Intelligent Lpg Gas Leakage Detection And Automatic Gas Reserve System

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Abstract

There are rapid advances in innovation that impact people life in some perspectives due to rapidly improvement in various areas, however, we must nonetheless adopt this innovation for the ultimate goal that we can make life easier to live with. In our country, it is out of the imagination to wait gracefully for LPG through pipes for each house, since the creation of LPG is excessively short. It is difficult to keep track of the LPG cylinder usage to book the new cylinder on time and mostly we will notice it after running out of gas. To solve this problem, we are making a device which will monitor the amount of LPG present in the cylinder at regular intervals and provide timely alerts beforehand. It will also book new cylinder automatically, if critical gas level is reached. Another major problem that customers of LPG chambers accurately obtain LPG gas compliance status "results in a large carry-over of the camera reserve, which is uncomfortable most of the time. Currently we have an IVRS frame in which the customer needs to know little about according to the automatic voice, also incorporates choice options The vast majority of unqualified people cannot complete the reservation due to this explanation and, in addition to one, part of which these fixed telephones are occupied due to blocked calls or telephones which do not work due to specific problems. They can transmit the LPG chamber on time Identified with the well-being of the customer in the filter by a gas spill GPL persistent and warns the customer overflow to avoid specific incidents which, for the most part, cost human lives.

Keywords *— Arduino, GSM Modem, Gas Sensor, LPG, Temperature sensor and Load Cell*

1.INTRODUCTION

In recent years approximately 3 billion LPG gas customers across the country, the majority of which are 40% of the masses. Several indicators have been implemented for the discovery of gas spills. The current framework provides a warning framework primarily aimed at identifying gas spills in homes and businesses.

The goal of the proposed framework is the weight of the cylinder continuously measured, like a certified LPG operator, so that it can act similarly when the chamber reaches the basic limits. , Send an SMS alert to the customer. The framework also aims to identify LPG gases such as propane and butane. Butane has an acceptable level above 600 ppm, above which it is considered to be a critical level and represents a risk. The camera weight limit level is used to reserve a programmed camera. The fundamental point of this task is to detect leaks of liquefied petroleum gas (LPG) in order to keep a strategic distance from serious fire accidents, and in addition, safety is a key issue, without human intervention. If it is a programmed camera stock, it is to promote security. The executive uses gas sensors to recognize LPG leaks and send text messages to alert buyers to gas leaks. The frame uses a weight sensor to weight the cylinder and display the corresponding weight on the LCD

screen. The proposed framework using GSM modems to alerting the people of gas spills by SMS and the status of scheduled camera reservations.

When the manager identifies that he has reached a predefined level where the emphasis on LPG is predominant throughout the environment, he sends an SMS to the registered phones to alert the buyer and incorporate a ringtone. The warning alerts the individual in their home, and a similar message is also displayed on the LCD screen, making essential movements, turn on the smoke fan or opening a window to repair the surrounding gas. To be discreet.

2. PROPOSED SYSTEM

In the proposed framework, we foresee "Room reserve programmed with LPG gas verification and frame ready". These reports focus on the identification of financial charges such as petroleum, liquefied petroleum gas, alcohol, etc. and alert people around the spill by SMS. In addition, the objective is to detect the ambient temperature and prevent fire accidents.

One of the progressively important components is the gas reserve programmed during the verification of the current use of LPG gas in everyday life. These companies alert their customers by sending a portable message via SMS with 3 conditions.

they are

- The weight of the LPG gas reaches the most extreme edge dimension.
- The LPG gas exceeds its highest rating.
- The temperature exceeds the ambient temperature.

These companies provide owners with ready messages via buzz signals and SMS. In addition, open the programmed doors and windows to allow the packaged gas to diffuse indefinitely into the air. After that, no fire accident will happen.

Use Case:

- The load sensor will be placed under the cylinder and the device will estimate the amount of LPG present using the mass difference.
- If critical level is reached the device will notify the user and it will automatically book new cylinder from their distributor.
- The LCD display will display amount of LPG present in current time.
- The user can calibrate and reset device manually.

