Date	19 September 2022
Team ID	PNT2022TMID26079
Project Name	Gas leakage monitoring and alerting system for industries
Maximum Marks	4 Marks

Abstract

Liquefied petroleum gas (LPG) is currently the most used gas in our home for cooking purposes. LPG gas is a flammable gas, if leaked it can cause major damage to life and property. Therefore it should be used in a safe handling manner and additional care has to be taken in order to prevent any leakage possible. The main features of LPG is that being heavier than air, it does not disperse easily and may lead to suffocation when inhaled. The leaked gases when ignited may lead to explosion. The number of deaths due to the explosion of gas cylinders has been increasing in recent years. Nowadays people are having very busy schedules and hence sometimes they forget or don't get enough time for booking the gas from the gas agency. So it would be much easier and helpful if there was a provision to book the gas automatically. A major amount of gas is being wasted due to the carelessness of consumer's. Sometimes they forget to turn off the burner which may also lead to damages.

PROBLEM SOLUTION

The main aim of this project is to monitor for liquid petroleum gas (LPG) leakage to avoid fire accidents, providing house/industry safety features where security has been an important issue. The system detects the LPG leakage using a gas sensor and flames using a flame sensor that alerts the consumer about the gas leakage by sending SMS with the help of GSM module which is connected to the arduino uno. When the LPG concentration in the air exceeds the certain level, the Gas sensor detects the leakage and then it immediately alert the consumer by sending SMS to specific mobile phone and alert the people at home by activating the Buzzer alarm and display the message on the LCD display simultaneously to take the required action and switch on the exhaust fan to decrease the gas concentration in the air. A simple flow chart to understand the working procedure of the system given below.

PROPOSED SOLUTION

The proposed system consists of atmega328 and it is interfaced to sensors like MQ2 sensor, load cell, infrared sensors etc. which are the input of the

system. Here the wifi-module is interfaced to these which give the ability to communicate with each other. The proposed method takes an automatic control action upon detection of gas.The regulator valve (motor) would be switched off which completely stops the flow of gas leakage. Initially if there is a gas leakage then the electronic sensor i.e. the gas sensor that obeys the principle of LPG sensor senses any gas leakage from storage, if any leakage sensed then the output of this sensor goes high. This high signal is monitored by the microcontroller and it will identify the gas leakage. If there is a leakage, the consumer is informed through the internet in his device and a signal is sent back to the microcontroller to turn off the valve. In this system, a sensor(load cell) is used to monitor the weight of the gas cylinder ,if it goes below a critical value the sensor senses this condition and sends a notification via internet to the gas agency for booking a LPG. The object detection sensor is used to detect the presence of any vessel over the burner. If a vessel is not detected over a predetermined time, then an alarm goes off and the consumer is alerted.

Component Descriptions

1. **MQ2 SENSOR:** A gas detector is a device that detects the presence of gases in an area, often as part of a safety system.
2. **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
3. **INFRARED SENSOR:** An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detect the motion.
4. **MICROCONTROLLER-ATMEGA328:** The high-performance Atmel 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel Iot Based Smart Gas Monitoring System National Conference on "Emerging Research Trends in Electrical, Electronics & Instrumentation" 86 | Page (ERTEEI'17) 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.
5. **WIFI MODULE (ESP 8266)**: The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network.
6. **ARDUINO:** Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

Solution Architecture Diagram: