iJRASET
International Journal For Research in Applied Science and Engineering Technology



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 7 **Issue:** VII **Month of publication:** July 2019

**DOI:** http://doi.org/10.22214/ijraset.2019.7047

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177*
*Volume 7 Issue VII, July 2019- Available at www.ijraset.com*

# LPG Gas Level Measurement Using Arduino

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***Abstract:*** ***LPG cylinder shave become an integral part of almost every home. Our kitchens are occupied with the LPG cylinders which help us to make delicious food. But it can also be dangerous and life threatening. Therefore, it requires a constant vigilance to reduce the danger. The aim of this project is to design a safety-oriented system which will alert all the user about any threat in the kitchen through mobile and also will be capable of performing required action immediately. This system will be able to detect leakage of LPG and send an alert message to all the user, at the same time it will switch off the gas supply of LPG by switching regulator-switch using a BO motor. It ensures the safety from any gas leakage accident like suffocation, explosion etc. As this system has a weighing sensor which can measure the weight of the cylinder and regularly update user about the gas left in the cylinder. This system will also help customers to know whether they are being cheated by any gas agencies by providing a less amount of LPG. In the present time, everyone is busy in their daily life and it is very difficult to know the status of the gas cylinder. It will be very helpful for all those aged people who live alone and are dependent on others. It will make them independent and secure them from any kitchen hazardous.***

***Keywords: LPG level Arduino, Uno Load cell (40kg), HX711 Load cell Amplifier Module, 16x2 LCD, Connecting wires, USB cable, Breadboard****.*

## I. INTRODUCTION

In this project we will be using “interfacing HX711 Load cell amplifier with Arduino” and16*2 LCD for designing arduino Weighing Machine using Load Cell HX711 Module. As this is a very simple “Arduino Weight Measurement project”. The electronic weighing machine uses the load cell to measure the weight produced by the load, here most of the load cells follows the method of strain gauge, which converts the pressure into an electrical signal, these load cells have four strain gauges which are hooked up in a Wheatstone bridge formation. While they are not at all exciting to watch, load cells are highly accurate transducers which also provides the user with information not generally obtainable by other technologies due to commercial factors. HX711 is a precision 24-bit analog to-digital converter (ADC) designed for weight scales and industrial control application to interface with a bridge.

In India, the supply of LPG through pipelines is not at all possible due to shortage of LPG. As technology is being improved by many gas agencies or distributors have implemented IVRS these days although due to daily busy schedules, customer finds very much difficult to book new cylinder, and also it is very dangerous when a LPG gas leakage occurs in any domestic usage, like chemical industry or in any other applications.

As this project provide booking of LPG cylinder and to overcome all the problem of LPG leakage. So, our main aim is to completely automate the process of refill booking without human intervention that accordingly will help the consumer against foul play. Our system is mainly intended to help consumers to upgrade their safety standards, also act in accordance with statutory requirements on environmental commitments and most importantly the basic function is being prevented by accidents and protect our life and property from disasters.

The primary objective of our paper is to measure the gas present in the cylinder when weight of the cylinder reached almost below the fixed load, using the sensors. The gas retailer can get the order for a new cylinder and the house owner receives the message about the same and all the details about the booking proceedings. Also the secondary objective is to provide any malfunction in gas system in order to prevent damage or explosion of LPG.

The Arduino UNO is an open-source microcontroller board which is based onthe Microchip ATmega328P microcontroller and also developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins which may be interfaced to various expansion boards (shields) and other circuits. The board has almost 14 Digital pins ,Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type BUSB cable. This can be powered by a USB cable or by an external 9 volt battery also, though it accepts voltages between 7 and 20 volts. As it is also similar to the Arduino Nano and Leonardo. Layout and production files for many versions of the hardware are also available . The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, as now evolved to new releases.

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## II. LITERATURE REVIEW

*A.* ARM control based technique to design automatic LPG detection system for use in home and industry. Here we use the mechanical instrument like weight stand (load cell) for measuring the gas cylinder wlevel. When the gas level reaches below to the threshold level which set value in the system. The load cell output is few Mv ,and provide the output. When the load is calculated and send message to the customer ,display on the LCD screen.

