A Synopsis on

AUTO GAS LEAKAGE DETECTION SYSTEM.

Submitted in partial fulfillment of the requirements of
the degree of

Bachelor of Engineering

in

Information Technology Engineering

by

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2019-2020

CERTIFICATE

This is to certify that the project Synopsis entitled ***"AUTO GAS LEAKAGE DETECTION SYSTEM ."*** Submitted by ***"Shailesh Maurya 17204008, Sankalp Patil 15104030, Akash Sapkal 16204035"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology.***to the University of Mumbai, is a bonafide work carried out during academic year 2020-2021

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Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Contents

Abstract

Gas leakage is a major problem with industrial sector, residential premises and gas powered vehicles like CNG (compressed natural gas) buses, cars. One of the preventive methods to stop accident associated with the gas leakage is to install gas leakage detection kit at vulnerable places. The aim of this paper is to present such a design that can automatically detect and stop gas leakage in vulnerable premises.

In particular gas sensor has been used which has high sensitivity for propane (C3H8) and butane (C4H10). Gas leakage system consists of GSM (Global System for mobile communications) module, which warns by sending SMS and webserver for continuously monitoring . However, the former gas leakage system cannot react in time. This paper provides the design approach on both software and hardware.

Introduction

Gas Leak Detector is a simple system that is designed to detect and notify any leakage of natural gas, methane, propane, butane, or any other flammable gas.

As we advanced through many generations, we have also developed great many things in the journey. We have used Earth's natural resources to obtain many things to be done, Petroleum, coal, and all other flammable gases being some of them. Petroleum, a natural resource which is non-renewable has helped the mankind to be alive several years. Coal, another non-renewable natural resource has helped through many generations. Over the last few decades, people has been using few flammable gases for cooking, methane, propane, butane being some of them. Although, these gases do help the man, but it also is equally dangerous when not taken care of.

If we seek out the recent accidents that happened in house due to gas leak, we will be seeing a handful of them. Well coming to the point, we have come up with a solution to at least control them.

Objectives

The main objective of our project is to design a simplified and effective device for detecting and monitoring LPG detection. This device can be used in any place where LPG is used. LPG gas which used in many applications because of its desirable properties like homes, hostels, industries, vehicles so we can use this device to detects gas leakage. This system automatically alert the people by sending the message and alert the people at home by activating the LCD, BUZZER. It also take the necessary action of preventing the gas leakage.A webserver is developed for continuous monitoring of the sensor's value.

Literature Review

Paper 1

Paper Title : An IoT based System for Domestic Air Quality Monitoring and Cooking Gas Leak Detection for a Safer Home

Authors: Kalpesh Gupta, Gokul Krishna G and Anjali T
Publication details : International Conference on Communication and Signal Processing, July 28 - 30, 2020, India

Findings: https://ieeexplore.ieee.org/document/9182051

Advantages: Proposing a hybrid low cost low power IoT based system for air quality determination and cooking fuel leak detection, enhancing the safety of the users in the house.
Disadvantages: Person don't get any alert message or any alarm.

Paper 2

Paper Title : Automatic Smart and Safety Monitoring System for Kitchen Using Internet of Things
Authors: Harika Pudugosula Student, Master of Technology Computer Science and Engineering Amrita School of Engineering, Bangalore Amrita Vishwa Vidyapeetham, India

Publication details : Proceedings of the International Conference on Intelligent Computing and Control Systems (ICICCS 2019) IEEE Xplore Part Number: CFP19K34-ART; ISBN: 978-1-5386-8113-8

