

Design and Implementation of Intelligent Automatic LPG Gas Booking and Monitoring System using Load Cell

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Abstract

There are many methods are available for booking a LPG gas in the gas agency. Methods include online booking, telephonic booking etc. But sometimes we may forget to do the booking due to the various reasons. It will be difficult situation for the one who uses LPG gas for cooking regularly. So we have proposed a new system which automatically book a cylinder when the gas is about to empty by sending a SMS by using GSM. In addition to that smoke sensor is used to detect gas leakage in the home. If any gas leakage detected automatically it will send SMS to the fire station. GSM is one of the most cellular networks used in India. In our project we have used load cell to monitor the wait of the LPG gas regularly. The values are next feed to the microcontroller. If the gas level is cross below the threshold level, then a SMS will be sent to gas agency automatically to book the new cylinder. Then a reply SMS will be sending to the customer about the booking status. At the same time application software is developed in the gas agency to inform and record the booking.

Keywords: safety, time, gas leakage detection, gas booking

I. INTRODUCTION

Now a day's every one want a facility which reduce their efforts, time and provide a way to do their work more easily. For cooking food we all use LPG gas. It produced in 1910 by 'Dr.

Walter Snelling'. LPG is a mixture of commercial propane and commercial butane having saturated as well as unsaturated hydrocarbons. LPG having versatile nature so its demand raise day by day. It Mostly uses in domestic fuel, industrial fuel and Automobile fuel. In INDIA gas distributor uses IVRS, SMS or ONLINE booking for LPG which are time consuming methods in fast running life. We find uneducated people are not able to do these task and busy schedule people they haven't sufficient time to do all the activity. Also safety plays the important role. As we all know that many accidents happen due to gas leakage. So to avoid these difficulties we develop project. We design a project by considering a safety issues and also provide Easy way for LPG booking. In the project MQ-6 gas sensor is use to sense the leakage gas. After that leakage motor will

close the regulator and through GSM message is send to the user.

II. EXISTING SYSTEM

A.IVRS

B. SMS

C. ONLINE BOOKING

IVRS was introduced due to the user's complaints regarding to the landline phones of the distributor's .Because they are not giving response to the users call or the call line is busy and also in the IVRS user required to follow the instructions according to their format which is very confusing process.

ONLINE BOOKING are the little time consuming process And it required some knowledge about the messaging and internet. These entire tasks are difficult to the uneducated peoples and time consuming for busy schedule peoples. Mostly users are not able to guess the level of LPG gas in cylinder. So booking was not done within time and user required to wait for a new cylinder which creates a difficulties to the user.

For SMS required STD code and distributor mobile no. SMS < IOC > to the same mobile number where booking is made .So IVRS, ONLINE BOOKING, SMS are time consuming processes for gas booking.

