Smart LPG Kit

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Abstract— In today's world use of LPG is increasing with development of various industries like automotive, food, petrochemical, iron and steel industries and it is also widely used in households. Conditions being different at different places there are chances of a gas leakage in rough as well as steady conditions. There is no security in case of gas leakage. It is very hazardous when an LPG gas leakage occurs in any domestic usage, chemical industry, petroleum industry & other applications. This system provides automatic switching off of gas regulator when a gas leakage is detected by the system. Additional feature of this system includes automatic gas booking when the gas reduces to a specific low value (threshold value), This paper explains about the most common problem experienced in our day- to- day lifes that is regarding GAS container going empty. We bring this paper to give information about the decreasing weight of the gas in the container, and to place a gas order using IOT. Also One new Innovative Idea is trying to implement "Automatic Cooking System". In this system using IOT Technology, we are given commands to system for cook the food or also warm/steam the food. This commands are given to that system using our Smartphone.

Keywords: Smart LPG Kit, IoT, Gas Leakage

I. INTRODUCTION

LPG is used in many needs such as domestic fuel, industrial fuel, automobile fuel. So the main aim of proposed system is to provide safety from gas leak. The system detects the leakage of LPG using gas sensor and alerts the consumer about the gas leak by sending SMS. The system also turns on the alarm and exhaust fans so that the leaked gas can be sent out. Another advantage of the system is automatic rebooking of cylinder. The proposed system continuously measure the weight of the cylinder and as soon as it reaches the minimum threshold it will automatically send an SMS alert to the user and authorized LPG gas agency so that agency can procced booking request. And all this information about gas leak, rebooking, weight of cylinder can be displayed on the LCD. Our system provides safety from the gas leakage, it detects leakage and takes control action over it. It is helpful for us to avoid blast of cylinder it also have provision for automatic gas booking.

Our system is also intended to help consumers to upgrade their safety standards, act in accordance with statutory requirements on environmental commitments and most importantly the basic function being prevented by accidents and protect life. The main objective of our paper is to measure the gas present in the cylinder when weight of the cylinder go to below the decided load, using the load sensors. The gas agency gets the order for a new cylinder booking and the user receives the message about the same and the details about the booking proceedings. And the secondary objective is to provide any malfunction in gas system in order to prevent damage or explosion of LPG.

Using DC motor and position sensors we are developed automatic cooking system. In our cooking system cooking is procced depend on commands coming from user at any location using Internet.

II. GOAL OF THE PROPOSED WORK :

Proposed system consists of gas leakage detection sensor which is interfaced with microcontroller. If leakage is detected microcontroller immediately start the servo motor to turn off the gas regulator. Totally external coupling is made to turn off gas regulator. Message will be also displayed on LCD display. Microcontroller will run an audio file when leakage is detected. Load cell is used to monitor the weight of cylinder. GSM module is interfaced with controller which will automatically book the cylinder when weight of cylinder goes below the threshold. It is also used to SMS gas leakage to specified mobile number. Using conveyor mechanism and position sensor we are developed automatic cooking system. This system is also operable through smartphone using internet.

III. LITERATURE SURVEY

This paper explains about the most common problem experienced in our day-to-day lives that is regarding GAS container going empty. We bring this paper to create awareness about the reducing weight of the gas in the container, and to place a gas order using IOT. [2] The gas booking/order is being done with the help IOT and that the continuous weight measurement is done using a load cell which is interfaced with a Microcontroller (to compare with an ideal value). For ease it is even has a been added with an RF TX & Rx modules which will give the same information. When it comes it to security of the kit as well as gas container we have an MQ-6(gas sensor), LM 35(temperature sensor), which will detect the surrounding environment for any chance of error. Whenever any change is subjected in any of the sensors (load cell, LM35, Mq-6) a siren (60db) is triggered.[3]

We all are very busy in our daily life and it is difficult to know the level of LPG gas cylinder. If LPG is going to finish without informing us it can create difficult condition for cooking etc. Our system design can help us to avoid such kind of problem in our daily life. Our design is based on ARM controller, it can track LPG emptiness all the time if LPG is very close to finish or at empty level then it can alert us by sending SMS to LPG Agency for ordering the LPG cylinder. As per current government regulations, intense demand but shortage in production of LPG cylinder, once a new cylinder is booked we need to wait for some days to get it delivered.[4] The other idea of our project is that it continuously monitors the level of the LPG present in the cylinder using load cell. If the gas level reaches below the threshold limit of gas around 2 kg so that the old empty

cylinder is replace by new one in time and automatically books the cylinder using a GSM module. LPG gas leakage detection projects main idea is to implement security system for detecting leakage of gas in the house. Now days there are many cases related to gas leakage which cause innocent people lives and property damage. This system detects the leakage of the LPG and sounds the alarm to alerts the consumer also it send the SMS about the gas leakage. It can also turn off the main power supply.[1] The presence of dangerous LPG leakage in the gas vehicle (cars, van, auto), companies can be detected using the Ideal Gas Sensor. The system can be simply integrated into a unit that can sound an alarm. This system is very useful to avoid the hazardous.

