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Gas Leakage Detection and Controlling System

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Abstract - *Now a days Safety plays important roles in home towards security over the gas leakage. The purpose of this project is to develop a system for the gas detection and controlling. The gas sensor used for development of this system is the combustible gas sensor MQ-2 that used in order to detect the present of liquefied petroleum gas (LPG). The sensor detects gas concentrations from 200 to 5000ppm. The output of the sensor is connected to Raspberry PI3 model B+. The system is programmed with python, whereas the system evaluates the sensed data, if the sensed data is more than threshold value an alert will be sent to the user and motor will be activated in order to turn off the gas regulator valve.*

Key Words: **MQ2 sensor; Raspberry Pi; Stepper Motor; Piezo Buzzer**

1. INTRODUCTION

The dangerous gas such as LPG may bring harmful effect towards humans as they may cause explosions. Then, it is certainly possible that the gas may leak and the system needs to be real time monitored. Thus, a gas detector is invented to detect the presence of LPG within an area to prevent any disaster.

In this paper, the detecting and controlling system is developed and implemented by using Python programming. In actual, the hardware included in this system is MQ-2 Gas Sensor, Raspberry Pi3 model B+, piezo buzzer and stepper motor to detect the leakage of the gas. The sensor has excellent sensitivity combined with a quick response time at low cost and ease of installation. When the gas leakage is detected, an alert warning notification will automatically be sent to the user through mail, at the same time it will raise an alarm and automatically the stepper motor gets rotated which in turn will turn off the regulator valve.

2. LITERATURE SURVEY

Gokula Kaveeya S, Gomathi S,Kavipriya K, Kalai Selvi A and Sivakumar S-"Automated Unified System for LPG using Load Sensor". In this approach Gas leakage detection and Gas refilling is done using the MQ5 sensor, GSM, Load sensor, Raspberry pi, Aurdino. MQ5 detects the LPG frequently whether the flow of gas is normal or abnormal, if it is abnormal, sends notification to user via GSM. If there is no response, the system automatically turns off. The problem in this is, Gas cannot be refilled without the intermediate(distributor) [1].

Mr. Sahil Adsul, Mr. Ashok Kumar Sharma and Mr. R.G Mevekari-"Development of Leakage Detection System". In this approach the data such as humidity, temperature, pressure, gas detection, sound detection is acquired by using sensors. The sensors used are DHT22/AM2302, TMP006, BMP180, MQ6, 20KHz microphone, 40KHz ultrasonic receiver, 40KHz ultrasonic module. ZigBee is a wireless communication technology used to create small personal area network. This idea is to detect leakage with different parameters and test on different type leaks was achieved. This system can be designed by using low power microcontroller board and using more high quality sensors

to detect accurate values at the output [2].

L.P Deshmukh, T.H Mujawar, M.S Kasbe, S.S Mule, J.Akthar and N.N Maldar-"A LabVIEW Based Remote Monitoring and Controlling of Wireless Sensor Node for LPG Gas Leakage Detection". This approach gives a system for monitoring the LPG gas leaks in the presence of air. The methods used here are Wireless Sensor Network, Sensor Node, Remote monitoring and controlling, LabVIEW, VISA. In this paper gas leakage is detected and alerts the user via alarm, sending SMS on user mobile phone and turns off the gas regulator valve [3].

Jinhao Sun, Jinhao Sun Yezi Li Xiaojin Yan -"The design of automatic detection processing device of gas leakage based on the MB95204K". Gas leakage causes loss of energy, personal injury and property damage. To solve these problems paper designed a gas leakage automatic detection and processing device by using Fujitsu MB95204K. Gases such as methane and carbon monoxide will automatically detect and alarm. The chemical transducer MQ5 detects concentration of gas generated signals and then does A/D conversion [4].

Ahmed Imteaj, Tanveer Rahman, Hosna Ara Begum, Mohammed Shamsul Alam-"IoT based Energy and Gas Economic Home Automation System using Raspberry Pi3". When gas leakage is detected by Gas sensor it makes the WeMOS known about this, which transfers signal to Raspberry Pi and it apprises the user immediately through GSM module. PIR sensors (Passive Infrared) that automatically perceives whether there is any weight over the burner through the button module and if no then the system will turn off the stove using the relay module considering input of button module [5].

The smart gas level monitoring, Booking and gas leakage detector over IoT is implemented by Kumar Keshamoni,

Sabbani Hemanth. In this approach they have used IoT, GSM, MQ2 sensor, ARM processor. The gas leakage is sensed by MQ2 sensor which sends a high pulse to Mc which in turn updates it in the IoT system, and the buzzer will be heard in the RFRx kit [6].

