IoT based Gas Monitoring System

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Abstract— Nowadays gas leakage has become a major issue. LPG gas is highly flammable and can cause severe damage to life and property. To prevent accidents from LPG gas leakage, a technology should be developed to detect gas leakage. Our project aims on reducing the accidents caused by gas leakage. This prototype describes the working of IoT based gas monitoring and gas leakage alert system. MQ135 and MQ2 are used to detect the LPG gas leakage. ARDUINO UNO serves as the primary controller to control the overall process. Load cells are used to measure the weight of gas present in the cylinder. One sensor (MQ2) will be placed near the gas valve and second sensor (MQ135) will be placed 4-5 feet away from gas burner. We have designed and application which will give details regarding temperature of the surrounding environment, amount of gas present in the gas cylinder and an alert message about the gas leakage. As an additional feature when the amount of gas in the cylinder will get below a certain threshold value, the application will automatically book another gas cylinder for the user.
Key words: IoT, Gas Monitoring System

I. INTRODUCTION

Liquefied petroleum gas (LPG) is currently the most used gas in our home for cooking purposes. LPG gas is a flammable gas, if leaked it can cause major damage to life and property. The number of deaths due to the explosion of gas cylinders has been increasing in recent years. Therefore, it should be used in safe handling manner and additional care has to be taken in order to prevent any leakage possible. The main features of LPG is that being heavier than air, it do not disperse easily and may lead to suffocation when inhaled. The leaked gases when ignited may lead to explosion. This IoT based gas monitoring and gas leakage alert system provides a mechanism wherein the user will be alerted when there is any gas leakage also now a days people are having very busy schedule and hence sometimes they forget or don't get enough time for booking the gas from the gas agency. So, it would be much easier and helpful if there was a provision to book the gas automatically.

A. Gas Leakage Detection

Two sensors, MQ2 and MQ135 are used to detect he leakage of gas. MQ2 sensor will be placed near the gas valve, while changing the valve only some amount of gas will be emitted which will be sufficient to trigger the MQ2 sensor because of which a false alarm will be generated so to avoid this another sensor MQ135 will be placed at the distance of 4 to 5 feet, So if the MQ135 is not triggered it means that the gas loss is minor or due to change of valve. If the MQ135 sensor gets triggered the gas has leaked and the precautions should be taken, to avoid the accident. The user will get a message about the leakage or loss of the gas. MQ135 and MQ2 are capable of detecting nitrogen, oxygen, alcohol, smoke or propane.

II. COMPONENTS DESCRIPTION

A. MQ2 Sensor & MQ135 Sensor

A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. Gas Sensor module is useful for gas leakage detection (in home and industry). It is suitable for detecting H2, LPG, CH4, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer.

B. Load Cell

A load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. Strain gauge load cells are the most common in industry.

C. Infrared Sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

D. WIFI Module (ESP 8266)

The ESP 8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor

E. Arduino

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino programs may be written in any programming language with a compiler that produces binary machine code.

F. Working

The sensors will be used to detect the leakage of the gas. The distance will be maintained between these two sensors, the MQ2 sensor will be placed near the gas valve, while changing the valve only some amount of gas will be emitted which will be sufficient to trigger the MQ2 sensor because of which a false alarm will be generated so to avoid this another sensor MQ135 will be placed at the distance of 4 to 5 feet, So if the MQ135 is not triggered it means that the gas loss is minor or due to change of valve.

If the MQ135 sensor gets triggered the gas has leaked and the precautions should be taken, to avoid the

accident. The user will get a message about the leakage or loss of the gas.

The Load cell is used to measure the weight of the cylinder, the default weight of the filled cylinder is entered in the database if the weight decreases less than a certain amount the remainder will be send to the user to book the new cylinder.

The Infrared sensor will be used to detect the loss of gas through the burner without vessel. If the burner is kept on without a vessel on it, it will trigger a message to sender about the loss of the gas.

The user will get the update about the gas available or the loss of the gas on his mobile or computer.
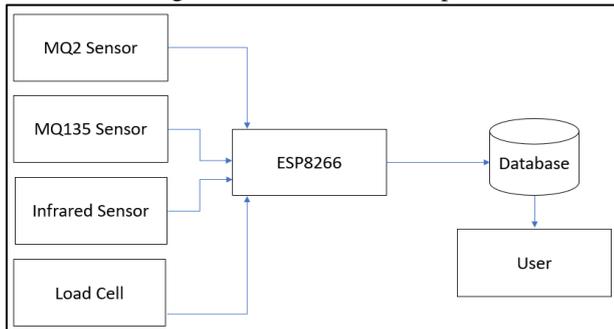

Fig: 1 Block Diagram

III. CONCLUSION

− In our modern scenario the usage of LPG has increased in a greater manner. As a result of this, the damages caused by the leakage of gas is increasing day by day.
− So as to eradicate this problem we are introducing highly advanced system known as Internet of Things (IOT).
− It is used in wide range of applications in present day society and introducing a vast scope to the future. Our proposed system is more effective and eco-friendlier due to the reason of detecting the leakage of gas.
− So it is mainly designed for the safety of people and property. Using IOT, it also allows us to book the gas from the gas agency, when the weight of the gas cylinder reduces below a threshold value.
− Thus people could easily use their time effectively. It also uses to alert the consumers about the wastage of gas while removing the utensils from the burner by using an object detection sensor.

REFERENCES

[1] https://www.projectsof8051.com/iot-lpg-leakage-detector-project/
[2] https://www.hackanons.com/2018/01/iot-based-lpgcng-gas-leakage-detection.html
[3] http://www.iosrjournals.org/iosr-jeee/Papers/Conf.17017/Volume-3/13.%2082-87.pdf
[4] https://dzone.com/articles/gas-leakage-detection-in-home-with-iot