



# AUTOMATIC GAS LEAKAGE DETECTION AND BOOKING BY SENSING CYLINDER WEIGHT

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## Abstract

The main objective of the project is to book gas automatically by predicting the weight of LPG. The weight sensor attached with the Load Cell helps in finding the weight of the LPG. When the weight of the gas comes below 1.5 kg, the booking process will be automatically done by GSM. The owner will get an alert message to replace the gas, when the weight of the gas comes below 0.8 kg. The project also focused towards kitchen in home, where home maker may forgot to close the gas stove knob. The leakage of gas may create a huge accident. To overcome this problem, the leakage of gas can be predicted and the process of closing of knob can be automated and the intimation will send to the respective person. The gas sensor helps to detect the leakage of gas, the servo motor attached with the gas cylinder knob helps to close during the leakage of gas occurs. The intimation of gas leakage alert helps the person to stop using cylinder after the closing of knob carried out.

**Keywords:** Gas Sensor, Load Cell, Weight Sensor

## INTRODUCTION

In India at present all gas booking process are carried out through SMS therefore this project proposed to implement in a smart way to book gas cylinder in an automatic way. The booking process can be carried out by predicting the weight of the cylinder by using load cell amplifier. The weight of the cylinder can be predicted as per the level reaches, the booking can be done by sending SMS through GSM attached with the circuit. The AT commands helps to trigger the GSM to send SMS. The SMS contains the booking code no, register name and address which helps to make booking in an automatic concept. The gas leakage can be predicted by attaching gas sensor, which sense the gas and operate the knob attached with the cylinder to close. The leakage of gas due to opening of knob or by damage of tube can be overcome.

## EXISTING PROBLEM

In existing system the booking of gas has been carried out in a manual process through SMS. If the user forgot to book, it will become a risky task at the end of the time. The user also can't predict the level of the gas, therefore monitoring the level of gas can't be carried out in manual. The user won't have a facility to predict the leakage of gas and the intimation also can't be known by the owner.

## DISADVANTAGE OF EXISTING SYSTEM

- The user can't monitor the level of gas.
- The booking process will be carried in a manual process, therefore time consumption will be more.
- The leakage of gas can't be predicted by the user.
- The user won't get any alert during the time of gas leakage, therefore the possibility of occurring accident will be more.

## CIRCUIT DESCRIPTION ARDUINO UNO

An Arduino Uno R3 made in Italy with box. In addition to all the features of the previous board, the Uno now uses an ATmega16U2 instead of the 8U2 found on the Uno (or the FTDI found on previous generations). This allows for faster transfer rates and more memory. No drivers needed for Linux or Mac (inf file for Windows is needed and included in the Arduino IDE), and the ability to have the Uno showup as a keyboard, mouse, joystick, etc.

**GSM MODULE SIM 900**

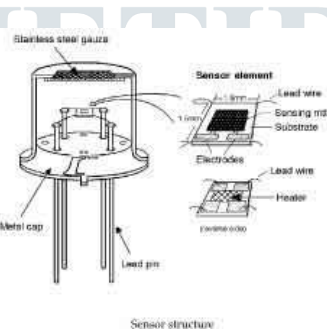
The SIM800 modem has a SIM800 GSM chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once user connect the SIM800 modem using the USB to RS232 connector, user need to find the correct COM port from the Device Manger of the USB to Serial Adapter. Then user can open Putty or any other terminal software and open an connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller user can start sending the AT commands. When user send AT commands for example: "AT " user should receive back a reply from the SIM800 modem saying "OK" or other response depending on the command send

**MQ2 GAS SENSOR DESCRIPTION**

The analog gas sensor - MQ2 is used in gas leakage detecting equipments in consumer and industry markets, this sensor is suitable for detecting LPG, i-butane, propane, methane ,alcohol, Hydrogen, smoke. It has a high sensitivity and fast response time. And the sensitivity can be adjusted by the potentiometer.

**WORKING OF GAS SENSOR**

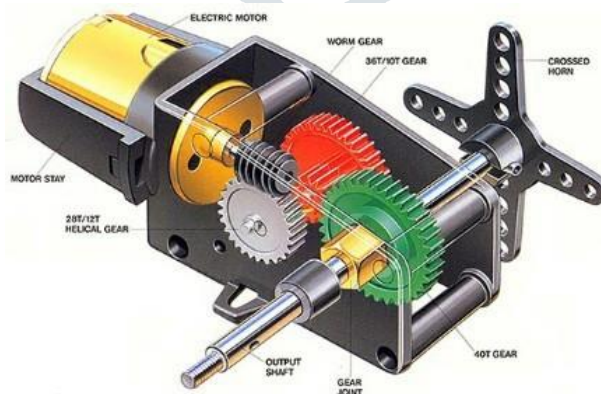
Gas sensors are available in wide specifications depending on the sensitivity levels, type of gas to be sensed, physical dimensions and numerous other factors. This Insight covers a methane gas sensor that can sense gases such as ammonia which might get produced from methane. When a gas interacts with this sensor, it is first ionized into its constituents and is then adsorbed by the sensing element. This adsorption creates a potential difference on the element which is conveyed to the processor unit through output pins in form of current.