Mohsen Rahmati, Honeyeh Yazdizadeh and Alizera Yazdizadeh-"Leakage Detection in a Gas Pipeline Using Artificial Neural Network Based on Wireless Sensor Network and Internet of Things". This approach uses Leakage Detection, Artificial Neural Network(ANN), Wireless Sensor Network(WSN), Internet of Things(IoT) and Gas Pipeline. In this, a neural network method for leakage detection of a gas pipeline by using flow pattern is applied. The pipeline is divided in several segments and each segment is modelled by considering i/o pressure of the gas flow [7].

Asmita Varma, Prabhakar S and Kayalvizhi Jayavel-"Gas Leakage Detection and Smart Alerting and Prediction Using IoT". This approach makes use of the IoT, Sensor,Alarm, Prediction, Data Analytics. IoT is a network which can be extended with the help of physical devices that are connected with different types of servers and with help of internet they will be exchanging the data. Here IoT is used for Gas Leakage Detection consisting of Smart Alerting techniques which involves calling, sending text message and email to the user and helps to predict hazardous situation so that people will be safe. A dedicated mobile application could be made for system [8].

Vinayshri Naik ,Chaitali Bagwe, Neha Kunte ,Vidya Ghadi, – "IoT based Gas Leakage Detection System with Database Logging, Prediction and Smart Alerting Review". This approach makes use of Data analysis, IoT, MQ5 gas sensor and Alarm. Gas leakages in any areas can cause danger. Therefore we are using IoT technology to solve the proposed problem and make predictions which will be helpful in current and future use [9].

Halavva Patil, Shreedhar Niradi, Jyothi D.T, Seema J.S, Shwetha D.G–"Smart Gas Booking and LPG Leakage Detection System". This approach makes use of Gas sensor-MQ06, GSM DC motor, microcontroller and load cell. Proposed system consists of gas leakage detection sensor which is interfaced with microcontroller. If leakage is detected microcontroller immediately starts the stepper motor to turn off the gas regulator and message will be displayed on the LCD display [10].

3. EXISTING METHODOLOGY

In all existing methods, different gas sensing technologies are used. However, most of the accidents happen because of our negligence to not switch off the regulator. The detection of gases and its monitoring has already been done. The exhaust fan method is not feasible for every situation and doesn't tackle the problem at the root level. Also, the exhaust fan's continuous use to disperse gas can in turn heat it up, which could ignite the cylinder and cause damage.

4. PROPOSED METHODOLOGY

The proposed methodology uses an automatic control action on detecting the gas. The regulator valve would be switched off in order to completely stop the flow of the leaked gas using the stepper motor. The user is alerted by the beep of buzzer and at the same time notification is sent through an email. Advantages of the proposed system are,

- Action is taken to control the leakage.
- If gas leakage is detected it will alert by beeping the buzzer and also send an email to the user.

5. RESULT

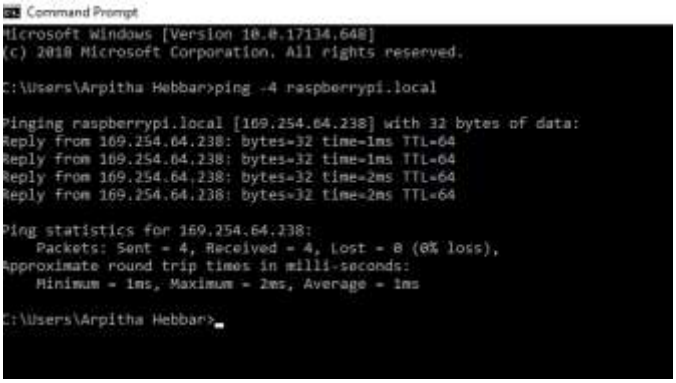

Fig -1: Command to get the IP address

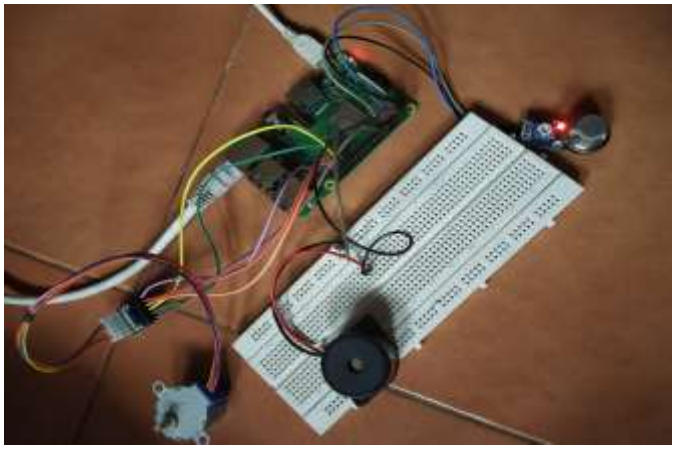

Fig -2: Implementation of proposed system

Fig -3: Output screen

The Fig.1 shows the command to get the IP address of the Raspberry Pi kit i.e ping -4 raspberrypi.local. The Fig.2 shows the overall connection between all the hardware components. When the gas leakage is detected by the sensor, the signal will be sent to the Raspberry Pi which will alert user by beeping the buzzer and sends notification to the user through email. The stepper motor will be rotated to turn off the gas regulator valve. Fig.3 shows the output screen of python program.

