

DECLARATION

We certify that,

- This report contains original work that we completed under the supervision of my supervisor(s).
- The work has not been submitted to any other Institute for any degree or diploma.
- We have followed the guidelines provided by the Institute in preparing the report.
- We have conformed to themes and guidelines given in the Ethical Code of Conduct of the Institute.
- Whenever we have used materials (data, theoretical analysis, figures, and text) from other sources, we have given due credit to them by citing them in the text of the report and giving their details in the references. Further we have taken permission from the copyright owner of the sources, whenever.

Signature of students

Anil Kumar

Saurabh

Ankit Meena

CERTIFICATE

This is certify that the Project Report entitled, “**Gas Leakage Detector with SMS Alert**” in complete fullfillment of the requirements for the award of the degree of **Bachelor of Technology in Instrumentation and Control Engineering** of **Dr B. R. Ambedkar National Institute of Technology Jalandhar, Punjab, India** is an authentic record of our own work carried out during the period form **August, 2023 to May 2024**, under the guidance and supervision of Karan Jain at **Dr B. R. Ambedkar National Institute of Technology Jalandhar, Punjab, India**.

Name & Signature of the Candidates:

1. Anil Kumar (21106010)
2. Saurabh (21106098)
3. Ankit Meena (21106015)

CERTIFICATE

This is certify that the Dissertation Report entitled, “**Gas Leakage Detector with SMS Alert**” submitted by **Anil Kumar, Saurabh** and **Ankit Meena** to **Dr B. R. Ambedkar National Institute of Technology Jalandhar, Punjab, India**, is a record of bonafide project work carried out by them under my/our supervision and guidance and is worthy of consideration for the award of the degree of **Bachelor of Technology** in **Instrumentation and Control Engineering** of the Institute.

Supervisor

Name: **Dr Karan Jain**

Designation : **Assistant Professor**

Signature with Date :

ACKNOWLEDGEMENT

It is great pleasure for us to undertake this project. We feel highly obliged to do the Project. We are grateful to our project guide **Dr. Karan Jain (Assistant Professor, Instrumentation and Control Engineering)**.

This Project Would not have reached this stage without high enormous help and worthy experience. Although this presentation has been prepared with utmost care and deep rooted interest. Even then we accept respondent and imperfection.

We are also thankful to our whole class and most of all to our parents who have inspired to face all the challenges and overcome all the hurdles in life.

Thank you All !!

LPG Leakage Detector Using Arduino With SMS Alert & Alarm

MINOR PROJECT REPORT

Submitted in fulfilment of the Requirements for the Minor Project

in

Instrumentation and Control Engineering

By

Anil Kumar, Saurabh and Ankit Meena

(Roll Numbers 21106010, 21106098, 21106015)

Supervised by :-

Dr. Karan Jain

Assistant Professor



DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING DR. B. R.
AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY JALANDHAR-144011,
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Arduino Code

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);

#include <SoftwareSerial.h>

SoftwareSerial mySerial(9, 10);

int gasValue = A0; // smoke / gas sensor connected with analog pin A1 of the arduino /
mega.

int data = 0;

void setup()
{
  randomSeed(analogRead(0));
  mySerial.begin(9600); // Setting the baud rate of GSM Module
  Serial.begin(9600); // Setting the baud rate of Serial Monitor (Arduino)
  lcd.begin(16,2);
  pinMode(gasValue, INPUT);
  lcd.print (" Gas Leakage ");
  lcd.setCursor(0,1);
  lcd.print (" Detector Alarm ");
  delay(3000);
  lcd.clear();
}

void loop()
{
  data = analogRead(gasValue);
  Serial.print("Gas Level: ");
  Serial.println(data);
```

