Model Development of WSN Based LPG Measure & LPG Leakage System Detection by using GSM

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ABSTRACT

In this paper, the paper is used a safety wireless project to leakage gas detector as well as gas measure. LPG (liquid petroleum gas). It has component in the form propane, butane. This module is used for home, commercial, industrial application etc. The volatile gas is a possibility of leaking which will be occupied to cause explosion or fire hazard. This study was designed by using a prototype system that functions. If there is a gas leaking in a room by using the MQ-6 sensor which detects LPG gas in the room. In MQ-6 sensor-based LPG leak early detection system using Arduino it has been successfully running according to an algorithm that has been designed and installed before in the test results LPG gas leakage is classified as the reasons of many disasters. The leakage and LPG gas measure detect sensor and sensor give notification. The output of the sensor goes low then sensor-detect the gas atmosphere. This is detecting by using micro-controller and buzzer turned it ON. Again sensor will send the notification to GSM module and display on LCD.

KEYWORDS: Arduino, microcontroller, MQ-6 sensor, LPG gas, GSM

1. INTRODUCTION

LPG (liquid petroleum gas) it can be leaked by gaseous or liquid state. Generally, in liquid petroleum gas by adding pressure and low temperature of the gas and it becomes liquid form. A given leak in liquid are dissipate cause of evaporation process and it generate into cloud of gas shown stuck on heavier in the air. The mainly some contents are important factor in this project: sensor unit, MQ-6, microcontroller, arduino, GSM modem. Thesensor can be detect other gases like iso-butane, propane, and even smoke. Many times due to shortage of GAS cylinder, people are facing issue regarding empty cylinder. So it helps to get notification.

GSM modem is configured by GSM command for sending and receiving SMS. Depending on the sensor output, the microcontroller can send message.

2. Literature Survey

Shivalingesh B. M, Ramesh C, Mahesh S. R, Pooja R, Preethi K. Mane, Kumuda S. Department of Instrumentation Technology BMS College of Engineering, Bangalore-19, India. "LPG Detection, Measurement and Booking System" Volume I, Issue VI, November 2014 ISSN 2321 – 2705. In this paper we present how to detect the leakage using a gas sensor and book a new cylinder automatically by sending a message to agency. The gas sensor MQ-6 is very sensitive to methane and propane which are main constituents of LPG. A load cell is used to measure the weight of cylinder continuously. The weight of cylinder is displayed continuously and some 4-5 MQ-6 sensors will be placed in different place of room, output of sensor will become high when there is LPG leakage is present. When the sensor output is high buzzer will be switched on and a message will be sent to customer and nearest gas agency via GSM. When the weight of cylinder equal to threshold value a message will be sent to agency to book new cylinder. The same system is implemented using Lab VIEW, and a statistical analysis of gas sensor and load cell is done.

OlubusolaOlufunkeNUGA1, KamoliAkinwale AMUSA1, Ayorinde Joseph OLANIPEKUN1,* 1 Electrical and Electronic Department, College of Engineering, Federal University of Agriculture, Abeokuta (FUNAAB) "GSM-Based Gas Leakage Detection and Alert System" Volume 1, Issue 1, 100-104. In this communication, an efficient method of detecting the leakage of cooking gas and alerting people about its occurrence via the use of existing Global System for Mobile Communication (GSM) infrastructure was developed. The GSM-based gas leakage alert system utilizes a gas sensor to detect leakages in the event that it occurs and then send short message to a predefined telephone number. MQ2 gas sensor, PIC 16F877A microcontroller, GSM modem and a DC stepper motor are the main hardware components employed in the development the gas leakage detection and alert system. The proposed system plays two roles in the event of gas leakage: alerting people about the leakage of gas by

sending short message to the predefined telephone number and by closing of the cylinder head to prevent further leakage by using the stepper motor. The developed GSM-based gas leakage detection and alert systems is suitable for deployment in homes, laboratories and restaurants to check undesirable event of gas leakages and attendant risks.