6. CONCLUSION

Detection and Controlling system for LPG is proposed. When the gas leakage is detected it beeps the buzzer, sends an email to the end user and rotates the stepper motor to turn off the regulator valve. We have used Python programming to implement this system.

7. FUTURE ENHANCEMENT

In future it can be implemented in large scale industries. This system can be designed by using more high quality sensors to detect accurate values.

REFERENCES

[1] GokulaKaveeya S, Gomathi S,Kavipriya K, Kalai SelviAand SivakumarS-"Automated Unified System for LPG using Load Sensor". 2017 International Conference on Power and Embedded Drive Control (ICPEDC). 978-1-5090-4679-9/17/$31.00,copyright2017 IEEE 459-462.

[2] Mr. Sahil Adsul, Mr. Ashok Kumar Sharma and Mr. R.G Mevekari-"Development of Leakage Detection System". 2016 International Conference on Automatic Control and Dynamic Optimization Techniques (ICACDOT). International Institute of Technology (IIIT), Pune.978-5/16/$31.00, copyright2016IEEE673-677.

[3] L.P Deshmukh, T.H Mujawar, M.S Kasbe, S.S Mule, J.Akthar and N.N Maldar -"A LabVIEW Based Remote Monitoring and Controlling of Wireless Sensor Node for LPG Gas Leakage Detection". 2016 International Symposium on Electronics and Smart Devices (ISESD) November 29-30, 2016. 978-1-5090-3840-4/16/$31.00, copyright2016 IEEE 115120.

[4] Jinhao Sun, Jinhao Sun Yezi Li Xiaojin Yan -"The design of automatic detection processing device of gas leakage based on the MB95204K". 978-1-4244-81651/11/$26.00,copyright2011IEEE1807-1809.

[5] Ahmed Imteaj, Tanveer Rahman, Hosna Ara Begum, Mohammed Shamsul Alam- "IoT based Energy and Gas Economic Home Automation System using Raspberry Pi 3". Proceedings of the 2017 4th International Conference of on Advances in Electrical Engineering (ICAEE), 28-30 September, Dhaka, Bangladesh. 978-5386-08692/17/$31.00, copyright 2017IEEE647-652.

[6] Kumar Keshamoni, Sabbani Hemanth-"Smart Gas Level Monitoring, Booking and Gas Leakage Detector over IoT". 2017 IEEE 7th International Advance Computing Conference.978-1-5090-1560- 3/17$31.00 copyright 2017 IEEE DOI 10.1109/IACC.2017.70330-332.

[7] MohsenRahmati, Honeyeh Yazdizadeh and Alizera Yazdizadeh- "Leakage Detection in a Gas Pipeline Using Artificial Neural Network Based on Wireless Sensor Network and Internet of Things". 978-1-5386-0837-1/17/$31.00,copyright2017IEEE659-664.

[8] Asmita Varma, Prabhakar S and Kayalvizhi Jayavel- "Gas Leakage Detection and Smart Alerting and Prediction Using IoT". 2017 Second International Conference On Computing and Communications Technologies (ICCCT' 17).978-1-5090-6221-8/17/$31.00, copyright 2017IEEE327-333.

[9] Chaitali Bagwe, Vidya Ghadi, Vinayshri Naik,Neha Kunte –"IoT based Gas Leakage Detection System with Database Logging, Prediction and Smart Alerting Review".IOSR Journal of Engineering (IOSRJEN) ISSN(e):2250-3021,ISSN(p):2278-8719. Volume 1, pp 25-28. International Conference on Innovative and Advanced Technologies in Engineering (March-2018).

[10] Halavva Patil, Shreedhar Niradi, Jyothi D .T, Seema J.S, Shwetha D.G –"Smart Gas Booking and LPG Leakage Detection System". IOSR Journal of Computer Engineering (IOSR- JCE). e-ISSN:2278-0661, p-ISSN:2278-8727 PP 09-13. National Conference on Advances In Computational Biology, Communication, And Data Analytics(ACBCDA2017).