IoT based Gas Level Detection and the Automatic Booking of the Gas

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Abstract - *Gas booking is a major requirement in every individuals life. The need of this project is to save time while booking of gas. When we call the gas agent our request may not be recorded or call cannot be connected. These are all waste of the person's time. If we have not noted the completion of gas we need to book it in black for money. By this project the level of the gas will be monitored at all the time and we get message when gas is about to complete or critically low that is below 20%. In this project we would like to introduce a arduino based system in which the load cell used to discover the weight of the gas present inside the cylinder .The gas sensor is used to measure or detect the gas leakage in the system. The sensor has the proper sensitivity and the brief reaction time at fewer prices. If gas completion is identified message to the lawful candidate or family member through the usage of the cloud, it alerts the lawful candidate or family member by sending the notification to refill the cylinder.*

KEYWORD: **GSM module, gas sensor, load sensor, Arduino Uno R3, Internet of things(IOT).**

1. INTRODUCTION

In our day to day life, LPG place in vital role in the field of cooking. LPG is preferable for our daily use as they are economical less cost when compared to other fuels. The main application of LPG is that is it replaces chlorofluorocarbon which damage the ozone layer. The composition of LPG is made up of butane (55%) and propane (45%) with some traces of isopentane and olefins. The LPG is stored in the form of liquid inside the cylinder. The butane and propane present inside the cylinder is odourless. Hence the ethylmercapton is added to cylinder in order to identify any leakage in the cylinder. LPG is lighter than water. LPG burns proportion of LPG-air mixture is between 1.8% and 9.5%.The LPG may be available from 4kgs to 450kgs.With the rising demand for LPG uses have to be compelled to prebook their LPG cylinder a minimum before the month or the user books the cylinder after when the gas level is empty. In our daily use it is difficult to find the level of the gas inside the cylinder hence we propose an efficient method to watch the amount of LPG within the cylinder and avoid prebooking and late booking of cylinder.

This paper deals with the gas leakage detection, continuously monitoring the level of LPG in the cylinder and automatic booking of new LPG cylinder. The gas sensor also detects other gases like the smoke coming out from the cigarette. When the leakage of gas is detected, the arduino alerts the user through the message. When the weight measured by load cell becomes critically low, the alert is send to the user and the automatic booking of the gas is done. The main application of the proposed project is to overcome the limitations such as early booking and late booking of the cylinder by consumers.

2. EXISTING SYSTEM

There are numerous techniques available now a days in order to detect any gas leakage or the spilling of gas from the cylinders. The basic principle behind the technique is that the change in the concentration of LPG is detected associated it activates an audio visual alarm once it exceeds an explicit threshold worth. Further, it sends another message through radiofrequency system to the receiver module. Hence the receiver module can be of a mobile unit that will be placed anywhere among the premises of the house therefore the alarm area unit typically detected and detected at the place where gas flows. The arduino reads the voltage from the detector and uses it to calculate the modification in concentration. The gas detector is sensitive to many gases and actually gas kind cannot be determined. Instead, during the work, it is assumed that the gas sensing element has the same or the identical sensitivity for LPG and CH4, it may be thought about a sound assumption.

3. PROPOSED SYSTEM

Gas level detection and automatic booking is done with various features, here the project is implemented using Arduino Uno R3 and the device will be a single system with multiple application for lpg consumers. The device monitors the load that is gas level and display it within alphanumeric display, the gas leakage is detected by gas sensor and also the automatic booking is done when the gas level is critically low that is below 20%.Then it sends an alert to the registered mobile number by a SMS with the help of GSM module and the alert database to user is displayed in the system monitor.

