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Smart Gas Management System

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ABSTRACT

Nowadays, Liquefied Petroleum Gas (LPG) is an unavoidable one in day-to- day life. LPG is used as a fuel in a wide range of applications including in heating and cooking appliances, industrial applications, in vehicles and as a propellant and refrigerant. Due to leakage of LPG, it produces hazardous and toxic impact for human beings , for other living creatures and also it makes a large number of fire accident. To avoid this we need to detect the LPG Gas leakage and make alert to the users who are using LPG Gas. The reason for larger fire accident is because of dc power supply provided to home appliances , so we need to cut off power supply to home at instant we sense the gas is leaking. Another Major problem LPG cylinder user facing is "They don't know exactly the status of LPG gas completion" makes even more delay in booking the cylinder which is uncomfortable most of the times. Now a days we are having an Automatic voice system which also includes select options .Most of the illiterate people can't even complete the booking due to this reason. In this project we are using LPG gas sensor for sensing the leakage and produce the result in audio and visual formats also alerts human via Short Message Service (SMS) for Gas detection and also for booking of LPG Gas. This project continuously measures the weight of the cylinder and once it reaches minimum level it will automatically sends message to the authorized LPG Agent so that they can deliver the LPG cylinder in time.

Keywords : LoadCell, Automation, GasSensor, Amplifier.

I. INTRODUCTION

In this modern running world, now a days each member of the family is going out for employment due to which people are less concentrated at their own places. During this time lag only many mishap occurs when the dwellers leave the gas switch on and eventually fire accidents take place .Our project deals with the system with automation of home appliances. Although much of the work has been done until today to realize the automation into practice, most of the work focuses on resource- constrained nodes, rather than linking the existing embedded systems to the automation. This automation will be achieved with the help of some sensors and MSP 430 microcontroller.MSP is an easy way to use microcontroller development board for the low power and low cost. Gas sensors is used to detect the gas leakage. Load cell is used for the continuous measurement of threshold value of cooking gas .For sending alert SMS regarding warning of gas completion GSM modules are used.

A. Existing System

At present automation has been introduced In many fields but yet when it comes to LPG using home appliances, this criteria has not been involved in the present working process yet. In the present system Gas leakage cannot be found initially as the whole system is manual. Due to this problem, fire accidents are still prevailing in households and many other LPG using appliances .Also the finished level of LPG cannot be found in the present system.

B. Proposed System

The objective of our proposal is to convert all this manual usage into automation. According to our idea LPG usage in our appliances in which, when tends to leak or any fire accidents prevail to occur there is an buzzer which automatically turns on which alert the user, more over the regulator of the gas will turn off automatically so the leakage of gas can be cut-shorted in the beginning stage itself . The Alert message will also sent to registered customer number We have worked upon another specification to ease our way for finding the accurate measurement of amount of LPG left when its used daily so that we can have remainder to book before its totally over. The remainder message will automatically sent to both registerd customer number and admin number i.e gas agent.

II. METHODS AND MATERIAL

Hardware Required

- MSP430
- GSM Module
- Load Cell
- Relay
- Gas Sensor
- Amplifier
- Solenoid Valve
- Power Supply

MSP430 Microcontroller

The Texas InstrumentsMSP430 family of ultra-low power microcontrollers consists of several devices featuring different sets of peripherals targeted for various applications. The architecture, combined with five low-power modes, is optimized to achieve extended battery life in portable measurement applications. The device features a powerful 16-bit RISC CPU, 16-bit registers, and constant generators that contribute to maximum code efficiency. The calibrated digitally controlled oscillator (DCO) allows wake-up from low-power modes to active mode in less than 1 µs.