*B.* Iot based technique for continuous weight measurement is done using a load cell which intern works on the principle of peizoelectric sensor is interfaced with the microcontroller, i.e, When a gas container is placed on the loadcellitmeasuresweightandsendanelectricpulsetothemicrocontroller which will compare the pulse with an ideal value in form of digital. If the compared value is high then it send a pulse to iot, but if the compared output is low then also send a pulse to Iot. Which will update it to the internet and even place a gas refill order.

*C.* Computer based technique the system detection procedure happens through the aid of different components especially designed for the application needed. For the amplify it hx711 is used, for detection of weight load cell is used. Here the arduino program is written to perform the different tasks

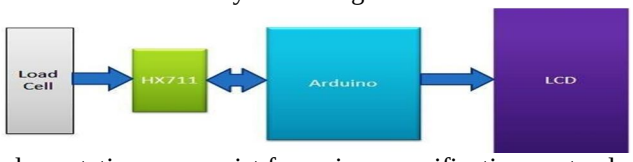
## III. DESIGN AND DEVELOPMENT

The purpose of the design and development plan section is to provide investors with a description of the product's design, chart its development within the context of production, marketing, and the company itself, and create a development budget that will enable the company to reach its goals. There are generally three areas you'll cover in the development plan section:

*A.* Product development
*B.* Market development
*C.* Organizational development

The first step in the development process is setting goals for the overall development plan. From your analysis of the market and competition, most of the product, market and organizational development goals will be readily apparent. Each goal you define should have certain characteristics

System Design




1) *Implementation Details:* Many implementations may exist for a given specification or standard. Following are the Hardware's and Software's we use in our project.

## IV. HARDWARE SPECIFICATION

The Hardware Specification describes all functional and non- functional requirements posed on a hardware element (hardware unit, Hardware Components or hardware process module). In order to prepare the Hardware Specification, the requirements will be derived from the specifications of higher system elements or hardware elements. The specification provides standards and tools for designing and decomposing the Hardware Architecture. If changes are required in the course of the development of the hardware element, the Hardware Specification shall be adapted at first. The Evaluation Specification System Element defines the evaluation cases required for demonstrating the requirements of interfaces and specifications.

1) *Load Cell:* Load cell is transducer which transforms force or pressure into electrical output. Magnitude of this electrical output is directly proportion to the force being applied. Load cells have strain gauge, which deforms when pressure is applied on it.
2) *HX711:* Now the electrical signals generated by Load cell is in few millivolts, so they need to be further amplify by some amplifier and hence HX711 Weighing Sensor comes into picture.
3) *Arduino Uno:* The Arduino UNO is an open-source microcontrollerboard based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.
4) *LCD Display:* 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.A16x2 LCD means it can display16 characters per line and there are 2 such lines

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## V. RESULT AND DICUSSION

In this project, the result is the final design of the project on topic " Gas Level Detector Using Arduino ". The major design components such as load cell , Arduino uno , HX711,LCD display. In addition, tools required to implement the project is specified clearly. The expected output can be implemented and perfected using the tools and with the specified designs as per the literature survey and hence the design phase of the project is designed successfully. The major advantage of the project includes efficiency , fast to access.

## VI. CONCLUSION

As we shorted out the problems faced by LPG gas consumers, so we come up with some Solutions to meet the few requirements of them. This paper presented various aspects of LPG GAS LEVEL DETECTOR and it was a low power and simple system for LPG GAS LEVEL DETECTOR. This system will have high application in industries and houses . And our project will prove to be boom for households and industries. This paper mentioned the standard preprocessing, feature selection and classification methods. Future modification may include like addition of microcontroller and GSM module for concentration detection and SMS system.

