Smart Gas Booking &
LPG Leakage Detection System

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ABSTRACT

In recent years there has been rapid development in technology which has made human life easier in several aspects. LPG is a need of every household but many accidents happen every year due to domestic gas leakage, so it should be used carefully. As safety and security is the most important factor we have proposed a LPG leakage detection and smart gas booking system. In our daily life, we don't know exactly the status of LPG gas completion which leads to inconvenience. Along with the leakage detection we also designed feature of sending message to user about the cylinder requirement. In this proposed system MQ-2 is gas sensor used to sense the LPG leakage gas and has high sensitivity to LPG and also response to natural gas. It offers quick response time and accurate detection. The additional advantage of the system is that it continuously monitors the level of the LPG present in the cylinder using level sensors and reduces the work load of gas agency.

Keyword : - *Android application, Arduino Mega, Gas Sensor, LPG automatic Booking, LPG leakage detection, MQ-2 sensors, Security.*

1. Introduction

Android is a linux based operating system it's designed primarily for touch screen mobile devices like smart phones and tablet computers. The android is a specialized OS that supports sizable amount of sensible phone applications. The android is an open source OS implies that its free and anybody can use it. The android has numerous apps available that can assist you managing your life one or different approach and it's out there low price in market at that reasons android is incredibly popular. The smart phones aren't only used for business purpose however they need innumerable uses and may be used as a Camera , Music player, Tablet PC, T.V. , web browser etc . With the use of latest technologies, new software package and operative systems are needed. Gas Detectors are within the marketplace for a really very long time and are immensely used. The applications of android apps are often found in industrial plants, refineries, pharmaceutical producing, paper pulp mills, craft and ship-building facilities, sewer water treatment facilities, vehicles, indoor air quality testing and houses. Various standards have been implemented for the gas leakage detection system. There are many existing systems which can detect leakage using different gas sensors. A developed system is one which continuously monitors the leakage of LPG gas and alerts user regarding leakage to avoid major accidents. In addition to leakage detection feature and when level of LPG gas falls under certain considerations the SMS is sent to the user for the booking of cylinder is added continuously measures the level of cylinder and sends SMS if level is below threshold.SMS based LPG leakage detection system enables user use this application remotely from anywhere. The user get updated with the date of delivered of LPG gas cylinder at home it also reduced the paper work of LPG holder and helps for proper arrangement of all user records.

2. Related Work

Table -1: Literature Survey

Paper	Problem	Solution
Smart Gas Cylinder : Leakage Alert and Automatic booking[1]	Monitor the quantity of gas level in the cylinder, when gas level reaches below the threshold limit of around 2kg it sends SMS to user by sending SMS on registered mobile number.	System provides security by sensing leakage of gas. Useful for use in house as well as in industry. Saves time and also it is helpful for data analysis about how much gas consumes in certain period of time
Smart LPG Monitoring & Automatic Gas Booking System[2]	monitors the leak of LPG gas and alerts user. sends SMS if weight is below threshold. It triggers the buzzer and therefore the LCD to display the message Gas Leak .	Help customers to upgrade their safety from supposed Accidents. Measure the gas present within the cylinder once weight of the cylinder is below the particular level. prevent damage or explosion of LPG
Automatic System For LPG Rill Booking And Leakage Detection[3]	pervasive sensors and LPG leakage is detected through the sensor. MQ-6 is gas sensor accustomed sense the LPG outflow gas and has high sensitivity to LPG and additionally response to natural gas.	Daily Order Placed Reports. Daily Delivered of LPG Gas Reports. Daily Order Reports. Monthly Dealers and Franchise Reports.
E-gas Seva Using Smartphone[4]	The System automates every and each activity of the manual system and will increase its throughput. By using PHP we will implement this method in each internet application and android application.	Help customers to upgrade their safety from supposed Accidents. Measure the gas present within the cylinder once weight of the cylinder is below the particular level. prevent damage or explosion of LPG.

3. Proposed Solution

3.1 Automatic gas booking:

In LPG gas detection the leakage gas detection is done by gas sensor which is interfaced with Android application. Proposed system is made such that it detects the level of LPG gas in the cylinder. When the level of gas level reduces under certain level the notification is sent in the android application to user. The user verifies if he/she want to book the cylinder. The automatic gas booking and management of records is done by the android application on holder records. And thus user gets all the information about the delivery of gas cylinder.

3.2 LPG Leakage detection:

In leakage detection module the leakage in pipe is detected using the MQ-2 sensor which is interfaced with the android application .User gets the notification when leakage is detected in pipe and respected actions can be taken.

