IoT Based Gas Pre Booking and Gas Leakage Detection Using IBM Server

Dr.S.P.RAJARAM[1], SG.THAIYAL NAYAGI[2], S.RIBUHASSINI[3], IL.SWATHIKA[4]

[1]Assistant professor, Department of EEE, K.L.N College of Engineering, Anna University, Pottapalayam-630612, Sivagangai, Tamil Nadu, India.
[1]ramraja798@gmail.com.
[2,3,4]Final year EEE, Department of EEE, K.L.N College of Engineering, Anna University, Pottapalayam-630612, Sivagangai, Tamil Nadu, India
[2]thaiyalnayagisubbiahganesh@gmail.com, [3]hasssini1997@gmail.com, [4]swathikailango1310@gmail.com

I.　　Abstract:

In order to lead a comfort and safety life, the home automation is one of the facts to be considered in our day-to-day life. In this proposed system we are trying to bring out kitchen automation where the gas leakage can be detected and alarmed. Also gas level can be frequently monitored and then displayed to the consumer which makes them ton use LPG effectively. Also gas pre booking can be done in this proposed system with the help of CC3200 a Wi-Fi module; it is an IoT based kit which will alert about leakage and lower gas level.

Detection and transmission module and receiving module are the two important modules in this proposed system. In detection phase, the gas leakage is detected using MQ6 sensor and the load sensor is used to measure the level of gas in the cylinder. In transmission phase, the signal from both the sensors is given to CC3200 which decides the next operation to be performed by the system according to the input given to the Wi-Fi module. If any leakage has been detected, the SMS is sent to the consumer and input to the buzzer will be high. SMS makes the consumer to know what is wrong when he/she is far away and the buzzer sound will alert the neighbors.

Also if the gas level is low, the automatic calling to the consumer occurs and intimates about the situation. Incase if a consumer wants to book a gas immediately, then the call can be automatically diverted to the respective gas agency by pressing one.

The details about the consumers will be fetched automatically; hence gas booking is made easily.

Key words: IoT, load sensor, MQ6 sensor, CC3200, LPG.

II.　　INTRODUCTION:

The core concept of this proposed system is to monitor the gas level and automatic gas pre booking. The continuous weight of the gas can be detected using load sensor and this load sensor works on the principle of piezo electric effect because, the weight of the gas is measured when it is placed on the load sensor and the corresponding electric pulse is given to the microcontroller[1]. If the gas level is low, the load sensor output is compared with the reference value by the microcontroller. And the high pulse is given to the IoT cloud when the value of load sensor is higher than the reference value[2-3]

The LPG is environmental friendly and do not produce any sort of pollution. But it causes the

serious threat when it leaks [4]. They are mostly stored in liquid form and vaporized in the pressurized steel cylinders at normal temperature [5]. This proposed system is to provide a safety device for detecting LPG gas leak at even at low level to avoid any possible accidents and alerting about occurrence of leak. It can be done with the help of MQ6 gas leakage sensor [6-10].

The CC3200 wifi module is used to control the entire circuit by making a call and diverting it to others. Also using Temboo server we can store the data about accidents and the events in the cloud server. The nexmo server is used to make a call and diverting it[11-12].

III. Proposed system

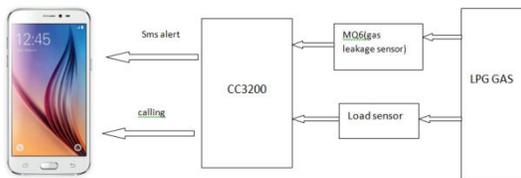The fig 1 shows the block diagram of the proposed paper.

Fig1 Block diagram of proposed system

When the gas leak has been detected with the help of MQ6 sensor, the message will be given to the consumer. At the same time with the help of load sensor, the weight of the gas is predicted and automatic call is made to the corresponding gas agency with the help of Nexmo server.

IV. CC3200

The CC3200 is the microcontroller it is a type of Wi-Fi module which when connected to the wifi will try to access the network and according to the program that has been embedded the microcontroller will act. The microcontroller has 40 pins and 4 ports. It has 8 analog input output pins. And

any one of the I/O pin is used as the input pin for the MQ6 sensor.