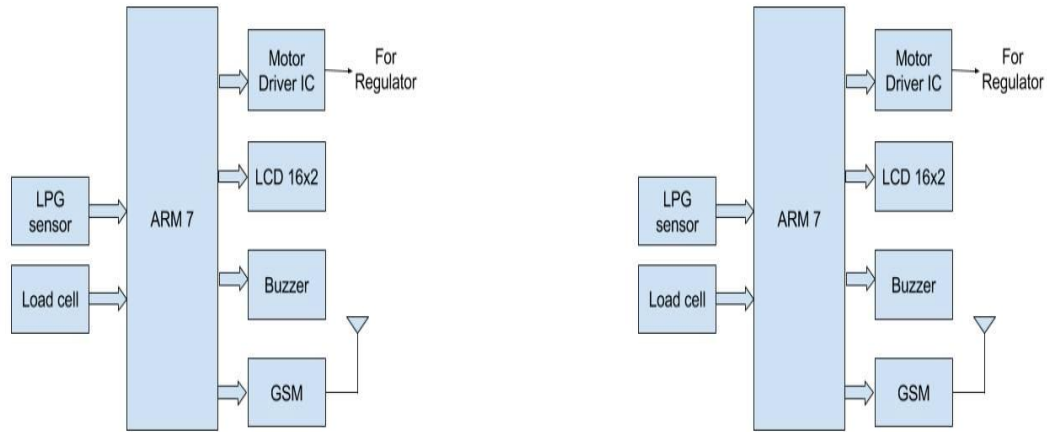


Figure 1: Existing system

III. PROPOSED SYSTEM

- A. LPG gas detection
- B. Auto gas booking

In LPG gas detection of leakage gas is done by gas sensor which is interfaced with ARM. When gas is detected motor will be turn on and it immediately turn off the gas regulator at the same time we inform the user about the gas leakage by sending the SMS, turning on the buzzer and also message displaying on LCD.

In auto gas booking we continuously measure the amount of gas which is present in the cylinder. When gas level goes below the set level then message will be send to the gas agency through GSM and confirmation message received by the user from gas agency. So user get cylinder within time.

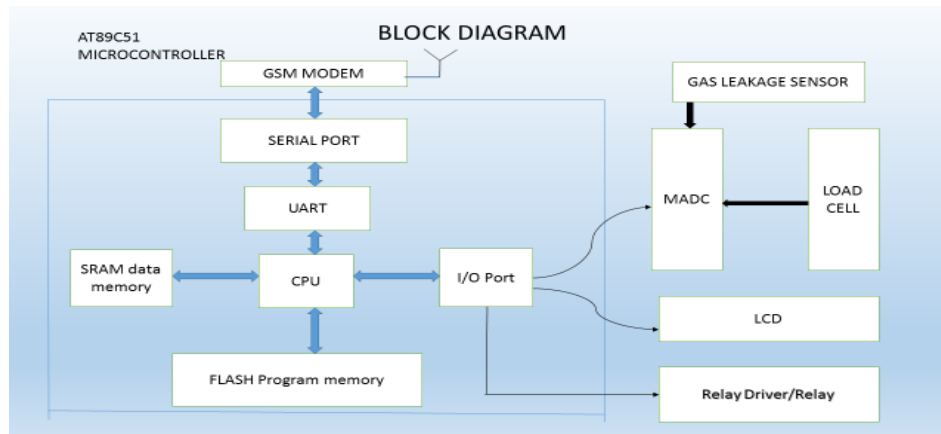


Figure 2: Transmitter

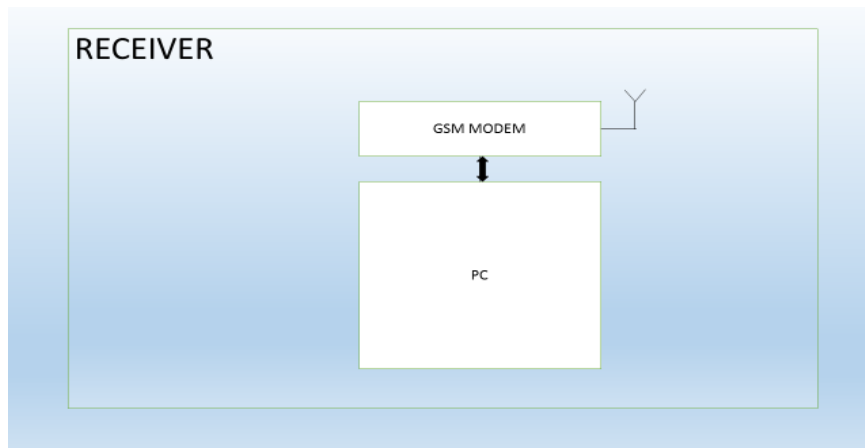


Figure3: Receiver

IV. HARDWARE DISCRIPTION

A. AT89c51 MICROCONTROLLER

AT89c51 is an 8 bit microcontroller at belongs to ATMEL'S 8051 family. ATMEL 89c51 has 4KB of flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times. 40 pin AT89c51 and four ports are designed as P0, P1, P2 and P3. All ports are 8 bit bi-directional ports i.e that can be used as both input and output ports.