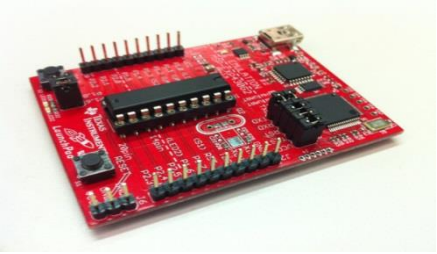


Figure 1. MSP 430

Load Cell

A load cell is typically an electronic device (transducer) that is used to convert a force into an electrical signal. This conversion is indirect and happens in two stages. Through a mechanical arrangement, the force to be sensed is deforming a strain gauge. The strain gauge converts the deformation (strain) to electrical signals. Normally, a load cell consists of four strain gauges in a Wheatstone bridge configuration, but are also available with one or two strain gauges. The electrical signal output is normally in the order of a few mill volts and requires amplification by an instrumentation amplifier before it can be used. The output of the transducer is plugged into an algorithm to calculate the force applied to the transducer.

Figure 2. Load Cell

An increasing number of cases. They are cheap but the stumbling block is their low storage capacity and the fact that they cannot be reprogrammed.

GSM

GSM (Global System for Mobile communications: originally from *Group Special Mobile*) is the most popular standard for mobile phones in the world. Its promoter, the GSM Association, estimates that 80% of the global mobile market uses the standard GSM is used by over 3 billion people across more than 212 countries and territories. Its ubiquity makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world. GSM differs from its predecessors in that both signaling and speech channels are digital, and thus is considered a *second generation* (2G) mobile phone system. This has also

meant that data communication was easy to build into the system.

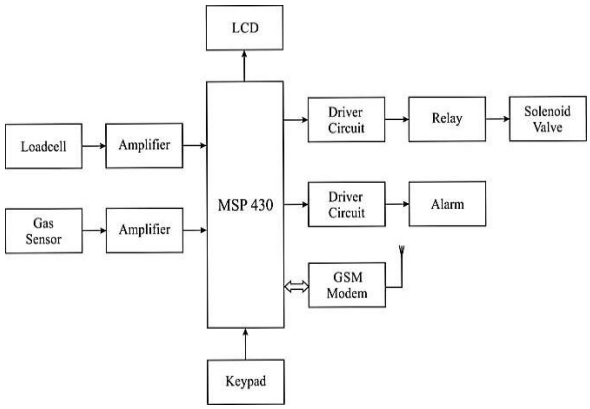
Figure 3. GSM

GAS Sensor

GS-106 type of gas sensor is used in this project. Gas sensor is a device which detects the presence of various gases within an area, usually as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. A gas detector can also sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave the area. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals.

Figure 3. Gas Sensor

BLOCK DIAGRAM



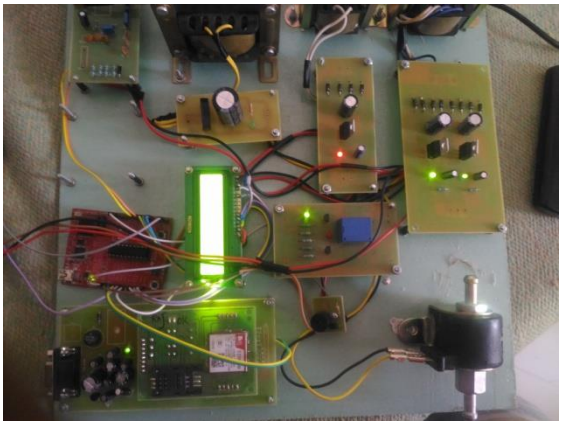
OBJECTIVES

1. To make gas booking without manual help.
2. To detect gas leakage.
3. To prevent fire accident.
4. Alert LPG user in all time.

III. RESULTS AND DISCUSSION

This paper serves to provide safety measures to LPG users all time and alert message regarding gas leakage and gas detection.

WORKING MODEL



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V. CONCLUSION

- We have implemented a simple system using concept of automation.
- It is a low cost & design efficient system.
- Low in power consumption .
- LPG users are get alerted in all time.
- The Alert message is sent via SMS through GSM Technology.

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