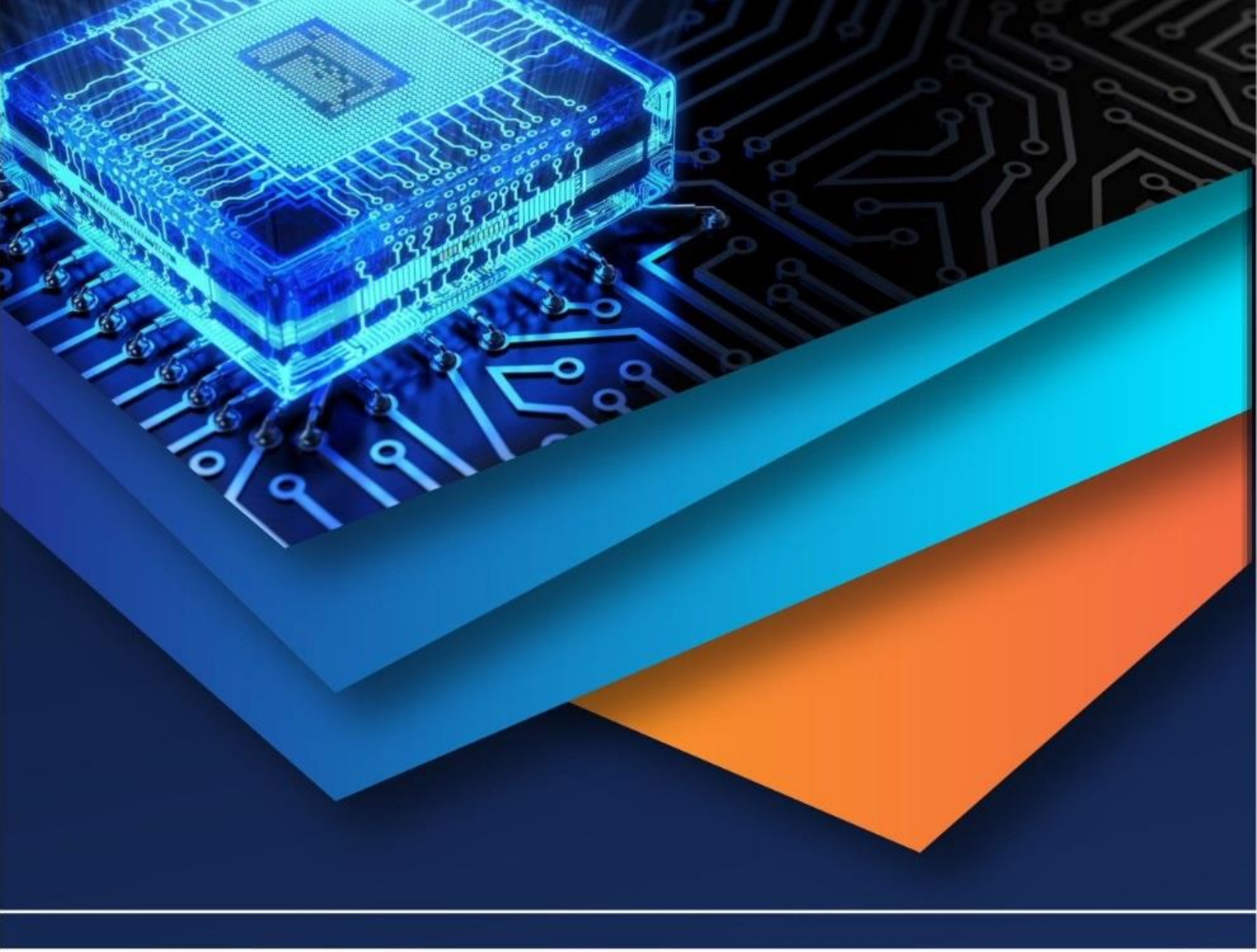
## VII. ACKNOWLEDGEMENT

I acknowledge with great gratitude to all those who have helped me to make this project a success. I express my thanks to the almighty god who has blessed me with a healthy constitution and has bestowed upon me the required skill to pursue the b-tech course.

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