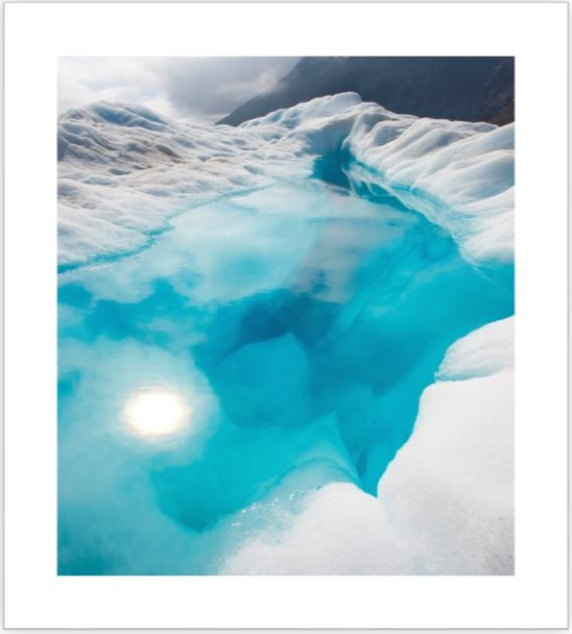

LPGedia

LPG GAS LEAKAGE DETECTION AND GAS MANAGEMENT DEVICE

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CS321 —— NOV 16, 2016

Salient Features:

- It detects the leakage of LPG gas.

    1. When there is a leakage, it first turns off the regulator using servo motor if regulator is on.
    2. It turns on the buzzer.
    3. Message “Leakage detected!!” is displayed on LCD attached to device.

- It displays the current Temperature and Humidity.

- It displays the current amount of LPG Gas (in Kg) in the cylinder.

- It will tell the user how much gas was wasted due to leakage.

- It will tell the user how much gas was consumed while cooking.

- If the amount of gas in the cylinder falls below a minimum threshold, it displays on LCD to replace the cylinder. And even if user starts cooking, Buzzer starts beeping just to make user aware of this.

Requirements:

- Arduino Mega 2560
- Arduino IDE
- OS: Windows/Ubuntu
- MQ5 Gas Sensor
- Buzzer v1.2
- Servo Motor (SG90)
- Temperature and Humidity Sensor
- Load Sensor
- HX711 Amplifier
- 20*4 LCD Display
- Breadboard
- Jumper Wires

Description:

This Device uses MQ5 Gas Sensor which detects the LPG gas on leakage. When leakage is detected, it first try to turn the regulator off if it is on. It then turns on the buzzer and the buzzer continues to ring until user turns the device off or leakage is stopped anyhow. Message related to same is also displayed on LCD Display.

Load Cell is used to display the amount of LPG Gas available in the cylinder on LCD Display.

This device uses Temperature Sensor (DHT 11 type) which detects the temperature of burner. If suppose Regulator is on and burner's temperature is greater than say, 60 deg. Celsius, then user might be cooking food. So this device will keep on displaying the amount of LPG gas consumed and amount of gas left in the cylinder while cooking.

If everything is in normal condition, then on LCD display, Temperature and Humidity inside room is

displayed. And the available amount of gas is displayed.

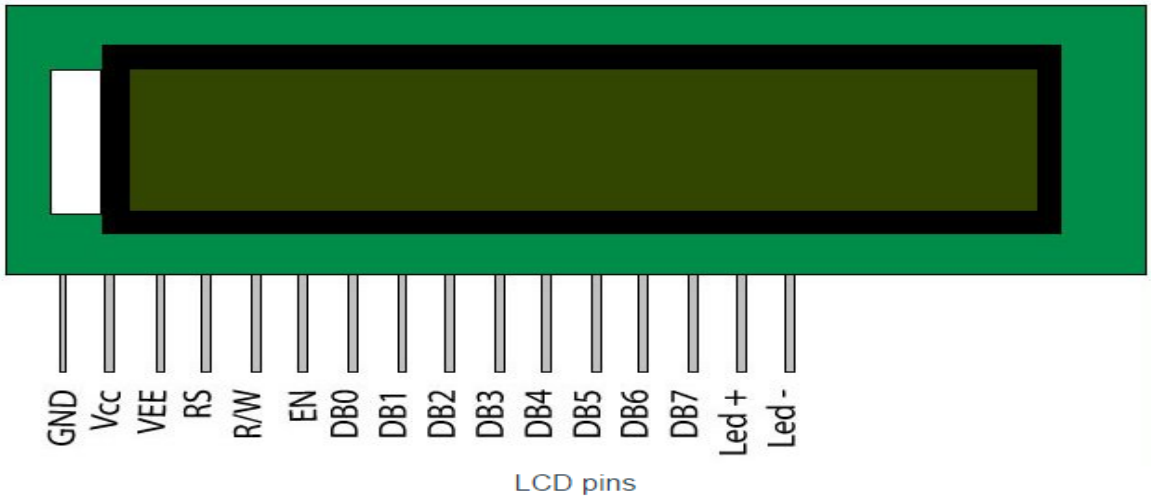
If the amount of LPG Gas available in the Cylinder falls below a threshold, say 2 kg, then it will beep the buzzer in a different tone. And message “Order New Cylinder” is displayed on LCD Display.

How to Use:

User just need to plug this device for power supply in the Kitchen Area. Connect the servo motor to regulator attached to cylinder. Fix Temperature Sensor below the Burner (Little away from burner). Put the cylinder above the load Cell Platform.