2.1 DESIGN AND IMPLEMENTATION

This proposed System contains microcontroller, GSM module, alert system, gas leakage identification system, weight estimation module and automatic gas cylinder booking system
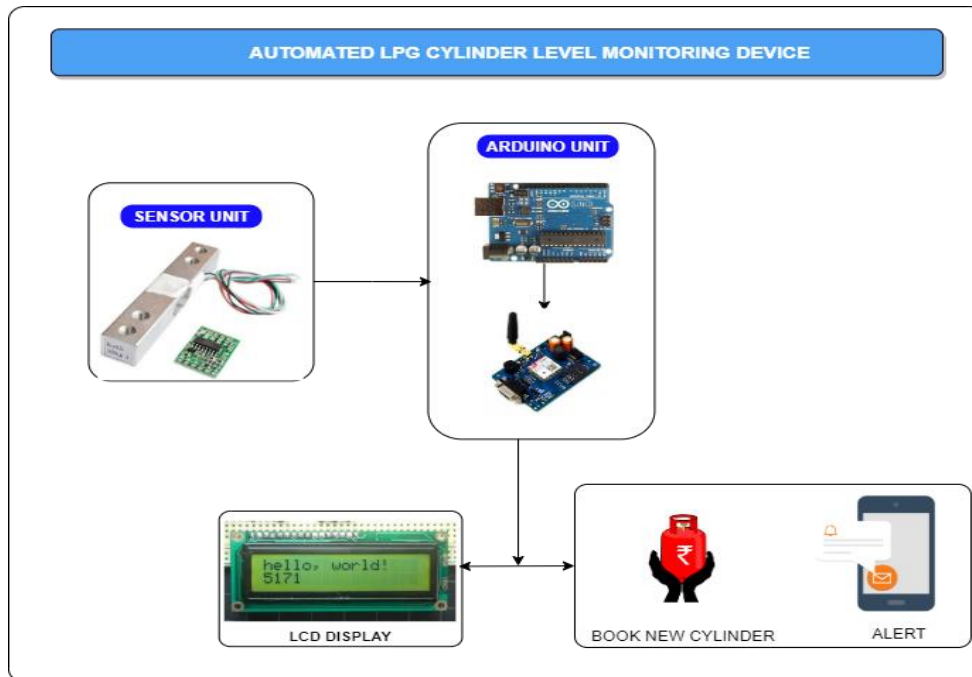

Figure 1: Block Diagram of Proposed System

A basic small-scale Arduino controller requires the ability to switch smoothly from 7 to 12 volts. It operates using various segments, such as transformers, rectifiers, channels and advanced downstream controllers which are easily accessible as modern connectors. We can flexibly support air conditioning to the DC connector or to the battery. The card operates from 7 to 12 volts. Sometimes, if the voltage drops below 7 V, the card becomes unstable at this point. The possibility of cutting the voltage above 12V will damage the card at this time.

The main scenario I use to start a business is Arduino. This allows you to organize your code effectively and efficiently. In addition, you benefit from features such as low cost, cross-steps, clear and simple programming requirements, open source and extensible programming. Arduino was a microcontroller board dependent on AT (technical sheet). Basically link it to your PC with a USB link or force it to boot with an AC to DC connector or a battery. With the highlights above, it encourages us to use in our corporate structure.

Another important segment that we use in our task is the use of load cells. Battery cells are transducers used to convert electrical energy into electrical signals. It is used as a percentage of the weight of the LPG gas chamber, so you can predict and warn customers when the chamber is discharged. There is a unique and affordable load cell on the market with various weight estimation capabilities.

Likewise, the gas sensor is one of the segments uses to identify the outputs of LPG (methane and propane) gases, passing from one type of label to another. For example, there are unique types of sensors that we rarely use in people homework, such as the methane sensor (MQ4) and the temperature sensor (LM35). MQ4 is used for the gas outlet. To keep a strategic distance from the use of CH4, natural gas and the noise of alcohol and kitchen exhaust and cigarette smoke. MQ-4 can distinguish gasoline and gas from 200 to 10,000 ppm. High impact on CH4 and natural gas. MQ 4 is sensitive, stable and has a long lifespan. The LM35 configuration is a precision IC temperature device with a breakdown voltage proportional to Celsius. The LCD (Liquid Crystal Display) is a 16x2 LCD module which is used to display

various sensor evaluations and the residual results of various results, which is a commonly used line 2 and displays a size of approximately 32 ASCII characters.