```
lcd.print ("Gas Scan is ON");
lcd.setCursor(0,1);
lcd.print("Gas Level: ");
lcd.print(data); delay(1000);
if ( data > 500) //
{
SendMessage(); Serial.print("Gas
detect alarm");lcd.clear();
lcd.setCursor(0,0);
lcd.print("Gas Level Exceed");
lcd.setCursor(0,1);
lcd.print("SMS Sent");
delay(1000);
}
else
{
Serial.print("Gas Level Low");
lcd.clear(); lcd.setCursor(0,0);
lcd.print("Gas Level  Normal");
delay(1000);
}
lcd.clear();
}
Serial.println("I am in send");
mySerial.println("AT+CMGF=1"); //Sets the GSM Module in Text Modevoid
SendMessage()
{
delay(1000); // Delay of 1000 milli seconds or 1 second
mySerial.println("AT+CMGS=\"+91900xxxxxxx\"\\r"); // Replace x with mobilenumber
delay(1000);
```



```
mySerial.println("Excess Gas Detected. Open Windows");// The SMS text you want to  
send  
delay(100);  
mySerial.println((char)26);// ASCII code of CTRL+Z  
delay(1000);  
}
```

Abstract:

"LPG Leak Detector Using Arduino with SMS Alert and Audible Alarm" is a small project that solves the big problem of gas leaks, specifically LPG gas used for cooking and heating. These leaks can be very dangerous because LPG is highly flammable. So this project offers a smart and affordable solution for quick detection of LPG gas leaks and your safety.

Here's how it works: The project uses an Arduino, a type of computer, along with special gas sensors and a GSM module (like a cell phone chip). The gas sensor can detect if there is too much LPG in the air. If it detects a dangerous level, the Arduino will do two things. First, it will sound a loud sound alarm to warn people nearby. Second, it sends a text message (SMS) to your cell phone to notify you of a leak even when you're not at home.

Simply put, this project helps protect you and your home from LPG gas leaks. If there's a leak, it'll make a loud sound to alert you and send you a text message so you're always in the know whether you're home or away. It's a smart way to avoid accidents and stay safe.

Literature Review

1.1 INTRODUCTION

The project titled "LPG Leak Detector Using Arduino with SMS Alert and Sound Alarm" will be of great help in terms of preventing any hazard caused by gas leakage. The purpose of this project is to detect the presence of an LPG leak as part of a safety system. In addition to an audible alarm, an SMS alert will notify the authorized person and a solenoid valve will be activated to shut off the gas supply to prevent any harmful effects due to gas leakage.

Descriptively, we use a gas sensor to monitor the LPG if the gas leakage exceeds the normal level. This proposed project will sound an audible alarm. In addition, the authorized person will be informed about the leak by means of an SMS alert and the gas supply will be automatically shut off. People can be saved from a potential explosion caused by a gas leak.

1.2 GENERAL OBJECTIVE

The main goal is to plan and develop the project "LPG Leakage Detector using Arduino with SMS Alert and Sound Alarm" as a side project. This project aims to create a system that can detect LPG gas leaks, sound an alarm and send SMS alerts to ensure safety in the event of a gas leak.

1.3 SCOPE AND LIMITATION

