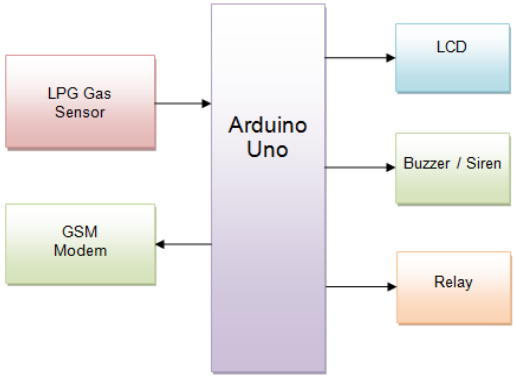

Fig 1.Process Diagram

A. ARDUINO UNO BOARD

The Arduino Uno has a number of services for communicating with a computer, another Arduino, or other microcontrollers. Which is offered on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer [6]. The Arduino Uno is a microcontroller board reliant on on the ATmega328. It consumes 14 computerized info/yield pins (of which 6 can be utilized as PWM yields and 6 can be utilized as Analog information sources), a 16 MHz resonator, a USB association, a power jack, an in circuit framework programming (ICSP) header, and a reset catch. It contains everything expected to help the microcontroller; just interface it to a PC (or proper divider control connector) with a USB link or power it with an AC-to-DC connector or battery to begin.

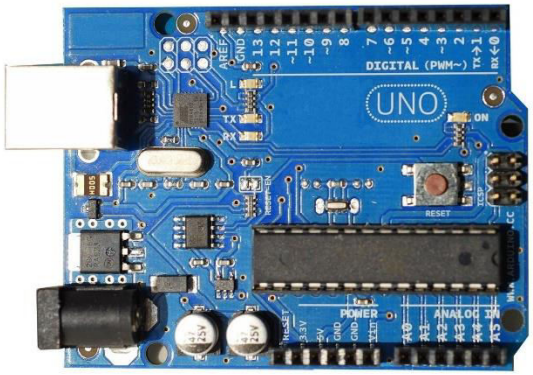

Fig 2. Arduino Uno board

B. Gas sensor (MQ6)

MQ6 gas sensor has great sensitivity to Iso-butane, propane, LPG and less sensitivity to smoke and liquor. The MQ-6 can detect gas focusses anywhere

from 300ppm to 10000ppm [1]. The MQ-6 Gas sensor can identify or gauge gases like LPG and butane. The MQ-6 sensor module convoys a Digital Pin which makes this sensor to work level without a microcontroller and that proves to be useful when just a single specific gas is identified. With regards to estimating the gas in ppm the Analog pin must be utilized, the Analog pin also TTL driven and deals with 5V and subsequently can be utilized with most consistent microcontrollers.

Fig 3. Gas Sensor (MQ 6)

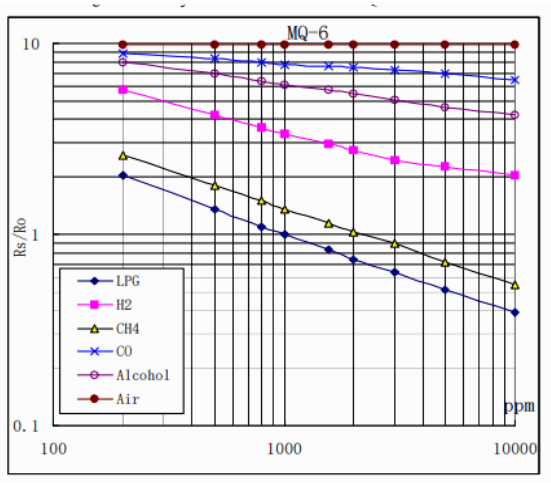

Fig 4.shows the typical sensitivity characteristics of the MQ-6 gas sensor for several gases.

The attentiveness range of MQ-6 gas sensor is 300-1000 ppm. This sensor is available in 6 pins package, out of which 4 pins are used for attractive the signals and other 2 pins are assistance for providing heating current. This sensor has fast reaction time [8].The power essential by the sensor is 5V. This sensor has different confrontation value in different concentration.

c. Piezo Buzzer

Buzzer is an audio waving device. It is some of the mechanical, electromechanical, electronic, etc. A device ingenuous to produce a buzzing sound or vibration when activated [6]. A buzzer is a device which makes a humming or blaring clamour. There are a few sorts; the most fundamental is a piezoelectric ringer, which is only a level bit of piezoelectric material with two terminals. There are two links are accessible in Piezo signal. These links are dark and red. Dark link are negative association, Red link are certain association.

Fig 5. Piezo Buzzer

D. Servo motor

A servo motor is an electrical device which can push or turn an object with incredible exactness. To turn object at some particular angles or distance, at that point utilize servo motor. It is simply comprised of straightforward motor which go through servo mechanism. It is small and lightweight with high yield control. This servo can pivot roughly 180 degrees (90 toward every direction), and works simply like the standard sorts yet littler. Any servo code, hardware or library can be utilized to control these servos. It complements a 3 horns (arms) and hardware.

Fig 6.Servo Motor

E. GSM SIM800A

GSM module is used to send an SMS to the handler cell phone. When the gas leakage is discovered by the gas sensor, microcontroller sends a signal to GSM module, in which one of the tasks is to send the text SMS. GSM module entails one SIM card [8]. The SIM800A Quad-Band GSM/GPRS Module with RS232 Interface is a finished Quad-band GSM/GPRS procedure in an LGA (Land matrix exhibit) type which can be implanted in the user applications. It provisions Quad-band 850/900/1800/1900 MHz and it correspondingly transmit Voice, SMS and information data with low power consumption.

Fig 7. GSM SIM 8000A

III. CONCLUSION

The main advantage of LPG GAS LEAKAGE DETECTOR AND MONITOR is its simplicity and its ability to warn its house owner about the leakage of the LPG gas. The other advantage of this device includes its emergency alerting systems. This sensor is implemented successfully and is easy to usage and also a low-cost product. Additionalbenefit of this device is that even though if no one is there in the house and then gas leaks arises, GSM module is there to send fast messages to the participants regarding the gas leak and thus it lowers the intensity of accidents. GSM module in this device ensures better safety regarding the gas leaks, it have the advantage of safety measures like window opening and tripper circuit which rises the efficiency of the system and offers more safety to the users.

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