INSTINCTIVE GAS BOOKING/ MONITORING SYSTEM

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ABSTRACT

*The primary objective of the project is to monitor the usage of the gas cylinder/refill and also order the next refill automatically when completed from the gas provider. A **pressure sensor/weight scale sensor** is placed under the gas cylinder. It is used to measure the weight of the cylinder and pressure exerted by the gas cylinder on to the ground. Experimental values are recorded from pressure sensor/weight scale sensor at proper time intervals. These values are sent to the **Intel Galileo board**. By setting up a weight limit/pressure limit from the recorded experimental values , when the gas in the cylinder reduces than the limit value, an intimation is given to the consumer mobile number. These processes are done by interfacing Intel Galileo with **GSM module** used for sending messages. The GSM module sends a message to the Gas provider. The message consists of the data required for Gas booking. The refill is booked and intimation is send to the customer about details of booking.*

*Keywords**: Intel Galileo gen2 board, GSM module, LCD display, load cell, INA125p instrumentation amplifier.*

I. INTRODUCTION

The primary objective of our project is to monitor the completion of the gas cylinder/refill and also order the next automatically to the LPG provider. The unit has a load cell, which measures the weight of the gas cylinder. The sensing element produces current signal, proportional to the temperature. This current signal is converted as amplified form of voltage signal by signal conditioning block. The analog output of the signal-conditioning block is compared with threshold value. Sensor detects the damage and sends the information to control unit, then the control unit trigger and send the appropriate message using GSM module. The application program for the microcontroller will be written in embedded 'C' and will be stored in the flash memory of the microcontroller.

II.SYSTEM OVERVIEW

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. **The** "INSTINCTIVE GAS BOOKING/MONITORING SYSTEM" using INTEL GALILEO BOARD is an exclusive project which is used

to alert the consumer by sending a message using the GSM Module when the level of gas in the gas cylinder is low. We can use this project for household purposes, Commercial consumer purposes, and LPG run vehicles.
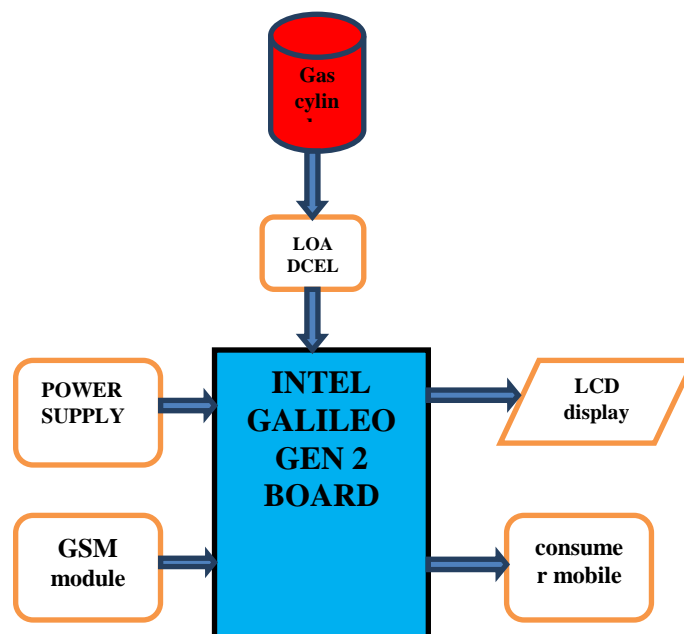

Figure: 1 SYSTEM OVERALL BLOCK DIAGRAM

II .A.INTEL GALILEO GEN2 BOARD

An Intel Galileo next to an Arduino Uno The board itself is a little bit larger than an Arduino Uno, but along with that size, you get a more powerful processor, more memory to store running programs, more data storage space, an Ethernet connector for connecting it to a network, and the ability to connect computer accessories through the USB port or the Mini PCI Express connector on the bottom. Intel's Quark SoC X1000 is the processor at the heart of the Intel Galileo. The firmware that runs on the Galileo is much more advanced than what's on an ArduinoUno.

On an Uno and most other Arduino devices, there is firmware on the board called the bootloader which is meant to help you upload and run your code on the board's processor. It only does that and not much else. The firmware on the Galileo, on the other hand, is much more advanced. Not only does it help you upload and run your code on the board, but it also keeps track of files, the date and time of day, and helps share the board's various resources between multiple programs running at the same time. In that way, it's more like a typical computer. In fact, the firmware on the Galileo is a version of Linux, the free operating system that powers many desktop computers and servers these days. Galileo may not have a screen or desktop environment, but it still has much of the functionality that an operating system affords. And through your Arduino code, you'll be able to

access this functionality, giving you much more capabilities than you'd have with a typical Arduino. For instance, if you want your project to take a picture from a web cam and email it, it's something that would be difficult to do with only Arduino code. But with the power of Linux, this could be done more easily.