Findings: https://ieeexplore.ieee.org/document/9065663

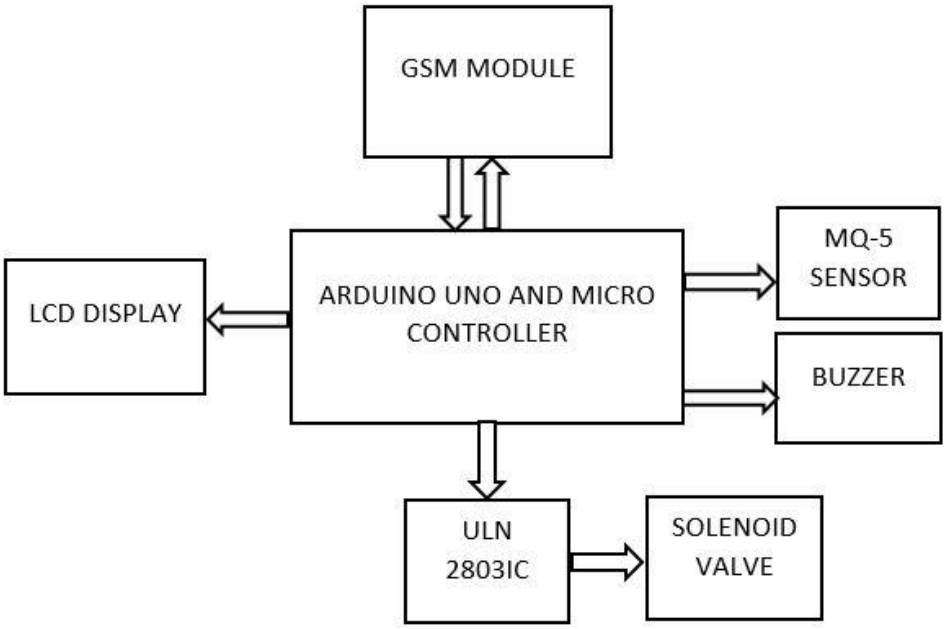
Advantages: The sensor used in this model can sense and detect the leakage of the gas, and the user gets notification regarding gas leak.

Disadvantages: To uploads the value into web server it requires the Wi-Fi module.