The subject of the project "LPG Leak Detector Using Arduino with SMS Alert and Audible Alarm" is to design and implement a safety system for detecting LPG gas leaks. This project aims to provide a comprehensive solution for ensuring safety in homes and commercial operations using gas leak detection, sound alarms and SMS notifications.

The system will use an Arduino microcontroller, gas sensors and a GSM module to monitor the gas concentration in the environment. When a gas leak is detected, the system activates an audible alarm that alerts people in the vicinity and sends an SMS notification to the authorized person. The primary focus is on increasing safety by quickly identifying and addressing gas leaks to prevent potential hazards.

The project has some limitations. It is designed for small-scale use, so it may not work well in large industrial environments. It also lacks advanced features such as remote monitoring or data logging. The system relies on the GSM network for SMS alerts, so it will not work without mobile coverage. In addition, it does not include additional safety features other than gas leak detection and alarms.

1.4 SYSTEM DESIGN (DATA FLOW DIAGRAM)

The system design for the project "LPG Leak Detector Using Arduino with SMS Notification and Audible Alarm" includes a data flow diagram that visually shows how data and information moves through the system. In this smaller project, the diagram will illustrate the interaction of a gas sensor, an Arduino microcontroller, a GSM module, an audible alarm and a solenoid valve.

It will show how the data flows from the gas sensor to the Arduino, which then triggers both the audible alarm and the GSM module for SMS notifications. In addition, an electromagnetic valve is activated to shut off the gas supply and ensure safety. A data flow diagram serves as a blueprint for understanding the functionality of the system and the communication between its components.

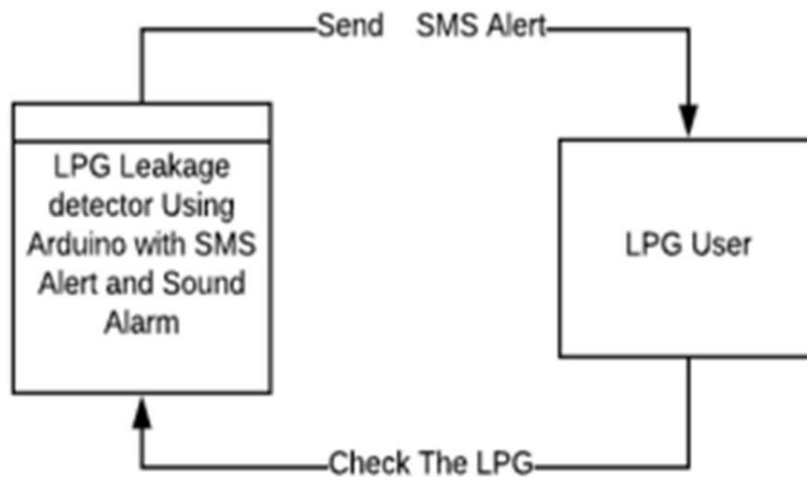


Figure 1

Research Gaps

We can explore a cost-effective solution to make our "Arduino-based LPG Leak Detector with SMS Notification and Audible Alarm" more accessible and affordable, especially in resource-constrained regions. This will help extend the security benefits to a wider range of users.

we can work to develop real-time data analysis methods to provide users with a more comprehensive understanding of gas leakage incidents as they occur. This real-time insight can be critical for timely decision-making and response.

In addition, we should consider the scalability of our system. Exploring how to adapt our project to larger installations such as commercial enterprises or industrial environments will help expand its potential applications and impact.

Last but not least, it is important to focus on the design of the user interface. We can explore ways to create a user-friendly interface that ensures ease of use and understanding for a diverse user base. This will make our system more accessible and practical for users with different levels of technical knowledge. These areas of research are in line with our goal of increasing the efficiency and effectiveness of our project while expanding its reach and applicability.

Key contribution of the work