It uses a GSM modem to alert the customer by sending an SMS (Short Message Service) on the gas leak and the completion status of the LPG gas. An advanced portable communication framework widely used in the United Kingdom and in various regions as called as GSM (Global System for Mobile Communication). GSM uses time division multiple access (TDMA) and is the most widely used innovation (CDMA, GSM and TDMA). GSM digitizes and synchronizes information. At this point, it sends information to a channel that has two different information spikes from customers. It operates in a repetitive band of 800 MHz or 1800 MHz.
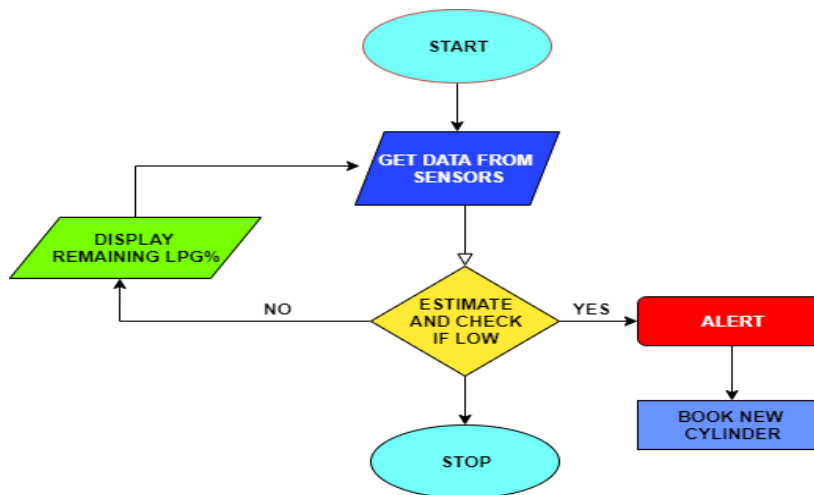
2.2 FLOW DIAGRAM OF PROPOSED SYSTEM

Figure 2 : Work flow Diagram

The figure shows the outline of the proposed system. For the system to work, the voltage sensor first measures the voltage level of the lead-acid battery. At the same time, mobile applications based on the Bluetooth interface use the mobile GPS function to read the position of the car. Battery voltage readings and vehicle position are sent to Aurdino. Nano- micro controller for processing. As shown, the processed data is sent wirelessly to the computer's battery monitoring user interface via the mobile APK. If the data transfer is successful, the computer's battery monitoring interface will display the updated battery status data. An email notification is sent to notify the user when the battery is low. The online battery system can not only measure the battery voltage but also communicate with the battery monitoring system to obtain the battery parameters. The working outline of the system is described in the next section.

2.3 GAS SENSOR (Methane gas)

MQ-4 is a sensor for materials sensitive to natural gas. The MQ-4 gas sensor is SnO2, which has low conductivity in the open air. In the presence of the desired solidification gas, the conductivity of the sensor is higher and the fixing of the gas is more important. A simple circuit was used to modify the individual performance signals for each fixed level. The methane, propane and butane measured by MQ-4 gas sensor is very sensitive to measure those

gas. The sensor can be used to recognize a variety of combustible gases, particularly methane. It is familiar and useful for so many uses.

2.4   TEMPERATURE SENSOR (LM35)

The LM-35 was an integrated circuit sensor that can be used to quantify the temperature with an electrical fault in response to the temperature (Celsius). The LM35 produces a higher breakdown voltage than thermocouples and may not require an improved breakdown voltage.

Its breakdown voltage corresponds to Celsius and the scale factor is .01v / centigrade. Its low flexibility and low self-heating capacity allow it to flexibly consume around sixty small amplifiers.

2.5   LCD SCREEN DISPLAY

LCD abbreviated as liquid crystal display. By replacing the use of the cathode ray tube (CRT), it has become very normal in the industry. CRTs are more powerful than LCDs and consume even larger and heavier objects. We think of LCD screens as a whole, but nobody knows what they do. LCD screens are widely used to replace LEDs (seven-part LEDs or other multi-fragmented LEDs) for additional reasons.

- Lower cost of the LCD screen.
- Possibility to display information relating to numbers, letters and illustrations. This contrasts with LEDs, which are limited to numbers and certain letters.
- By merging the controller with the LCD screen, the CPU continues to display information.
- Easily program text, text and design information.

They are specified for use in microcontrollers and cannot be started from standard IC circuits. It is used to create various messages on a small LCD screen.

2.6   LOAD CELL

APK files are designed to display real-time data during uploads and downloads. Therefore, these studies monitored the entire download process from start to finish. In the APK interface design, the data displayed includes battery voltage, battery current, SOC, and battery temperature.

- The load cells have different operating principles, that is to say
- Sensor based on fluid pressure.
- Force sensor based on elasticity
- Load cell based on a magnetostrictive or piezoelectric effect

2.7   PIEZOELECTRIC BUZZER

Bell is an audible indicator. Signals are used at the factory for alerts, clocks, and confirmation of customer information (such as mouse captures and keystrokes). The company used an electronic type buzzer, which is a piezoelectric component determined by a small controller signal. Peisolinger is based on the opposite directives of Peisopower, discovered in 1880 by Jack and Pierre Curie. It is rare to create force, such as when mechanical weight is applied to a particular material. Such a material is called piezoelectric material. When the alternating electric field exposed to the material stretches, or when the signs reappear along these sound-carrying lines, and comprehension stops.

