Gas Leakage Detection, Alerting and Monitoring using IoT

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Abstract*: This journal 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. 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-2(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-2) a siren (60db) is triggered.*

Keywords- GAS, IoT, GSM, WiFi, LPG, RF,Gas Sensor(MQ-series),stepper motor driver IC,PIC micro controller,Relay

I. INTRODUCTION

This paper is an effective & affirmative way of monitoring the gas quantity in the container, and to intimate as well as to place an refill order in the respective branch office(gas agency), via an message by means of internet through IoT module. the continuous measure is done using the load cell which intern works on the principle of piezo electric sensor, i.e; when an gas container is placed on the load cell it measures the weight and sends an electric pulse to the microcontroller which will compare the pulse with an ideal value in form of digital (the electric pulse is converted in to equivalent digital value). If the compared output is high then it sends a pulse(high) to the IoT which will update it to the internet but doesn't place an order, but if the compared output is low then it send a pulse(low) to the IoT which will update it to the internet an even place an gas refill order. and for ease of user there is even Radio Frequency(100mtrs) module which has its Tx encoder kit to the main board & its Rx decoder for an sub board, so the need of providing it with these is that when an gas order is being place it notifies the consumer with an siren alarm.

II. SENSORS

1.   LM 35 (temp. sensor)
And now for the sensors, if any fire is to be happened then the temperature sensor will sense an high change(positive change) in temperature and will send an pulse to microcontroller which intern will send an update to the internet trough IoT, and as well it will trigger an siren alarm in the RF Rx kit(sub board).

2.   MQ-2 (Gas Sensor)
MQ 2 sensor is basically an LPG(liquefied petroleum gas) which is composed of propane & butane, so when an gas leakage is sensed by the sensor it will send an high pulse to the Mc which will update it in the IoT, and even an buzzer is heard in the RF Rx kit. and the problem can be sorted & solved. Thus the overall components & sensors play role in the paper as explained above

III. RELATED WORK

There are very few existing models for the same requirement. So the models have to be discussed to provide their flaws and Reason for the origin of this new model.

1. ARM Processor
This system will send an alert SMS to the consumer whenever any leakage of LPG detected and in case of emergency, it will turn off the power supply and activate the alarm. On the other hand, this system continuously monitors the level of LPG present in the cylinder with the help of load sensor. The Gas user can replace the old cylinder with new one in time and automatically book the cylinder using a GSM module[5] in case of the level of leakage of gas reaches below the threshold level i.e.2kgs. The device ensures safety and prevents suffocion and explosion due to gas leakage with GAS Leakage and Temperature Sensors. This paper is designed and implemented using ARM 7 processor and simulated using keil software. The flaw in the above mentioned model is no security for the user, and as well as the use of processor instead of controller.

2.   GSM Technique

This designed project economical, automatic LPG booking, leakage detection and real time gas monitoring system is proposed in this paper. In this system, the LPG leakage is detected through the sensor and information is sent to the user by SMS & simultaneously alerts the customer using a GSM module. On the other hand this system continuously monitors the level of LPG present in the cylinder with the help of load sensor. The Gas user can replace the old cylinder with new one in time and automatically book the cylinder using a GSM module

This model uses traditional way of GSM & which is a little bit tough for uneducated people to understand.

3.   GSM with no secure block

Now a day's every one want a facility which reduce their efforts, time and provide a way to do their work more easily. For cooking food we all uses LPG gas. It mostly uses in domestic fuel, industrial fuel and automobile fuel. In INDIA many distributer uses IVRS, SMS or ONLINE booking for LPG which are time taking process in fast running life. It is inconvenient for both Educated as well as Uneducated people as due to lack of time and lack of knowledge respectively and Safety is also an important concern. As we all know that much accident happens due to gas leakage [2]. So to avoid these difficulties we develop paper. We design a paper by considering a safety issues and also provide Easy way for LPG booking. In the paper MQ-6 gas sensor is use to sense the leakage gas. Once leakage is detected, it will close the regulator and send the SMS to the user through GSM.

This model is very new but it has some drawbacks like heat-up of motor (easily) may be the cause of an accident, and even more it to makes use of the GSM model.
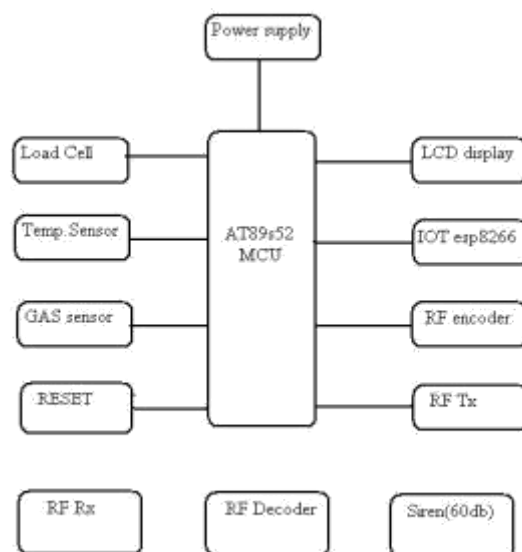
4.   Systeam Architecture

Figure 1.Block Diagram Gas booking System

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.

IV. INTERNET OF THINGS

ESP8266EX (ESP- Espressif Systems Smart platform; EX-revised version) offers a complete and self-contained WiFi networking resolution, it can be used to host the application or to offload wireless networking functions from another application to the processor. ESP8266EX hosts the application it picks up directly from an external flash; it has integrated cache to improve the performance of the system in such applications. Alternately, with the help of a WiFi adapter, wireless internet access can be added to any micro controller-based design with simple connectivity (SPI/SDIO or I2C/UART

interface). it integrates the antenna switch, RF module, power amplifier, low noise receive amplifier, filters, power management modules, and the entire solution, including front-end module, is designed to occupy minimal PCB area. ESP8266EX also integrates an enhanced version of Tensilica's L 106 Diamond series 32-bit processor, with on-chip SRAM, besides the WiFi modem properties. ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs, so as it can be made to work as an entirely individual system even if required. Thus the IoT module has the main phrase in the paper.

V. RESULTS

The below graph shows the updation in the internet through IoT for any change in the LPG gas level, there are only two levels that is either 0(low) level or 1(high) level. The gas is considered as low if the 0 level is appeared, else it is high if the level 1 is appeared.
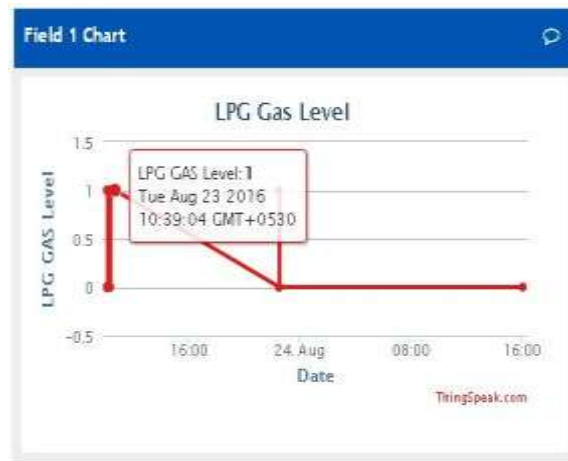
VI. CONCLUSION

Hence, from the above discussion we can conclude that the paper (Automatic Gas Booking using IoT & RF) is absolutely ethical for the application of the users who consume(use) gas in their daily life. It not only helps in making the work easier but also plays a major role in the security avoidance of accidents to the user and helps in leading a easy life.

VII. REFERENCES

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