3.1. Block diagram

The below diagram represents the block diagram of IOT based gas level detection and automatic booking of gas. In this, the leakage detected and the weight of the cylinder is displayed in the 16*2 LCD module. The GSM module sends the message to the user and to the gas agent.
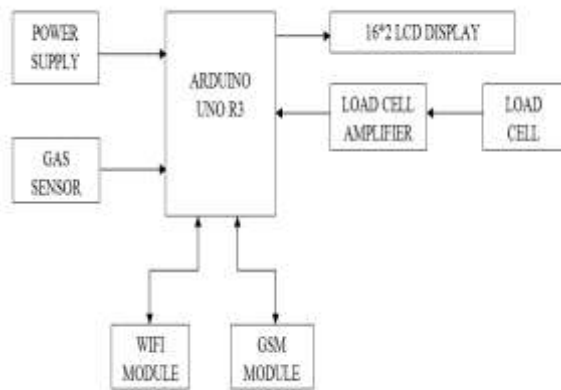

Fig-1: Block diagram

3.2. Description

This system consists of the following block:

3.2.1. Load Cell

A Load cell (SEN13329) is a transducer that measures force and output is converted as an electrical signal. The load cells are used since it provides an accurate weight. The driving voltage is about 5 to 10V.this is used to measure the weight of the cylinder.

3.2.2. Gas sensor

Gas sensor (MQ-6) module is useful for gas leakage detection especially the butane and the propane present in the cylinder. The potentiometer can be used to change sensitivity. Sensitive material of mq6 sensor is stannic oxide which has lower physical phenomenon in clean air. The physical phenomenon of this sensor is high only when any flammable gas is detected. There is a change in the resistance of the sensor when the gaseous element comes in contact with the sensor. Thus the voltage changes and the voltage can be read by arduino. These sensitivity varies for individual gaseous elements.

3.2.3. Load Cell amplifier

The load cell amplifier is a small circuit board designed for the HX711 IC that allows you to read the load cell voltage

in order to measure the weight. The load cell amplifier reads the data from the load cell, amplify signal and sends it to arduino for processing. The clock and data of HX711 are connected to pin 4 and pin5 of arduino.

3.2.4. Arduino Uno R3

Arduino Uno is a controller used in our project, the output of gas sensor and load cell are connected to the input of arduino and the output of the arduino is connected to the LCD .It has 14 digital input/output pins out of which 6 can be used for PWM outputs and these are the inputs and outputs of various sensors , 6 analog inputs , 16MHZ ceramic resonator , a USB connection , a power jack for power supply , an ICSP header for writing the program in arduino and a reset button that erases all programs in the arduino.

3.2.5. LCD

LCD (Liquid Crystal Display) is a combination of two states of matter, namely the solid and the liquid. The liquid is used to provide a comprehensible image in LCD. The LCD works on the principle of obstruction lightweight. When compared to cathode ray tube and LED, LCD is thinner. LCD is used to display the weight of the gasoline content.

3.2.6. GSM Module

The GSM (M590E) is a wireless module, provides a high quality SMS, GPRS data connection for use in industrial and commercial fields. It may be operated at 850 MHZ, 900 MHZ, 1800 MHZ and 1900 MHZ.

3.2.7. Wifi Module

The ESP8266 is the low cost wifi microchip which connects upto 426 metres, with the fully integrated TCP/IP stack and microcontroller capability module. This module helps the microcontroller to connect to the wifi network and makes the simplest and the easiest TCP/IP connections using Hayes style commands.

4. RESULTS

The hardware implementation of IOT based gas level detection and automatic booking of gas is shown below.

Fig-2: Hardware

The below figure3 and figure4 represents the output of the project (gas level detection and booking using iot) sent to the gas agent and the output send to the user.

Fig-3: Output send to gas agent

Fig-4: Output send to the user

5. CONCLUSION

Hence, a cost effective gas level detection system is proposed, designed and implemented successfully, the system explains a fully automated approach towards the booking of the gas and alert the user when any gas leakage is detected and also when the gas level is critically low that is below 20%. The level of the cylinder measured from load cell and the gas leakage in system is displayed on the 16*2 LCD display, the GSM modem sends a message to the user when there is any leakage detected in the system or the gas level is critically low. The cost involved in developing the system is low when compare to other gas monitoring systems available in the market.

6. REFERENCES

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