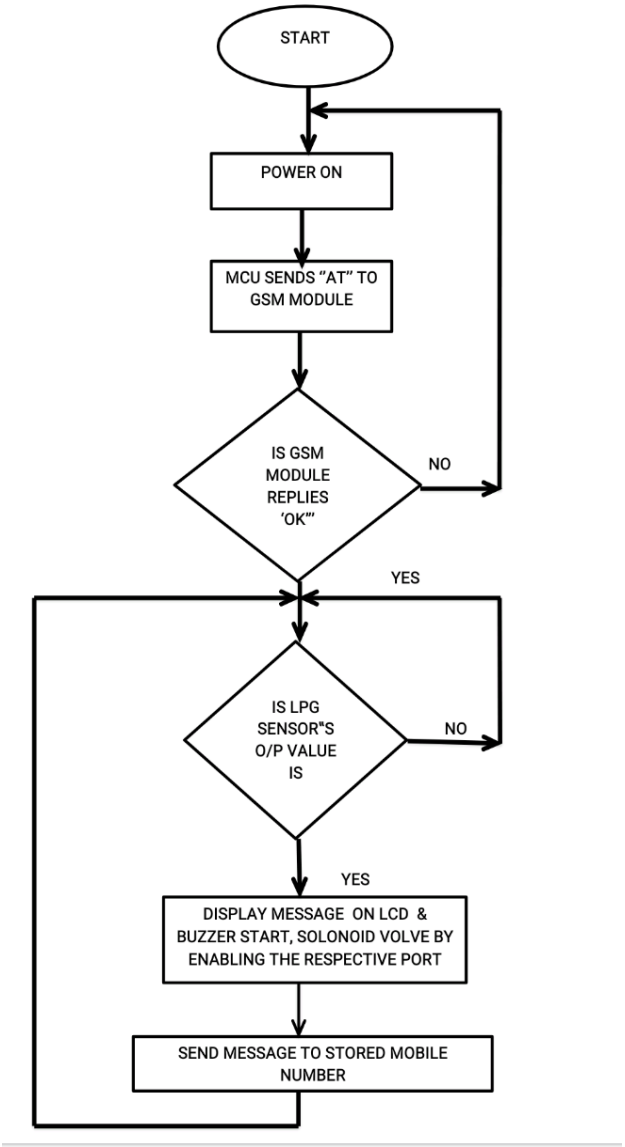
Problem Definition

- Gas leakage leads to various causality resulting into both financial loss as well as human life.
- In human's daily life, environment plays a vital role in health issues. The risk of fires, suffocation, explosion all are based on their physical properties such flammability, toxicity etc.
- The number of deaths figures due to explosion of gas cylinders has been increasing in recent years.
- The main reason for such explosion is due to sub-standard cylinders, worn out regulators, old valves and lack of awareness using gas cylinders add to risks.

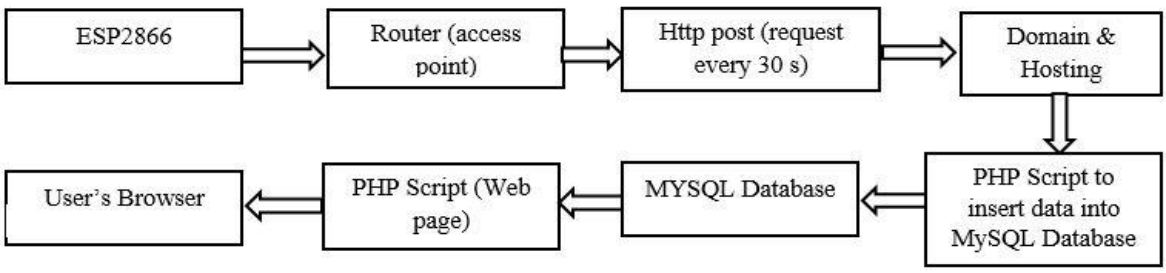
Proposed System Architecture/Working



Working Flowchart



Webserver Process Block Diagram



Design and Implementation

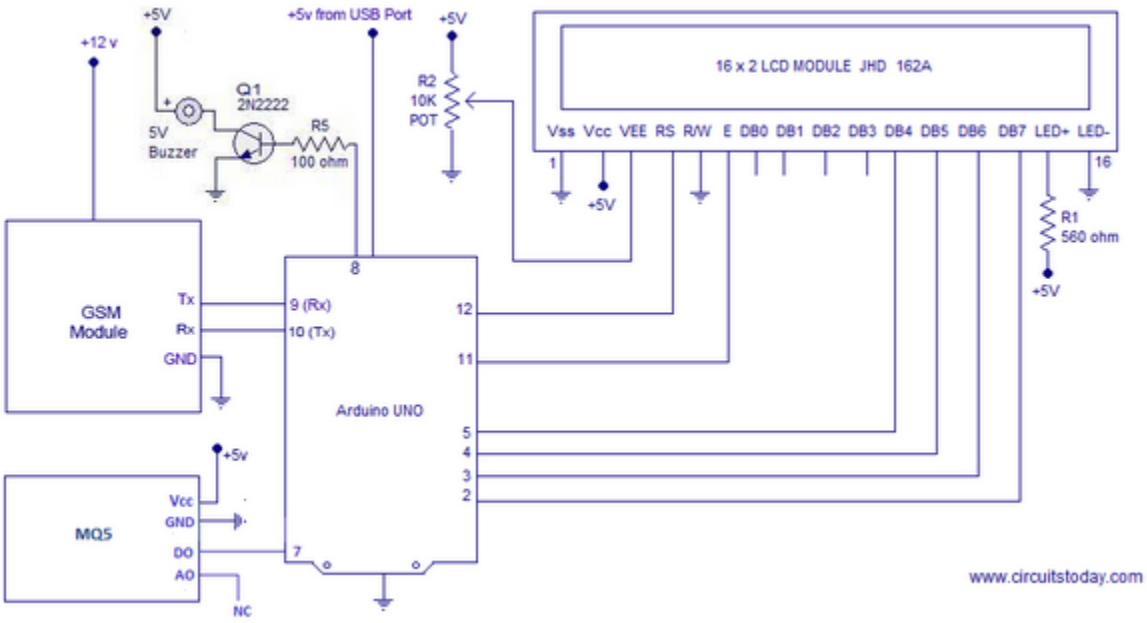
Code:

```
#include <SoftwareSerial.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
SoftwareSerial mySerial(9, 10);
int buzzerPin=8;
int lpg_sensor=7;
int sv=6;
int gas_value;
void setup()
{
pinMode(buzzerPin,OUTPUT);
pinMode(sv,OUTPUT);
pinMode(lpg_sensor,INPUT);
 mySerial.begin(9600);
Serial.begin(9600);
lcd.begin(16,2);

lcd.print("   WELCOME TO ");
lcd.setCursor(0,1);
lcd.print("    APSIT  ");
delay(5000);
lcd.clear();
delay(500);
}


void loop()
{
gas_value = digitalRead(lpg_sensor);
if(gas_value==0)
{
digitalWrite(buzzerPin, HIGH);
digitalWrite(sv,LOW);
lcd.print("Gas Leakage Detected!!");
mySerial.println("AT+CMGF=1"); //To Send SMS in Text Mode
delay(1000);
mySerial.println("AT=CMGS\"+9199***\"\r"); //Change the phone number you are using
delay(1000);
mySerial.println("Gas Leaking"); //The content of the message
delay(200);
mySerial.println((char)26); //The Stopping Character
delay(400);
lcd.clear();
delay(500);
 }
else
```

```
{
digitalWrite(buzzerPin,LOW);
digitalWrite (sv,HIGH);
lcd.print("No Leakage Detected!!");
delay(1000);
lcd.clear();
}
}
```