Process of Implementation:

Step 1: Interface an LCD Display with an Arduino



LCD pins

LCD Pins		Arduino Pins
GND	-->>	GND
Vcc	-->>	5V
VEE	-->>	GND
RS	-->>	Digital Pin 7
R/W	-->>	GND
EN	-->>	Pin 6
DBo – DB3	-->>	Leave
DB4 – DB7	-->>	Pin 5 – Pin 2 respectively
Led +	-->>	5V
Led -	-->>	GND

Step 2: Interface MQ5 Gas Sensor with Arduino

MQ5		Arduino
SIG	-->>	A0
NC	-->>	Leave
Vcc	-->>	5V
GND	-->>	GND

Step 3: Interface Buzzer with an Arduino

Buzzer		Arduino
SIG	-->>	Pin 8
NC	-->>	Leave
Vcc	-->>	5V
GND	-->>	GND

Step 4: Interface Temperature Sensor with Arduino

DHT 11		Arduino
SIG	-->>	A1
NC	-->>	Leave
Vcc	-->>	5V
GND	-->>	GND

Step 5: Interface Servo Motor with an Arduino

Motor		Arduino
Orange Wire	-->>	Pin 9
Red Wire	-->>	5V
Brown Wire	-->>	GND

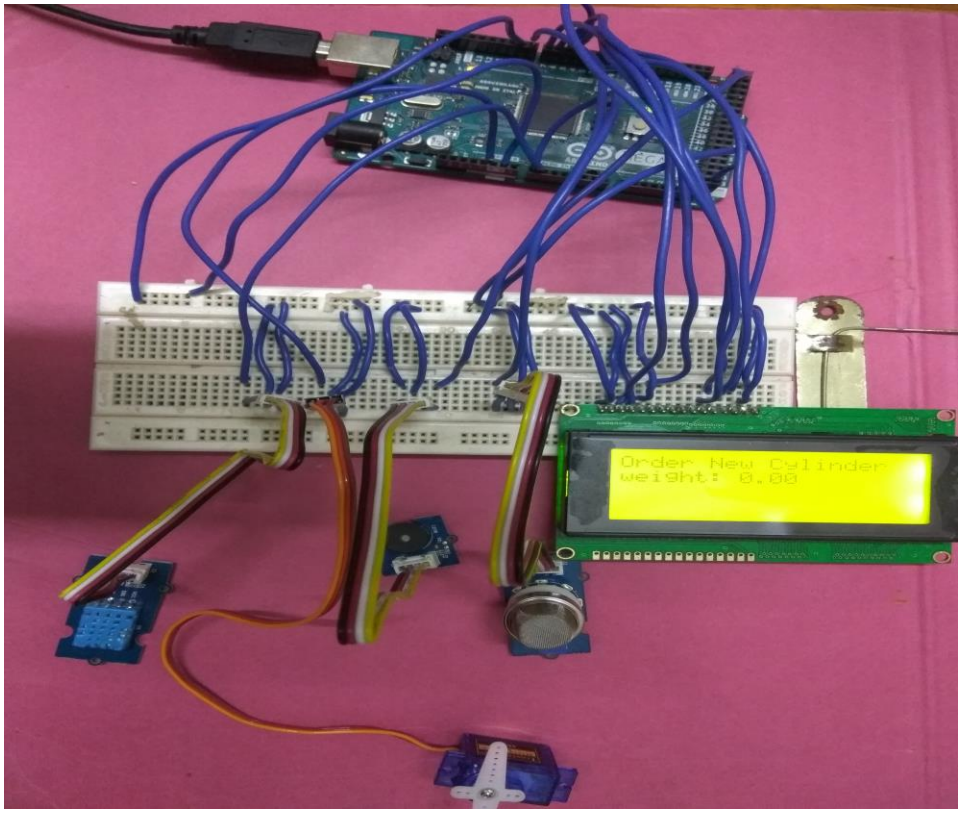
Step 6: Interface Load Cell with HX711 Amplifier

Load Cell		HX711
Green Wire	-->>	A-
Red Wire	-->>	E+
Black Wire	-->>	E-
White Wire	-->>	A+

Step 6: Interface HX711 with an Arduino

HX711		Arduino
GND	-->>	GND
DT	-->>	A4
SCK	-->>	A3
Vcc	-->>	5V

Final Circuit Diagram Of the project:



Step 7: Add Library of following sensor to Arduino using the steps given below.

- HX711 -- Library for Load Sensor amplifier
- DTH -- Library for Temperature and Humidity Sensor

➔ Under Arduino IDE, Go to “Sketch”->”Include Library” ->”Add .zip File” -> open the zipped library downloaded from above link -> “Add”

Step 8: Upload Arduino code to Arduino Mega 2560 using Arduino IDE

Future Work:

- We are planning to add GSM Module which will be used to send SMS to the user in case of any unusual behavior detected by device.
- An android app will be made which will control this device. Basically this app will be used to store the customer info in the device like customer number, agency name, or say complete info required to book a cylinder via phone. So, once the amount of gas falls below a certain threshold, it will indicate the user and there will be a button pressing of which will book the cylinder automatically.
- A keypad will be attached to the device and user can set the count of cooker buzzer she wants after which gas cylinder will be automatically turned off. It will help the user in following ways:

--> User don't have to sit and wait for the cooker buzzer till the count.

--> Since user may forget the count and use extra gas for the extra buzzer. So it will save the gas.