Features

- Compatible with MCS-51™ Products
- 4K Bytes of In-System Reprogrammable Flash Memory
- Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-level Program Memory Lock
- 128 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-bit Timer/Counters
- Six Interrupt Sources
- Programmable Serial Channel
- Low-power Idle and Power-down Modes

B. GSM MODEM

Global system for mobile communication is a device which modulates and demodulates signals as required to meet the communication requirements. Here we are continuously checking the weight of the cylinder and leakage gas. If weight goes below the set value and leakage is detected then trough GSM message will be send to the gas agency and the user respectively.

C. UART

UART refers to Universal Asynchronous Receiver/Transmitter is the microchip with programming that controls a computers interface to its attached serial device.

D. SERIAL PORT

A serial port is an interface that allows a PC to transmit or receive data one bit at a time.

E. SRAM DATA MEMORY

SRAM means Static Read Only Memory is random access memory (RAM) that retains data bits in its memory as long as power is being supplied.

F. FLASH PROGRAM MEMORY

Flash program memory is a non-volatile memory chip used for storage and transferring data between the personal computer. It is ability to be electronically reprogrammed and erased.

G. I/O PORT

Input output port is to perform an input or output operation. I/O devices are used by a human to communicate with a computer.

Input device - keyboard, mouse Output device – monitor, printer

H. GAS LEAKAGE SENSOR

Gas leakage sensor is used to sense gas leakage in the home, industries, hotels. If any gas leakage detected automatic it will send SMS to the Gas Agencies or fire station.

I. LOAD CELL

A load cell is a transducer that is used to convert a force into electrical signal. Mostly cantilever or bending type load cell is used. Here we measure a weight of the cylinder by placing the cylinder on load cell arrangement. Actually Load cell consists of four strain gauges in a Wheatstone bridge configuration.

Firstly by using mechanical arrangement the force being sensed deforms a strain gauge and then strain gauge measures the deformation as an electrical signal, because the strain changes the effective electrical resistance of the wire. Out of the bridge is due to the applied pressure or force of the cylinder.

J.LCD DISPLAY

Here we use a 16x2 LCD display for displaying the status of the cylinder i.e leakage of gas if occurred and weight of the cylinder continuously.

V.ALGORITHM

1. Load cell i.e pressure sensor is used to check the weight of the cylinder and that weight is displayed on LCD
- 2.If the cylinder weight is below the pre-defined threshold value the automatically send SMS to the pre-defined number i.e to gas agency
3. The threshold value get fix into the UC programming.
4. GSM modem is used to send and receive the message.
5. Message will be sent from user to gas refill officer and notification will get from the gas refill officer to user.
6. When gas leak is detected by the LPG gas sensor.
- 7.LPG gas sensor will send the signal to the UC and automatically shut down the main power supply.
8. LCD is used to display the LPG gas leak status i.e “LPG gas detected” display on LCD when gas leaked.

VI.ADVANTAGES

1. It insures the security from the gas leakage and hazards.
2. It is very less time consuming and cylinder replace in time.
3. Easy implementation.
4. It is fully automated system; errors due to human are control.

VII.APPLICATION

1. House hold purpose
2. Gas agency
3. Chemical factory
4. Companies
5. Hospitals etc.

VIII.RESULT

Gas leakage detected by the gas sensor. Load cell is continuously measuring weight of the gas cylinder. When gas level goes below the set level, message is send to the gas agency for booking purpose.



Figure: 3 Booking New Cylinder



Figure:4 Gas Leakage Deduction

IX.CONCLUSION

By implementing this project we help the people to save their time by providing automatic gas booking. It can provide the security to people by sensing the leakage of gas. It is very useful for domestic purpose as well as for the industrial purpose. The programming used for this project is very simple and can be easily understood as we have used C language. Ease of use of this system makes the project user friendly.

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