IV. System architecture
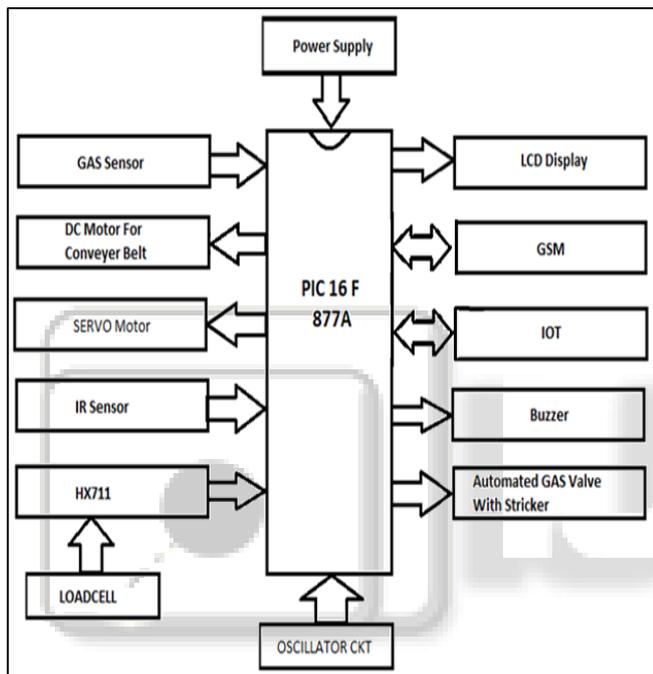
The above block diagram shows the outlay of the entire paper which has been discussed above the hardware requirements are quite limited & easily available as well as less feasible. The gas container is placed on the Load Cell and it constantly keeps on sending the electric pulses to the microcontroller to compare it with the ideal value. We already know the use of Temp. sensor & gas sensors and their respective roles which is to maintain the Boards & gas container security, they are also connected with the MC and an trigger pulse is sent if any gas/ fire is occurred, to the IoT apart from the RF module. The other block is the sub board which consists of the RF decoder & RF Rx which are helpful in the triggering of the Siren alarm by sensing the signal sent from the RF Tx. the reset switch(pulse) is used to reset the microcontroller & the devices connected to it. the LCD display is used to display the status of the gas container and as well as to report if any accident is to occur. The IoT is the main component which play the major role for updating of the status of the entire kit.

Conveyor mechanism and position sensors are used. MC is send signals to that conveyor mechanism. Using position sensor, detect the position of the pot and stop that pot at desired spot. This system is work manually and also using smartphone/automatically.

V. Hardware description

A. Microcontroller:

An efficient and smooth working controller is needed to continuously sense both leakage and level of the gas. And also quick response is require when gas leakage detect. Along with this the monitoring weight of the gas cylinder compere information with threshold weight & which can follow the steps for further processing. The detection system includes PIC 16F877A microcontroller board. It has 40 digital input/output pins, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

Fig. 1: PIC 16F877A

B. LCD:

This is used for display purpose in this system. All the changes or required action needs to be taken will flash on this LCD. This LCD is of 16*2 configurations. That means they are having 16 columns and 2 rows. Each row and each column can be individually programmed to display the characters with the help of microcontroller.
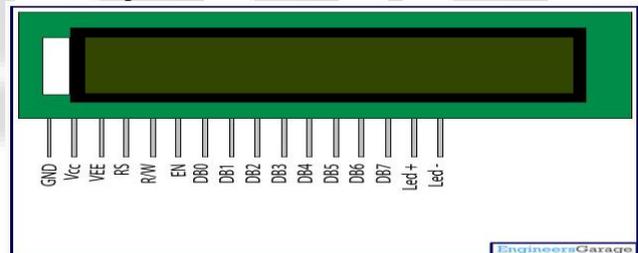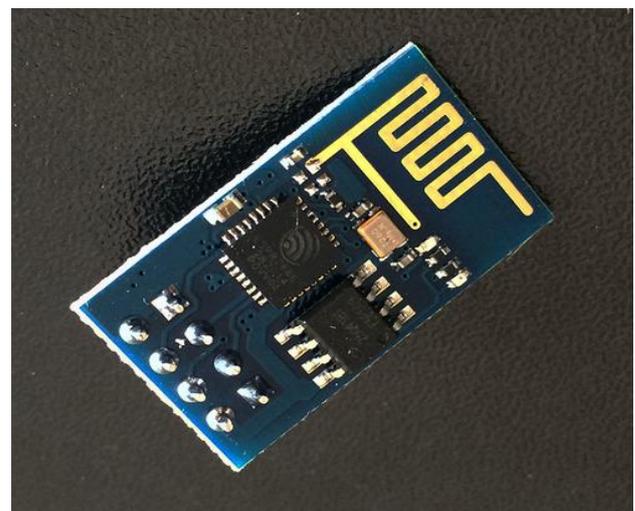

Fig. 2: LCD

C. Wi Fi Module:

Fig. 3: WiFi Module

ESP8266 is a chip which is wireless network micro-controller module. It will be a system-on-a-chip (SoC).It has

capabilities for 2.4 GHz Wi-Fi, general-purpose input/output etc. This module has a powerful enough onboard processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development upfront and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.