B. GSM MODULE

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.

GSM supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service). GSM operates in the 900MHz and 1.8GHz bands in Europe and the 1.9GHz and 850MHz bands in the US. The 850MHz band is also used for GSM and 3G in Australia, Canada and many South American countries. By having harmonised spectrum across most of the globe, GSM's international roaming capability allows users to access the same services when travelling abroad as at home. This gives consumers seamless and same number connectivity in more than 218 countries.

GSM was originally defined for the 900 MHz range but after some time even the 1800 MHz range was used for cellular technology. The 1800 MHz range has its architecture and specifications almost same to that of the 900 MHz GSM technology but building the Mobile exchanges is easier and the high frequency Synergy effects add to the advantages of the 1800 MHz range.

C. 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. Load cells of one strain gauge (quarter bridge) or two strain gauges (half bridge) are also available. The electrical signal output is typically in the order of a few millivolts and requires amplification by an instrumentation amplifier before it can be used. The output of the transducer can be scaled to calculate the force applied to the

transducer. Strain gauge load cells convert the load acting on them into electrical signals. The gauges themselves are bonded onto a beam or structural member that deforms when weight is applied. In most cases, four strain gauges are used to obtain maximum sensitivity and temperature compensation. Two of the gauges are usually in tension, and two in compression, and are wired with compensation adjustments. The strain gauge load cell is fundamentally a spring optimized for strain measurement. Gauges are mounted in areas that exhibit strain in compression or tension. The gauges are mounted in a differential bridge to enhance measurement accuracy. When weight is applied, the strain changes the electrical resistance of the gauges in proportion to the load. Other load cells are fading into obscurity, as strain gauge load cells continue to increase their accuracy and lower their unit costs.

D. INA125P INSTRUMENTATION AMPLIFIER

The INA125 is a low power, high accuracy instrumentation amplifier with a precision voltage reference. It provides complete bridge excitation and precision differential-input amplification on a single integrated circuit. A single external resistor sets any gain from 4 to 10,000. The INA125 is laser-trimmed for low offset voltage (250µV), low offset drift (2µV/°C), and high common-mode rejection (100dB at G = 100). It operates on single (+2.7V to +36V) or dual (±1.35V to ±18V) supplies.

The reference voltage is accurate to ±0.5% (max) with ±35ppm/°C drift (max). Sleep mode allows shutdown and duty cycle operation to save power. The INA125 is available in 16-pin plastic DIP and SO-16 surface-mount packages and is specified for the –40°C to +85°C industrial temperature range.

APPLICATIONS

● Pressure and temperature bridge amplifiers

● Multi-channel data acquisition

● Battery operated systems

● General purpose instrumentation

2.E.LCD DISPLAY

A **liquid-crystal display** (**LCD**) is a flat panel display or other electronic visual display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

A 16*2 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. Click to learn more about internal structure of a LCD.

III. ARDUINO SOFTWARE

Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on processing. Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.
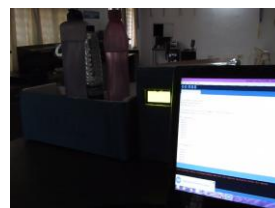
IV RESULTS

The project "**INSTINCTIVE GAS BOOKING/MONITORING SYSTEM**"was designed such that the load value from the load cell decreasesfrom a pre determined value given in the code , making it easier to book the refill .
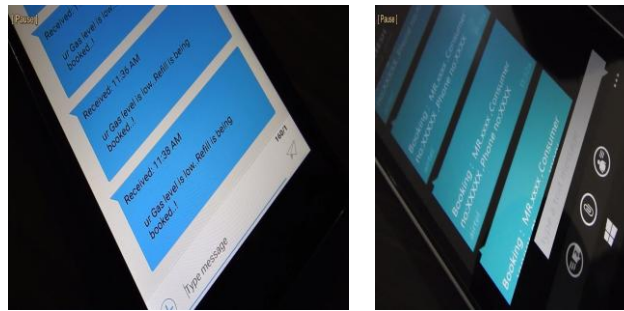

LCD Display showing Weight of Gas Cylinder

Load Cell Setup

Total Project Setup

Msg in Consumer mobile Num   Message at LPG Provider

V.CONCLUSION

In many circumstances this project proves useful to the people living in rural areas , Villages and also to the lower and middle class societies in cities. This project is a prototyping example of a real time working module. The key objective is to develop a low cost system which can monitor the level(Weight) of the cylinder in the particular household and provide an alert in case of cylinder being empty. Being safe and secure is the demand of the day. Our effort behind this project is to design and fabricate a gadget which is so compact in itself that provide advantage of personal monitoring system. This device will probably be very useful for the household.

ACKNOWLEDGEMENT

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