GAS LEAKAGE DETECTION AND AUTOMATIC BOOKING USING IOT

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ABSTRACT

There is a rapid development in technology which influencing the human life in several aspects due to rapid development in different fields but we still need to adopt that technology such that we can make human life more easier to live. In our Country it is not possible to supply LPG through Pipes to each and every home as production of LPG is too short. At present we are having an system Advance LPG cylinder booking through IVRS or online which is most difficult for the illiterate and busy schedule people to book the LPG cylinder in advance. This paper proposes a system that will make entire LPG cylinder booking procedure automated without human intervention. This system continuously measures the weight of the cylinder and once it reaches minimum threshold it will automatically sends message to the authorized LPG Agent so that they can deliver the LPG cylinder in time. Along with the Automated cylinder booking we also designed feature related to the safety of the user in which it continuously monitor the leakage of LPG gas and alerts the user regarding leakage to avoid major accidents which costs human lives mostly.

Keywords: Automatic booking,Continuous monitor,Leakage detection,IVRS,Online

I.INTRODCUTION

There are approximately 30crore LPG users in the country in which mostly 40% of the population. The Several standards have been implemented for the gas leakage detection system. The existing systems provides an alarm system which is mainly meant to detect an Gas leakage in the house and commercial premises The objective of the proposed system is to continuously measure the weight of the cylinder and as soon as it reaches the minimum threshold it will automatically sends an SMS alert to the user as well as Authorized LPG agent so that they can act accordingly. This system also designed to detect LPG gases such as propane and butane. The allowed level for butane is 600ppm above which it is considered to be of high level and poses a danger. The threshold level of weight of the cylinder is used for automatic cylinder booking. The main aim of this project is to monitor for liquid petroleum gas (LPG) leakage to avoid major fire accidents and also facilitating safety precautions where security has been an important issue and automatic cylinder booking without human intervention. The system detects the leakage of the LPG using gas sensor and alerts the consumer about the gas leakage by sending SMS. The system measure the weight of cylinder

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by using weight sensor and display corresponding weight in LPG display. The proposed system uses the GSM Modem to alert the person about the gas leakage via SMS and status of automatic cylinder booking. When the system identifies that LPG concentration in the air reaches the specified level then it alert the consumer by sending SMS to registered mobile phone and alert the people at home by activating the alarm which includes Buzzer simultaneously and also display the same message on LCD to take the necessary action and switch on the exhaust fan or opening windows to decrease the gas concentration in the air.

II. LITERATURE SURVEY

[1]Different techniques were introduced for measuring the amount of gasoline present in the cylinder and scheduling its booking The system in which, the inbuilt pressure sensor in RFID was used to measure the level of the gas inside the cylinder. The output of the pressure sensor was given to the PIC controller, where the voltage corresponding to the gas weight was stored. The same was displayed on the LCD, which was connected to the output port of the controller. A threshold value was set in the controller. Once the threshold level was reached, the voltage value was given to the alarm, which alarmed the user .

[2]The study in which the frequencies of tone generated by knocking on the outside surface of the container was used to detect the liquid level inside. A detailed model was based on Euler-Bernoulli beam theory to study the feasibility of the method for a cylinder with complicated but practical structure and the results show that experimental data agree well with the theoretical analysis. The results indicate that the proposed model can accurately explain the behaviour of the vibratory frequencies under different liquid levels. The apparatus can be successfully implemented to automatically sense the near empty condition of the gas cylinder .

[3]Gas flow measurement devices were used to measure the pressure in the cylinder different equipment's such as Pitot tubes work by comparing the pressure in a small diameter tube (impact pressure) to the static pressure around the tube. In Venturi Pressure measurements are taken before and at the mid-point of a constriction, then the flow rate is calculated from the difference in these two measurements. Orifice plates are a well-proven flow measurement technology. Because orifice plates are interchangeable, a technician can change the plate size to achieve desired pressure differential with changing flow rates .

[4]Gas Level observance, Booking and Gas outpouring Detector victimization IoT. During this the gas amount within the instrumentation is ceaselessly monitored and it additionally intimates the various branch so as to position the new LPG cylinder. The Radio frequency module is used in order to make the user to use it easily and this module consists of the transmitter and receiver kit. The transmitter is an encoder kit which is fixed in the main board and the receiver is a decoder kit which is fixed in the sub board. In addition to easy usage, it also has the advantage that it gives the same information. The temperature sensor is also used in order to detect the errors which occurs

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due to the surrounding environment. The main drawback in this system is that the use of processor instead of the controller and moreover there is no security for the user .