4. System Architecture

To design an Automatic LPG gas booking and leakage detection system for use in Home and Industry. These monitoring system can be used to automatically LPG gas booking and Leakage detection. Here we can use the mechanical instrument like MQ 2 sensor for measuring the gas cylinder level. The gas level drops below certain threshold level. MQ-6/MQ2 gas sensor is used in system, When the LPG leakage is detected by the sensor and information is sent to the user by notification on android application.
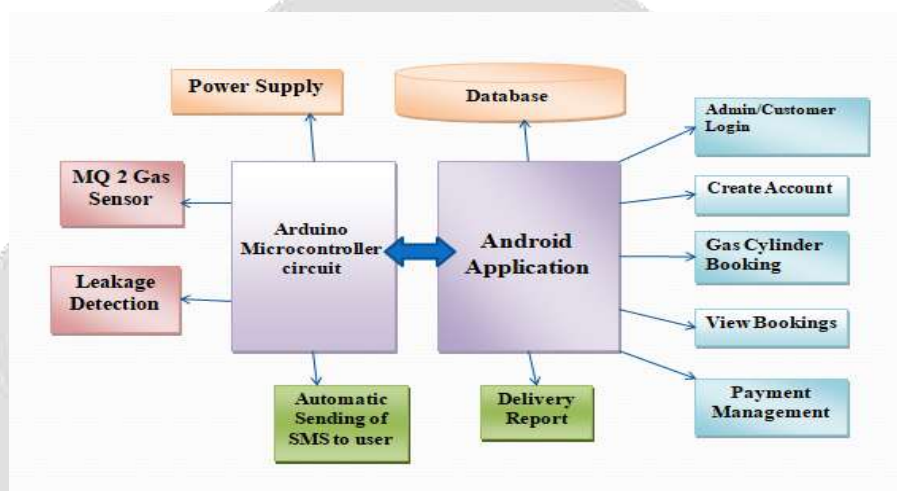

Fig -1: System Architecture.

4.1 Algorithm

//Description: LPG level detection and leakage detection

//Input: LPG Gas Pressure

//Output: Alert Dialog to User on Android Application

START

Step1: Initialize WIFI connection with the hardware circuit.

Step2: Enter the correct Password to get connected with WIFI.

Step 3: if (System.Connected == true)

　　　　else

displayMessage(String errorMessage);

Step 4: Read the Pressure of Gas.

Step5: Read the Gas Temperature.

Step 6:if(Pressure< Threshold){ AlertDialog(String Notification); }

Step 7: Goto Booking activity and procced for booking refill steps.

Step 8: To detect Gas leakage in Cylinder pipe by using MQ2 sensor.

Step 9: Give Alert Notification On user Application.

END

4.2 Implementation

- NodeMCU

NodeMCU is an open source IoT platform. It includes code that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware that is predicated on the ESP-12 module. The term "NodeMCU" by default refers to the code instead of the dev kits. The firmware uses the Lua scripting language. It is supported the eLua project, and engineered on the Espressif Non-OS SDK for ESP8266. It uses several open supply comes, like lua-cjson, and spiffs.

- BMP180

The BMP180 consists of a piezo-resistive sensor, an analog to digital convertor and a control unit with E2PROM and a serial I2C interface. The BMP180 delivers the unsalaried price of pressure and temperature. The E2PROM has stored 176 little bit of individual standardization information. This is used to compensate offset, temperature dependence and different parameters of the sensor.

UP = pressure data (16 to 19 bit)

UT temperature data (16 bit)

- Binding Circuit

Table -2: Pin Configuration

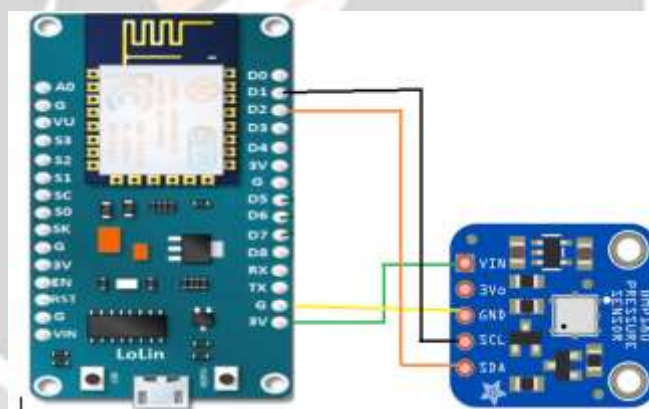| Sr. No	Node MCU	BMP 180
1	D1	SCL
2	D2	SDA
3	GND	GND
4	3V	VIN