Snapshot:

Circuit Diagram:



Working Module Snapshot

LPG is available almost everywhere to fulfill household needs and industrial demands. The MQ5 Sensor sense the gas and lcd display will show that gas leakage has been found and buzzer will beep the alert sound and sms message will send to your mobile number that gas leakage is found (the sms feature is added because sometimes we can be in office or outside from home, in that situation we can get alert msg that gas leak has been found). Instead of regulator we are using a Solenoid Valve It will play a role of regulator. When gas leak is found solenoid valve will stop the flow of gas automatically.

A webserver is developed for continuous monitoring of the sensor's value. ESP2866 makes an HTTP post request to a PHP script to insert sensors value into a database. A specific domain name and hosting space are required for reaching out to the webserver.A MySQL database is prepared for storing data from the sensors. A PHP script is developed for inserting the data into the MySQL database. The user can monitor the value of the sensor from anywhere by accessing the web addres.

Summary

We have assumed from these existing and above discussed technology. We shall use a new technology IOT (Internet of Things) to get fastest notification of gas leakage. We will also use a website or application under the IOT technology to get fastest response from the module. The other module and things which are used in this project is GSM module, microcontroller, LED for indication, a buzzer to notify local peoples and MQ 5 gas sensor module to sense the gas leakage. We shall use a Solenoid valve to OFF the knob of cylinder regulator to avoid the accidental cases due to gas leakage.

References

[1] Kalpesh Gupta, Gokul Krishna G and Anjali T ” An IoT based System for Domestic Air Quality Monitoring and Cooking Gas Leak Detection for a Safer Home” International Conference on Communication and Signal Processing, July 28 - 30, 2020, India

[2] Harika Pudugosula Student, Master of Technology Computer Science and Engineering Amrita School of Engineering, Bangalore Amrita Vishwa Vidyapeetham, India “Automatic Smart and Safety Monitoring System for Kitchen Using Internet of Things” : Proceedings of the International Conference on Intelligent Computing and Control Systems (ICICCS 2019).