III.EXISTING SYSTEM

Most fire accidents are caused because of a poor-quality rubber tube or the regulator is not turned off when not in use. Therefore, developing the gas leakage alert system is very essential. Hence, this paper presents a gas leakage alert system to detect the gas leakage and to alarm the people onboard.Many of the people are forgetting about the booking of the gas cylinder now a days in their busy schedule.Therefore developing the automatic booking of a gas cylinder is very essential.Hence, this project presents a automatic booking of gas..Recently we observed that in many of the industries and homes there is a leakage of CO2 gas or smoke,by inhaling this somke there is a chance of getting many respiratory problems. By this smoke detecting system is introduced to detect these type of smokes when they are heavy in intensity which leads to danger.

Drawbacks

The main disadvantage is that there will be no communication with people far away from home.The main disadvantage of this is it will only book the gas cylinder and didn't send the return message to the customer,they have to check the status in app or any other application.The main disadvantage of this is it will only detect the smoke but not avoid it.

IV.PROPOSED SYSTEM

This paper proposes a system that will make entire LPG cylinder booking procedure automated without human intervention[1][2]. This system continuously measures the weight of the cylinder using a Weighing sensor and once it reaches minimum threshold [3]it will automatically sends message to the authorized LPG Agent so that they can deliver the LPG cylinder in time.

Along with the Automated cylinder booking we also designed feature related to the safety of the user in which it continuously monitor the leakage of LPG gas[4] and alerts the user regarding leakage to avoid major accidents which costs human lives mostly.All the sensor data will be updated in the website by using Wifi module[5][6].

BLOCK DIAGRAM

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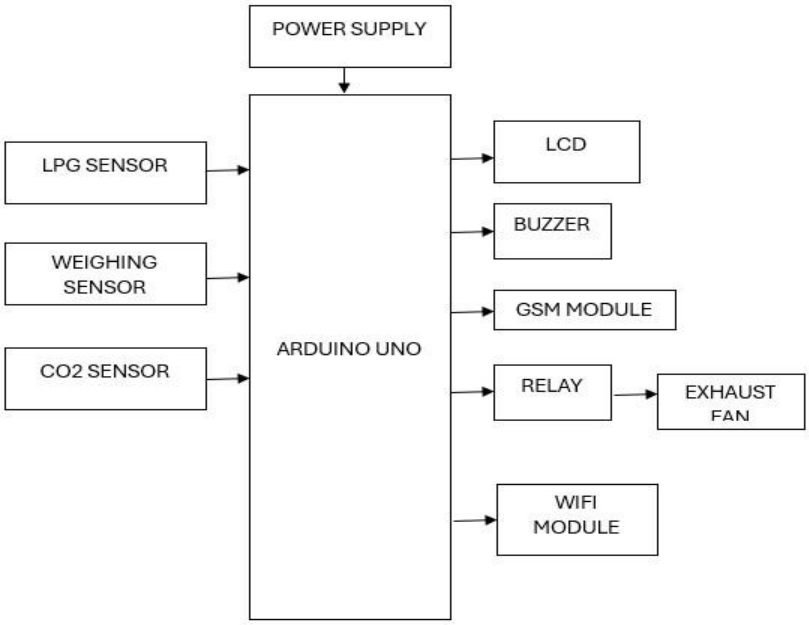

Fig 1 : Block diagram for proposed system

IMPLEMENTATION

Objective - 1

Leakage detection

Usually in many homes and industry's we observe that there is a leakage of gas cylinders may occur .By this many lives and properties may damages. For this leakage if we are not present at the home and we are at the out side we didn't know the leakage of gas occurred we go home and light the gas it may be dangerous . So we made a application to detect the leakage of the LPG gas through a LPG sensor. If the leakage of gas cylinder crosses above 100ppm the controller sends a alert message to the mobile through GSM module " Alert!,LPG gas leaked at your home.Check it"and also make a phonecall to the person of the family at the condition if we are at far away from the home. If we are at home or at the surroundings the buzzer will rang through the controller.

Objective - 2

Automatic booking

We connect the weight sensor to and controller named Arduino Uno.Along with the weight sensor we get the ADC module(analog to digital converter).We know that if the object placed on a machine with our naked eye but the controller can't know about it so we use IR sensor to detect the object.IR sensor passes a light rays in a beam of light if the light rays get reflected by colliding with any object then it send a signal to the controller there is an object at the same way we here detect the object placed on a weight machine.After receiving the signal the Controller calculate the weight and pass a signal to the GSM module ,if the weight of the object is less than 250gms then

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it sends SMS to the certain gas agency and book the gas cylinder through the consumer number and also get the return message that “Dear customer,your LPG gas cyliner booked today”.And also make a phone call to certain gas agency for booking a LPG gas cylinder.Or else if the weight of the object is greater than threshold value(250gms) It remains Constant and wont send any message.