- Circuit Layout

Fig.-2: Circuit Diagram

4.3 Experimental Result Analysis :

The efficiency of our solution to the existing shortcoming is expressed on the basis of physical and theoretical factors. On the theoretical basis, our algorithm is a success because we tried to provide solution to a very new problem of gas pressure sensing and detection of leakage. The proposed gas leakage detector is promising in the field of safety. The attempt while making this prototype has been to bring a revolution in the field of safety against the leakage of harmful and toxic gases to minimize and hence nullify any major or minor hazard being caused due to them. The system must be able to book the refill when there is a request. The alert notification must be sent on the users mobile phone regarding the leakage in the gas. The system should give the details of Delivery date to the customer.
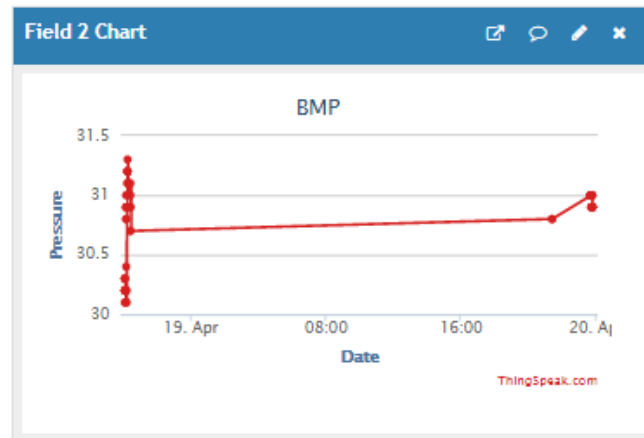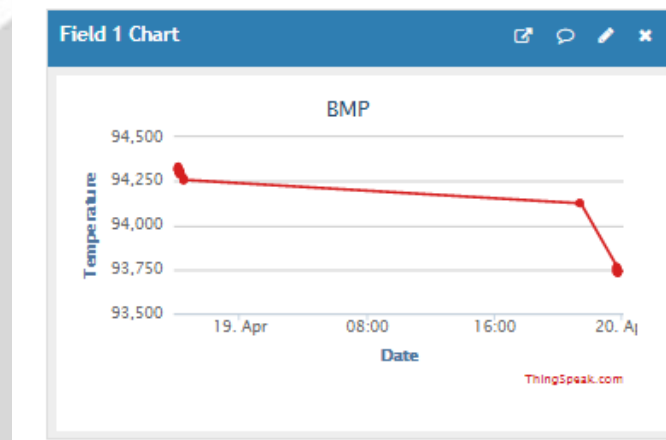
Chart -1: Pressure Value
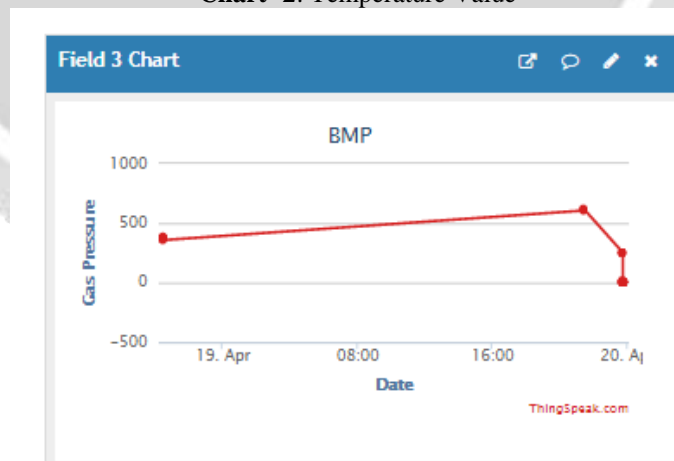

Chart -2: Temperature Value

Chart -3: Gas Leakage Pressure Value

5. CONCLUSIONS

The proposed gas leakage detector is promising within the field of safety. The attempt whereas creating this paradigm has been to bring a revolution within the field of safety against the leak of harmful and toxic gases to minimize and thus nullify any major or minor hazard being caused due to them. Our system is reasoned to assist customers to upgrade their safety norms, act in consequently with minimum needs on environmental problems and largely the basic function being prevented by major disasters and protect life and property from reputed Accidents. The objective of our project is to measure the gas present within the cylinder once weight of the cylinder is below the actual level, this will be done using the load sensors. The gas distributor 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 coupling system so as to stop harm or explosion of LPG.

The future work would create it additional adaptable and additional responsive for any application it must be updated often. In future the system can be modified with the voice recognition system.

6. REFERENCES

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