Gas leakage detection and monitoring system using MQ2

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Abstract –The presence of hazardous gases such as LPG in common household, industries, laboratories is very normal. For that sake an alarming system is necessary so we can prevent loss of lives and properties. The sensor and Arduino used in conducted study are widely used to detect essence of propane, iso-butane, LPG and even smoke. The sensor comes with an advantage of combine a sensitivity response time. When sensor detects any gas leakage in household its output goes to low(logic 0) . Arduino UNO used in the study receives the signal whenever sensor detects any gas leakage hence outputs the results in desired form. As per developed software program the system can generate various alarms such as buzzer etc

Keywords — Gas leakage, LPG, MQ2 sensor, Arduino Uno, Servo Motor.

I.INTRODUCTION

An Arduino grounded MQ2 detector which will detect gas leakage. As we all know that fire attacks in domestic household, restaurants, industrial workplaces have become veritably common. When gas leakages occur they aren't easy to de as they only catch fire if any ignition occurs which is dangerous. There is a high chance of CNG vehicles catching such fires. The detector used in circuit will detect suchlike gas leakages and pass on the information to be displayed on LED and further it can be converted into intimidating systems. This system will minimize the risk that are associated with gas leakages. As we know the circuit is based on MQ2 detector its able to detect a wide range of gases including LPG, smoke, propane and methane. For an indoor air quality monitoring system, breath checker or early fire detection system, MQ2 Gas Sensor Module is a veritably good choice.

Grounded on data from the Center for Public Policy Studies (Puskepi), recorded cases of gas explosion from 2008 to 2010 :189. A total of 61 cases passed in 2008, 50 cases in 2009, and 78 cases in 2010 [1]. Liquified Petroleum Gas (LPG) is a liquefied petroleum gas which contains a hydrocarbon mixture which is then compressed by adding pressure in order to decrease the temperature then turn into liquid [2]. In public use, it is stored in a high-pressure cylinder, so that if the cylinder leaks and exposed to a fire it can cause a fire. LPG gas that leaks can be recognized by the smell, but if the gas absorbs into the water, electricity or carpet installation, it will be difficult to detect [3].

So far most systems have focused on detecting LPG substantially. Our project is a detection and monitoring system for any potentially dangerous gases. The system will help in preventing avert problems caused by gas leakages such as undetected gas leakages can also induce excess of utility bills, health problems, environmental etc.

II.METHODOLOGY/EXPERIMENTAL

A. Components

Fig. 1. MQ-2 sensor

Fig.2. Servo motor

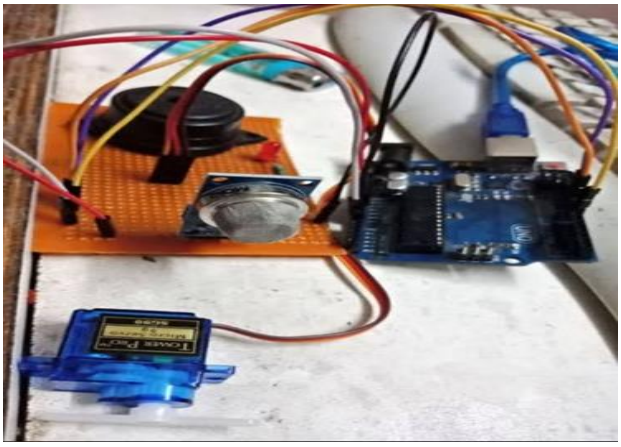

Fig. 3.Basic electronic components to complete the circuit

- Place the MQ-2 sensor on the breadboard, use the analog pin and connect wires to VCC, GND and AO from MQ-2 sensor.
- LEDs 1,2,3 are connected to pin No. 8,9,10 of Arduino.
- Pin No. 7 is connected to the servo motor for output.
- Pin No. 11 is connected to the buzzer.
- Connect AO to Analog pin 0 on the Arduino.
- Connect the Vcc and ground of the components to the Vcc and ground of Arduino
- Connect GND to (-) and VCC to (+) on the breadboard.
- Give 5V to the breadboard on the positive line and 0V or GND to the breadboard on the negative line.
- Use 5V and GND on the Arduino from the power pins.
- Take the USB cable and connect it to Arduino and then connect it to your desktop

B. Pseudo code:

Set mq2_pin as A0 // Set the analog pin for the MQ2 gas sensor
Set led_pin as 13 // Set the digital pin for the LED indicator

Initialize serial communication at 9600 bps
Set led_pin as output
Loop:
Read analog value from mq2_pin using analogRead()
Convert analog value to voltage
Print the voltage to serial monitor
If concentration <= 100:
Turn on LED 1
Print “No Leakage”
If 100<concentration<=200
Turn on LED 2
Print “Leakage detected”
Else:
Turn on LED 3 and buzz
Print Danger
Delay for 1 second
End loop

III.RESULTS AND DISCUSSIONS

Pseudocode discussed in II.I gives output in terms of Concentration(ppm) and Voltage Output(V). Some sample test results based on the code are as listed in table I.

Table I

Test Case	Concentration (ppm)	Output
1	0	"No Leakage" message displayed, servo moves to position 30, LED 1 blinks, LED 2 and LED 3 off
2	150	"Leakage Detected" message displayed, servo moves to position 90, LED 2 blinks, LED 1 and LED 3 off
3	300	"Danger" message displayed, servo moves to position 120, LED 3 and buzzer blink, LED 1 and LED 2 off
4	200	"Leakage Detected" message displayed, servo moves to position 90, LED 2 blinks, LED 1 and LED 3 off
5	450	"Danger" message displayed, servo moves to position 120, LED 3 and buzzer blink, LED 1 and LED 2 off
6	100	"No Leakage" message displayed, servo moves to position 30, LED 1 blinks, LED 2 and LED 3 off
7	35	"No Leakage" message displayed, servo moves to position 30, LED 1 blinks, LED 2 and LED 3 off

The study so far indicates that despite of systems constructed till now that are efficient and practical, we need systems that are significantly advanced. This can be achieved by conducting such studies until an ideal solution is discovered in practice.

IV.CONCLUSION

- The model proposed in the study is a big help to enable prompt action by the premises owner and safety association towards forestall problems that may be associated with gas leakages.

- The MQ2 detector plays a major part of detecting feasts in this system.
- The MQ2 detector will smell the leakage. Arduino is specially used in this design as it's easy to use in the circuit and the program upload is simple. If the leakage is of high intensity it will put the buzzer on so that the processor will be alert.[5]
- The thing to make this model has always been to introduce a revolution on safety to reduce and thus reduce any large or little risk that may arise from the leaking of poisonous and dangerous gases[4].
- One analogous operation area is monitoring of gas reservations and gas leakages for both household and industrial applications.
- The major security aim to make it simpler to reserve gases and detect leaks to prevent tragedies caused by neglectfullness.

V.ACKNOWLEDGMENT

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