2.8   GSM MODULE

GSM (Global Mobile System) / GPRS (General Packet Radio Service) TTL SIM900 Quad / GSM / GPRS The gadget is triggered at frequencies of 850 MHZ, 900 HZ, 800 MHZ, 1900 HZ. It is very small and easy to use in addition to GSM modems. The modem is configured

with TTL 3V3 and 5V DC interface hardware, so that users can interact directly with 5V microcontrollers (AVR, 8051, Arduino, PIC, etc.) and 3V3 microcontrollers (ARM, ARM Cortex XX, etc.). ..)

Figure 3: GSM SIM800 Module

The baud rate can be adjusted from 9600 to 115200 bps in AT command (attention). This GSM / GPRS TTL modem has an internal TCP / IP stack, which allows users to link to the web via GPRS. It's as good for SMS as DATA for moving cell phone applications to cell phone interfaces. The modem can interact with a microcontroller that uses USART highlighting (universal synchronous asynchronous receiver and transmitter).

3. RESULTS & DISCUSSIONS

LPG gas leakage detection and alert system based on an Arduino MQ-4 gas sensor, an LM-35 temperature sensor, a 10kg load cell as an information device (for the model), a piezoelectric vibrator , a 16x2 LCD screen, an automatic cylinder with GSM module as a Book performance device.

Figure 4: LCD showing output of Temperature, gas level and weight

All that is considered the ambient temperature is 25° C, but we increased the temperature of the LM35 to 53° C. Initially before the gas spill, the performance of the gas sensor is 0 ppm, but when gas is detected, the yield is 267 ppm. Since we set up a 10 kg load cell, the most extreme limit is a load of 10 kg. 338 is in grams of weight.

The figure below shows an SMS message on the customer's mobile phone. This message is sent by the GSM module for various types of information responses in the company. When the LPG gas reaches the minimum limit level, the message "The gas does not recharge sufficiently" is sent to the customer. As a result, the customer will know when to reserve the

camera and avoid camera delays. When the gas is completely empty, the message "Gas will flow quickly" will be sent.
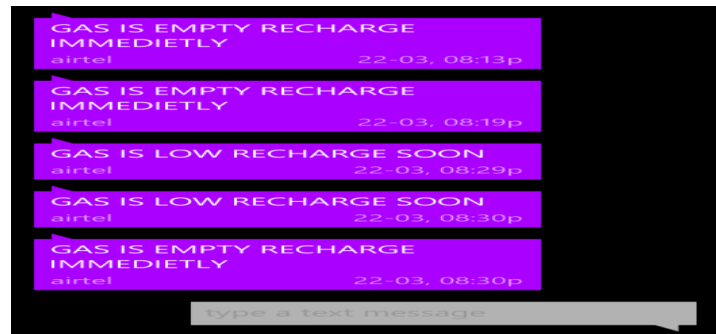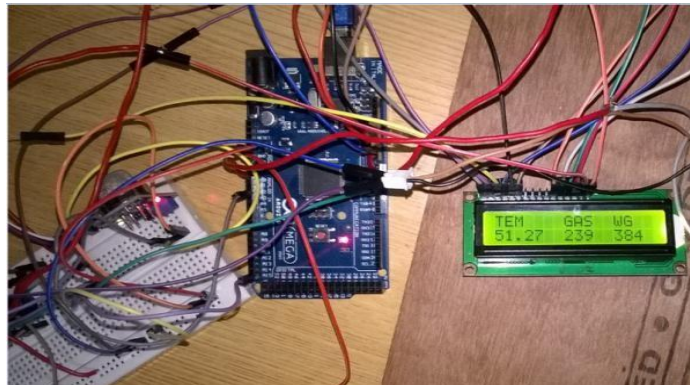

Figure 5: SMS"s sent to the user mobile

Figure 6: Initial Design of the Project

3. CONCLUSION

Having resolved the problems encountered by buyers of LPG gas, our manager fully automated the procedure for top-top reserves without human intervention, so we identified specific needs to meet some of these needs. Consider the answer. Our framework will help clients improve their standards of well-being, act with minimal prerequisites for natural problems as needed and, in most cases, their essential skills before a serious mistake. The aim is to protecting life and property from possible accidents. The main achievement of proposed system is to quantify the gases present in the room when the weight of the room is under a fixed load. This should be possible using a weight sensor. The gas retailer receives a request for another part and the owner (buyer) receives a status message. A secondary objective is to break the gas conditioning framework to avoid damage or LPG explosions. In this sense, the framework we have created helps LPG consumers in a way to have a comfortable presence. This verification framework could be further improved by using Bluetooth instead of GSM to send the alarm message to the client. This improves another continuous application. For mechanical purposes, you can create a portable robot to identify different gas fixings. Likewise, the expansion of the load cell can be used as a weight sensor to identify gas readings in the room, recognize heavy gases in the room piping and display alarm messages via SMS and LCD screen. Our Device uses the GSM network to alert the user and to book new cylinder from LPG distributors.

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