Objective - 3

CO2 detection and avoidance

In many industries and homes there is a leakage of the smoke may occur by damge of machines and damage of appliances respectively.By inhaling this gas we may get lot of health issues to avoid this we may found application to detect this leakage of co2.If the leakage of CO2 is more than 100ppm then the controller get message through the CO2 sensor.The controller send a signal to the relay module by the relay the exhausting fans may automatically ON and the gas goes out into the air.In this way we avoid the heavy smoke when we are not present at the place.

HARDWARE RESULTS

Gas leakage detection

In this application used mainly three devices namely MQ6 gas sensor,GSM module and controller named Arduino UNO.These all are connected using connecting wires as per the fig 1 and the result is observed on the LCD display.The MQ6 sensor senses the LPG gas leakage as above the threshold value and gives signal to the controller ,the controller sends a message to the GSM module,this GSM module shows alert message on the LCD.

Fig 1 : Gas leakage detection

Automatic Booking of LPG gas

In this application used mainly three components namely Load sensor or Weight sensor, controller as Arduino UNO,GSM module.These components are connected using connecting wires as per the fig 2 below and the result is observed on the LCD display.The weight sensor detects the weight of the LPG gas if the weight of the gas is less than the threshold value then the GSM module sends

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message to the certain gas agency by using the consumer number then the gas booked automatically and the message will get return as the LPG is booked.

Fig 2 : Automatic booking **CO2**

detection and avoidance

In this application the weight used the components Arduino as controller,MQ2 sensor, Exhausting fans,Relay these all components are connected using connecting wires as per the fig 3.IF the co2 or any other smoke is detected by the CO2 sensor the controller analyse and sends message to the Relay.Here relay acts as switch which get signal through the controller.If it detects smoke it ON automatically then the Exhausting fans exhaust the smoke out to the atmosphere.

Fig 3 : CO2 detection and avoidance

V. RESULTS DISCUSSION

Gas leakage detection

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The below table shows the comparison of the results based on the existing system and proposed system.It shows about the parameters of the sensing the least value of the LPG, getting the alert message through the buzzer,getting alert message through SMS and checking leakage status through internet and the result of these parameters are clearly mentioned below table in the form of the numeric values and words.

Table 1 : Result comparison for Gas leakage detection between existing and proposed systems.

Parameters	Existing system	Proposed system
Sensing least value of LPG gas	300 ppm	100 ppm
Getting alert message from buzzer	Yes	Yes
Getting alert SMS through SMS	No	Yes
Checking leakage status through internet	No	Yes

Automatic booking

The below tables shows the comparison of the existing system and proposed system of the application automatic Booking of gas contains some main parameters as speed of booking of gas,getting return message from gas agency,booking cylinder through phone call not only with SMS,getting the return call from the gas agency to customer for all these parameters the results are clearly mentioned in below table.

Table 2 : Result comparison for automatic booking of gas between existing and proposed systems.

Parameters	Existing system	Proposed system
Speed of booking	Takes upto 1 min	Takes 30secs

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Return message from gas agency	No	Yes
Booking via call	No	Yes
Getting return call from gas agency	No	Yes

CO2 detection and avoidance

This application also shows the comparison between the existing system and proposed system and the parameters of this application is detecting least value of smoke ,avoidance of this smoke,the results of this parameters are clearly mentioned in the below table.

Table 3 : Result comparison for CO2 detection and avoidance between existing and proposed systems.

Parameters	Existing system	Proposed system
Detecting least value of smoke	500 ppm	90-100 ppm
Avoidance	No	Through exhaust fans

VI.CONCLUSION

As we shorted out the problems faced by LPG gas consumers so we come up with some solutions to meet the few requirements of them, as we made our system is completely automate the process of refill booking without human intervention. Our system is also reasoned to help customers to upgrade their safety norms, act in accordingly with minimum requirements on environmental issues and mostly the basic function being prevented by major disasters and protect life and property from reputed Accidents. The primary objective of our project is to measure the gas present in the cylinder when weight of the cylinder is below the fixed load, this can be done using the weight sensors. The gas retailer gets the order for a new cylinder and the house owner (consumer) receives the message regarding the status and the secondary objective is to provide any malfunction in gas servicing system in order to prevent damage or explosion of LPG. Thus the system developed by us will somehow help the LPG Gas Consumers to lead a comfortable life.In future When there is a leakage in gas cylinder the main supply of the home will be cut off automatically using home automation.Automatic payment should be paid after cylinder booking from user bank account.

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