D. GSM Modem:

This GSM modem is a highly flexible plug and play GSM 900 / GSM 1800 / GSM 1900 modem for direct and easy integration RS232, voltage range for the power supply and audio interface make this device perfect solution for system integrator sand single user. Voice, Data/Fax, SMS, DTMF, GPRS, integrated TCP/P stack and other features like the GSM / GPRS modules on this homepage.

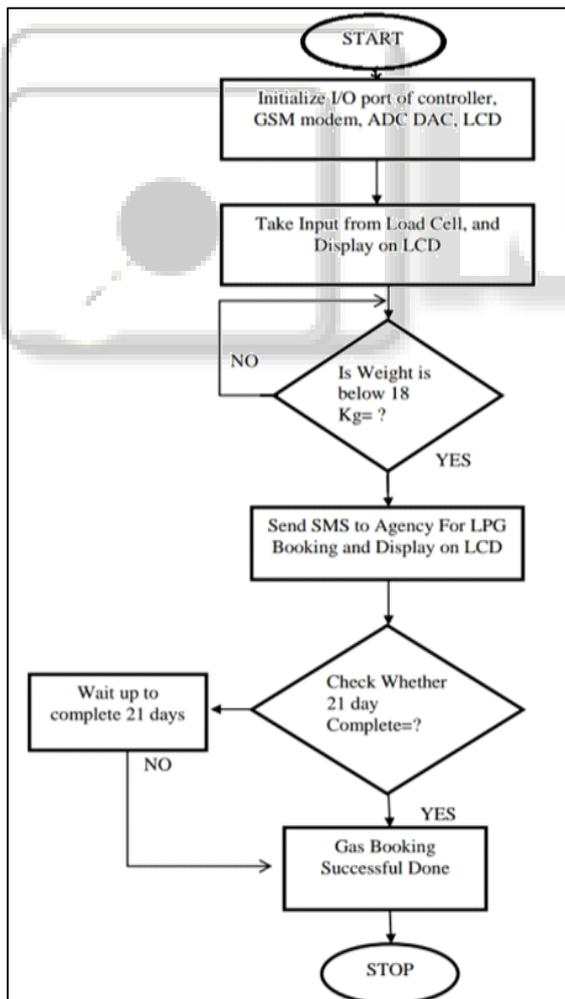## VI. FLOWCHART

A. Gas Booking
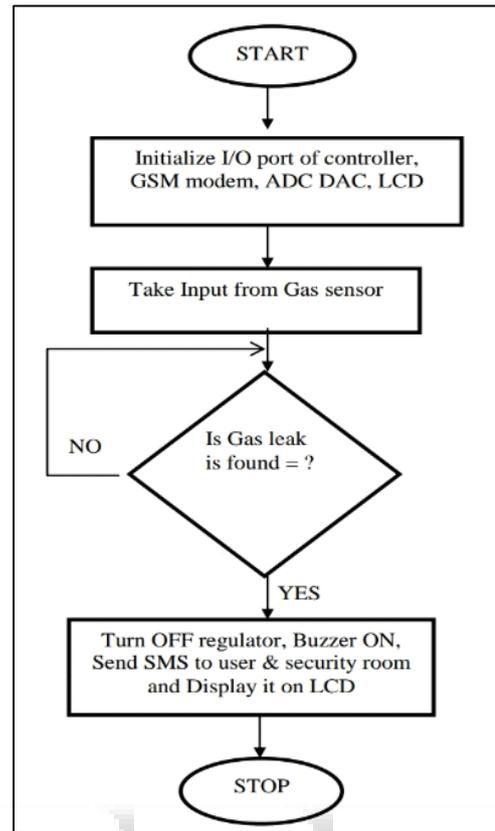

Fig. 4: Flowchart of Gas Booking

B. Gas Leakage

Fig. 5: Flowchart of Gas Leakage

1) Advantages:
− Alarm on gas leakage.
− Continuous gas level indication.
− Automatic gas booking.
− Auto switching off the gas when gas leakage is detected.
− Automatic cooking system. Operated as manually or automatically.
2) Application:
− For Residential purpose
− For restaurants
− Industrial purpose
− Biomedical sector

VII. CONCLUSION

The system provides control action by closing the regulator knob, after that the system sends an alert message to the user and fire station within short time of leakage. It has more advantageous function than the existing system thus the real-time automatic approach is proposed in case of rebooking of cylinder. This monitoring and detection system is proposed mainly to meet the safety standards and to avoid fire accidents because of leakage. Automatic cooking system is takes commands manually or automatically using smartphone. And cook the testy food save much time.

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