It plays a vital role in enhancing safety by effectively detecting LPG gas leaks and immediately warning the user. This not only prevents accidents and injuries, but also has the potential to save lives, making it a key feature. Another key benefit is the integration of real-time SMS alerts. It ensures that users are immediately notified of a gas leak, allowing them to quickly intervene to mitigate risks, even when they are not on site. This real-time notification feature adds a layer of security and peace of mind.

In addition, the scalability of the project is remarkable. Its design and concept can be adapted for larger installations in commercial and industrial environments, extending its security benefits to a wider context. This adaptability increases the practicality and impact of the project.

Emphasis on creating a user-friendly interface ensures that the system is accessible and easy to use for a diverse user base. This inclusivity extends from tech-savvy individuals to those with limited technical knowledge, making the project more user-friendly and widely applicable. Together, these key contributions make the "LPG Leak Detector" project an important effort in gas leak safety and prevention.

Work done so far

Project Planning: Outline the project scope, goals, and timeline. Define roles and responsibilities of team members or contributors as appropriate. **Research and gathering requirements:** Identify the components needed for the project such as gas sensors, Arduino boards, GSM modules, sound alarms, load cells and power sources. Research the specifications and compatibility of these components.

Procurement of components:

Purchase or acquisition of necessary hardware and software components for the project. Make sure you have all the necessary materials to build the system.

Circuit Design: Design an electronic circuit that includes gas sensors, an Arduino board, a GSM module, an audible alarm, and a load sensor. Make sure that the components are connected correctly and that the circuit design meets the project goals.

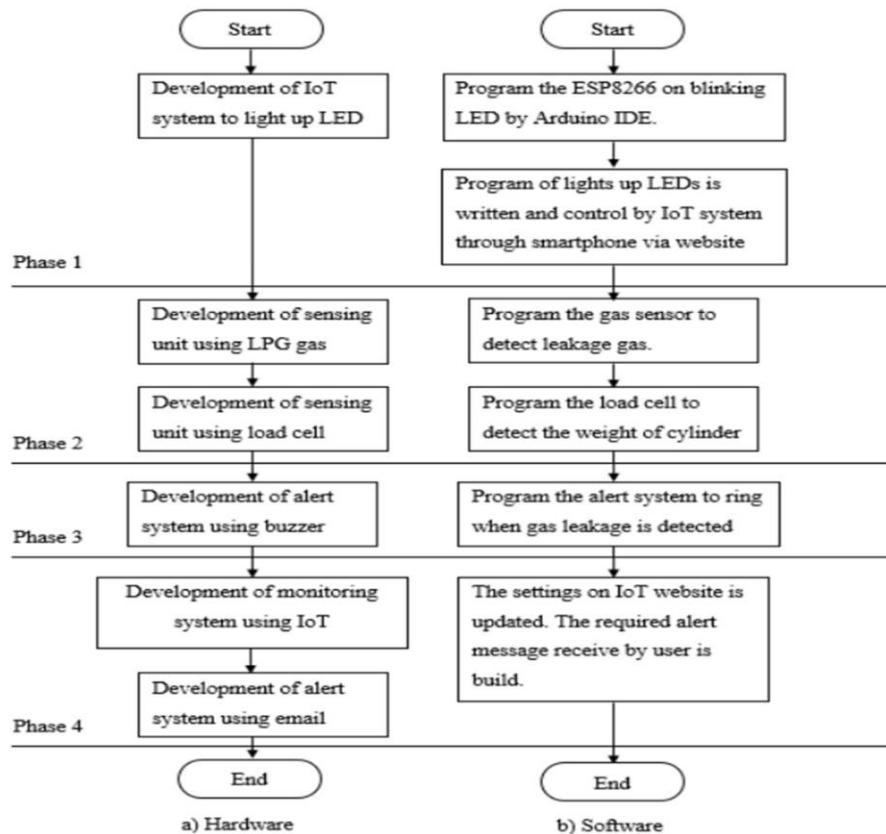


Figure 2

Propose project Outcomes

Project Results for "LPG Leak Detector Using Arduino with SMS Notification and Audible Alarm" Smaller Project:

Develop a comprehensive LPG safety system that will be fully operational. This system will be able to effectively detect LPG gas leaks and ensure immediate safety by activating audible alarms and sending real-time SMS alerts to users' mobile phones. This feature will serve as a basic safety measure to prevent accidents and injuries associated with gas leaks.

It is the integration of weight measurement technology using load cells. This enhancement will allow users to closely monitor the weight of LPG cylinders and offers a practical way to monitor gas consumption. In addition, the system will provide low level alerts, ensuring users are well informed when gas levels are running low. By incorporating weight measurement, we aim to make the system even more user-friendly and functional, helping users avoid unexpected gas shortages. Together, these dual objectives contribute to a comprehensive and practical solution for LPG safety and management. The successful completion and delivery of these results will demonstrate the effectiveness of the smaller project "LPG Leak Detector Using Arduino with SMS Alert and Audible Alarm" and its potential to enhance LPG safety and management.

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