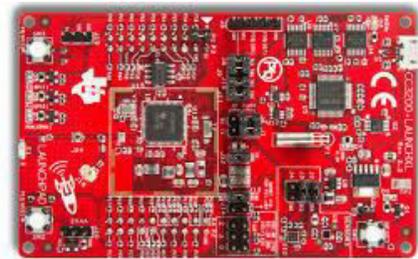Fig2 and fig3 shows the architecture of CC3200 and block diagram of CC3200
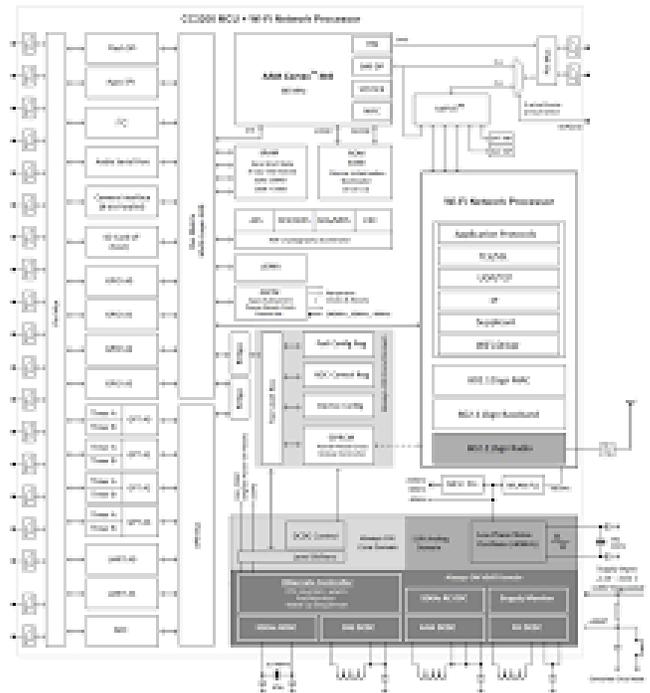

Fig2: Architecture of CC3200

Fig3 : Architecture of CC3200

V. MQ6 Sensor

The MQ6 gas leakage sensor is a type of gas leakage sensor which will be able to differentiate the smoke, CO_2, and other poisonous gas. Its value is 0 during normal condition. When any gas leak has been occurred the output of the sensor will be 1.

This sensor has 4 pins.

- The input pin, from which 5v supply will be given.
- The ground pin.
- The analog pin.
- The digital pin

Fig4 shows the MQ6 sensor and its pin configuration.

Fig4: MQ 6 Sensor

VI. Load Sensor

The load sensor will frequently monitor the weight of the gas. The load sensor will able to weight the gas cylinder and if its weight falls down below the limit it senses the signal will be given to the microcontroller and according to the program the microcontroller executes its instruction and makes a call.

VII. Temboo server

The Temboo server is one of the cloud which is used to store the database and it will help in connecting the CC3200 microcontroller with the internet. This act as the basic cloud server that connect the microcontroller with the other electronic devices.

VIII. Nexmo server

This nexmo server is used to make the call whenever any low weight of the gas has been detected. This is also another type of cloud which is used along with Temboo and Twilio server. The nexmo server will also collect the database of all the calls it records it and with the help of voice recognition system, the inbuilt voice will be given out whenever any call has been made and it is responsible for diverting the call as per the user activities.

IX. Results and discussions

Whenever the gas weight is low the consumer need not to worry about frequent monitoring. The gas will be pre booked according to the weight of the gas.

A call will be made to the consumer and if he press 1 the call will be diverted to the corresponding gas agency and the consumer details will be automatically fetched to the database of the gas agency server from the Temboo cloud server.

If any gas leak has been happened that can be detected with the help of gas leakage sensors and also the buzzer alert will be given. With the help of Twilio cloud server we can also send sms to the consumer this makes the smart alerting system.

The table given below will explain about the load sensor activity for pre booking

Comparison of LPG and Empty Cylinder

S. No	Weight	Activity
1	$15 \leq X \leq 20$	Books gas
2	$20 \geq X \geq 37$	Ideal state

The table given below will explain the gas leakage sensor.

MQ 6 sensor with leakage detection

MQ 6 value	Type of leak	Activity
1000-1500	LPG	Alert by buzzer and sends SMS
2300-2750	Smoke	Light glows

X.   Conclusion

Now a day's home automation is of more concerned. The home automation starts from kitchen automation. For smart home appliances we can pre book the gas. This reduces the frequent monitoring of the gas weight. Also there is no need to remember the consumer number and their details. If it is fetched once it will be stored in the cloud server and it will be accessed automatically by the Temboo server in case of gas pre booking.

Also the security level of the home can also be increased by detecting any LPG gas leakage if any and sending a alert. This system can be implemented in homes. It is very much useful in our day to life.

XI.   References

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