Kunal R. Birkute1, Shubham S. Bodke2, Dipali S. Khilari3, Sneha S. Salvekar4 1,2,3Student –BE E&TC APCOER, Pune-09, SPPU Pune 4Assistant Professor, Department of Electronics and Telecommunication Engineering APCOER, Pune-09 "A Study on: Wireless Sensing Network (WSN) gas leakage detection system with IOT" e-ISSN: 2395-0056 p-ISSN: 2395-0072 Volume: 06 Issue: 06 | June 2019. There have been many incidents such as explosions and fires due to gas leaks. Such occurrences can have dangerous effects if the leak is not detected early. The wireless detection network based gas leak detection system is a project that can detect the gas leak in the environment and send data to the cloud via the MCU node. The Internet of Things (IoT) is the network of "things" that physical things can communicate through sensors, electronics, software, and connectivity. These systems do not require human interaction and the same happens with the IOT based gas detection system, it does not require human attention. The WSN-based gas leak detection system detects the gas using a gas sensor. The gas sensor interface to the MCU node is implemented in this project. The signal from this sensor is sent to the node microcontroller (ESP8266). The microcontroller is connected to a cloud and a buzzer. WSN based leak detection is implemented using an ESP8266 chip. This is a WiFi module used to connect microcontrollers to the Wi-Fi network, make TCP / IP connections, and send data. The data collected by these sensors is sent to the cloud. The MCU node then sends the data to a cloud. Once the gas leak is detected, the buzzer will be turned on and the result will be displayed in the cloud. The prerequisite for this GLP project for gas leak detection and intelligent warning is that the WLAN module is connected to a WLAN hotspot or access point.
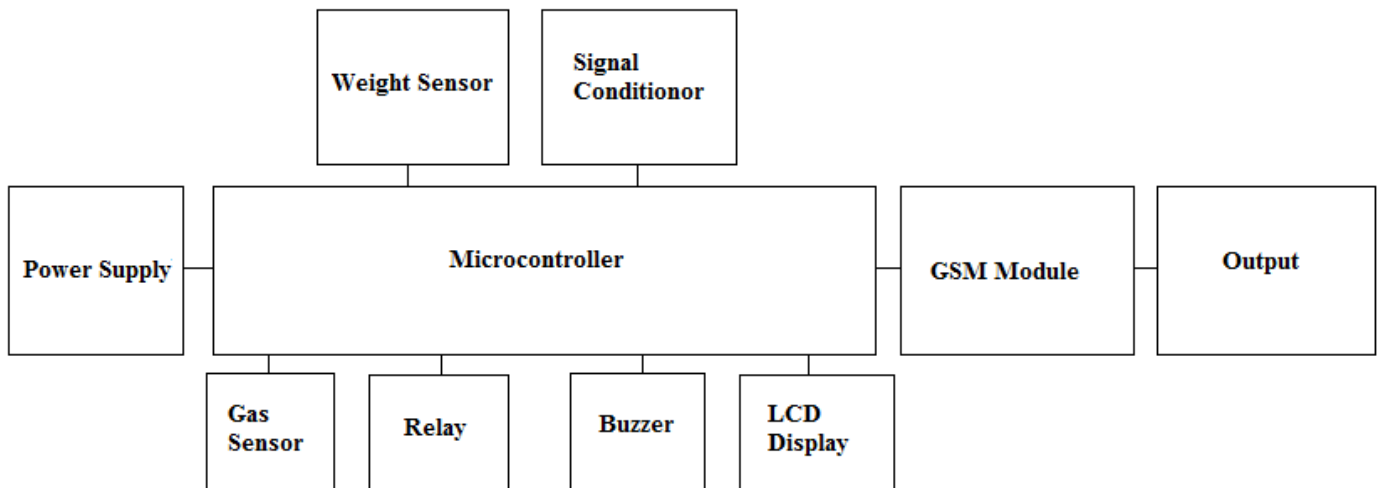
3. Block diagram

Fig1. Block diagram of LPG gas Leakage system and weight measure

4. Methodology
Microcontroller:
A microcontroller is an integrated circuit (IC) device used for controlling other portions of an electronic system, usually via a microprocessor unit (MPU), memory, and some peripherals. These devices are optimized for embedded applications that require both processing functionality and agile, responsive interaction with digital, analog, or electromechanical components.

The most common way to refer to this category of integrated circuits is "microcontroller" but the abbreviation "MCU" is used interchangeably as it stands for "microcontroller unit". You may also occasionally see "µC" (where the Greek letter mu replaces "micro").

"Microcontroller" is a well-chosen name because it emphasizes defining characteristics of this product category. The prefix "micro" implies smallness and the term "controller" here implies an enhanced ability to perform control functions. As stated above, this functionality is the result of combining a digital processor and digital memory with additional hardware that is specifically designed to help the microcontroller interact with other components.

GAS sensor:
A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Based on this voltage value the type and concentration of the gas can be estimated.

The type of gas the sensor could detect depends on the sensing material present inside the sensor. Normally these sensors are available as modules with comparators as shown above. These comparators can be set for a particular threshold value of gas concentration. When the concentration of the gas exceeds this threshold the digital pin goes high. The analog pin can be used to measure the concentration of the gas.

MQ6 Sensor:
This sensor will detect the gases (Iso propane, Butane) at a concentration of 300-10000ppm.When a gas is detected by the sensor then it compares with the comparator present in the sensor for producing digital logic data output to the Arduino.

Arduino:

In this project Arduino plays important role in interfacing the components to it. Input is given to the Arduino and output is taken from Arduino by using digital pins for displaying the output.

5. Conclusion

This project is fully designed as a wireless communication so that human interference is no not there. by implementing this project we can ignore the problematic conditions caused due to unawareness of gas cylinder and gas detection. This paper provides a solution to prevent such accidents or disasters. Real time gas measurement and gas leakage display on LCD and also gets notification via SMS. This module also can be work under the mobile communication domain. This project is used in domestic, industrial as well as commercial purpose.

6. Bibliography

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