**TRIGGER SERVO MOTOR TO CLOSE KNOB**

If the leakage of gas occurs due to not closing of knob, the servo attached with the knob get triggered and the closing of knob will be automatically carried out. The servo motor will work as per the angle intimate by the Arduino board. The servo motor helps to close the knob, thus the flow of gas can be stopped.

**WORKING OF SERVO MOTOR**

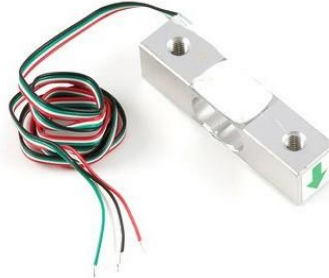
Servo are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire. There is a minimum pulse, a maximum pulse, and a repetition rate. A servo motor can usually only turn 90 degrees in either direction for a total of 180 degree movement.

**KG LOAD CELL**

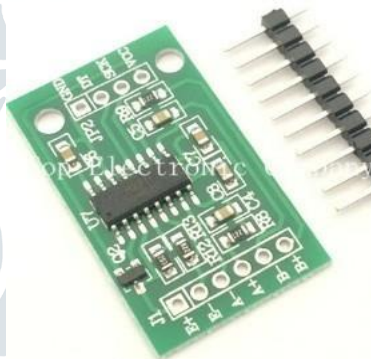
A load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. The various types of load cells include hydraulic load cells, pneumatic load cells and strain gauge load cells. Through a mechanical construction, the force being sensed deforms a strain gauge. The strain gauge measures the deformation (strain) as a change in electrical resistance, which is a measure of the strain and hence the applied forces. A load cell usually consists of four strain gauges in a Wheatstone bridge configuration. Strain gauge load cells work on the principle that the strain gauge (a planar resistor) deforms/stretches/contracts when the material of the load cells deforms appropriately. The change in resistance of the strain gauge provides an electrical value change that is calibrated to the load placed on the load cell.

### kgLoadcell

#### HX711 LOAD CELL AMPLIFIER



The HX711 load cell amplifier is used to get measurable data out from a load cell and strain gauge. Load Cell Amplifier is a small breakout board that can read the load cells to measure weight. By connecting the amplifier to microcontroller we will be able to read the changes in the resistance of the load cell to get very accurate weight measurements. The HX711 Load Cell Amplifier accepts four wires from the load cell. These pins are labeled with colors; RED, BLK, WHT and GRN. These colors correspond to the conventional color coding of load cells, where red, black, green and white wires come from the strain gauge on the load cell. Once the load cell is hooked up to the amplifier, we can hook up VDD, VCC, DAT, CLK, and GND to a microcontroller such as an Arduino board.

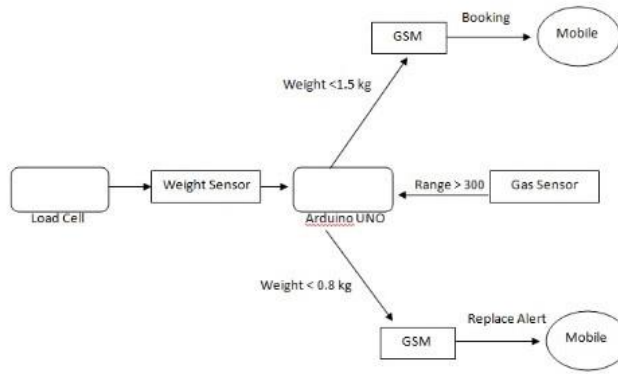


#### 16X2LCD

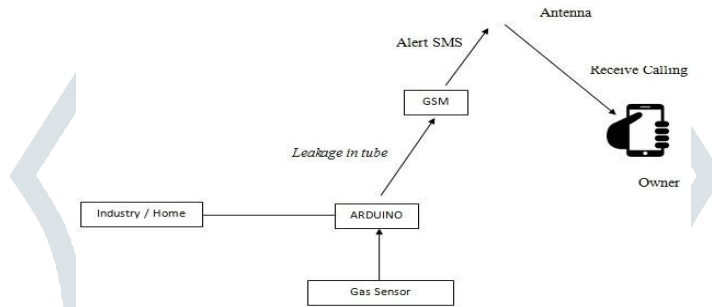
LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

**BLOCK DIAGRAM**

Detect LPG Weight



**DETECT LEAKAGE OF GAS**



**CONCLUSION**

By implementing this 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 is very simple and can be easily understood as we have used C language. The ease of use of this system makes this work user friendly.

**RESULT**

Gas leakage detected by the gas sensor to control these leakage motor get started and turn off gas regulator. Load cell is continuously measuring weight of the gas cylinder. When gas level goes below the set level message is sent to the gas agency for booking purpose.



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