PROJECT REPORT

Gas Leakage Monitoring and Alerting System

Team ID : PNT2022TMID10383

(Department of Computer Science And Engineering)

Karthik Balaji S (TL)	720819104052
Ajay S	720819104006
Aravinth S	720819104011
Hari Krishnan M	720819104041

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ABSTRACT:

The Internet of things (IoT) is the system of gadgets, vehicles, and home machines that contain hardware, programming, actuators, and network which enables these things to interface, collaborate and trade information. IoT includes broadening Internet network past standard device, for example, work areas, workstations, cell phones and tablets, to any scope of generally stupid or non-web empowered physical device and ordinary articles. Installed with innovation, these gadgets can convey and connect over the Internet, and they can be remotely observed and controlled [1]. The meaning of the Internet of things has advanced because of union of numerous innovations, ongoing examination, AI, ware sensors, and implanted frameworks. Conventional fields of installed frameworks, remote sensor systems, control frameworks computerization (counting home and building mechanization), and others all add to empowering the Internet of things. A gas spill alludes to a hole of petroleum gas or different vaporous item from a pipeline or other regulation into any territory where the gas ought not be available. Since a little hole may steadily develop a hazardous convergence of gas, spills are perilous. Notwithstanding causing flame and blast dangers, holes can slaughter vegetation, including huge trees, and may discharge amazing ozone harming substances to the environment. Keywords: IOT, MQ5 sensor, Arduino module, GSM networks.

Introduction :-

Now a days the home safety detection system plays the important role for the security of people. Since all the people from the home goes to work on daily bases, it makes impossible to check on the appliancesavailable at home specially LPG gas cylinder, wired circuits, Etc. Since last three years there is a tremendous hike in the demands of liquefied petroleum gas (LPG) and natural gas. To meet this access amount of demand for energy and replace oil or coal due to their environmentaldisadvantage, LPG and natural gas are preferred. These gases are mostly used on large scale in industry, heating, home appliances and motor fuel. So as to track this leakage gas, the system includes MQ6 gas sensor. This sensor senses the amount of leak gas present in the surrounding atmosphere. Through this, explosion or getting affected by the leakage of gas could be avoided.

Objective :-

The design of a sensor-based automatic gas leakage detector with an alert and control system has been proposed.This is an affordable, less power using, lightweight, portable, safe, user friendly, efficient, multi featured and simple system device for detecting gas. Gas leakage detection will not only provide us with significance in the health department but it will also lead to raise our economy, because when gas leaks it not only contaminates the atmosphere, but also wastage of gases will hurt oureconomy. The need for ensuring safety in workplaces is expected to be thekey driving force for the market over the coming years.

Problem Formulation:-

Gas leakage is nothing but the leak of any gaseous molecule from a stove, or a pipeline, or cylinder etc. This can occur either purposefully or even unintendedly. As we are aware that these kinds of leaks are dangerous to our health, and when it becomes explosive it could cause great danger to the people, home, workplace, industry and the environment.

Few of the major incidents that took place due to gas leakage include the Bhopal Disaster and the Vizag Gas leak. The Bhopal disaster is known to be the worst industrial accident ever. Approximately 45 tons of Methyl Isocyanate was leaked from this insecticide plant. Methyl Isocyanate is an organic compound and a chemical that could come from the carbamate pesticides. This colorless, poisonous and flammable liquid is something that human beings have to be away from.

Vizag Gas leak was a resultant of the escape of styrene that were unattended for a long period. This colorless oily liquid can spread in fumes. So, a detector must be made in such a way that could detect any kind of gas, fume, leak, smoke etc. However harmful and dangerous it can be, the detector could be attached with certain parameters that could help toprevent the issue.

List of Components :-

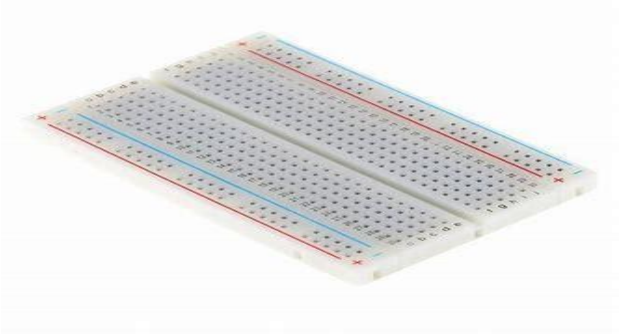
S.No.	Name of the Component	Quantity
1.	Arduino UNO R3	1
2.	Breadboard	1
3.	LED	2
4.	Resistor	5
5.	Piezo	1
6.	Gas Sensor	1
7.	LCD 16*2	1

Arduino UNO R3 :-

Arduino Uno R3 is one kind of ATmega328P based microcontroller board. It includes the whole thing required to hold up the microcontroller; just attach it to a PC with the help of a USB cable, and give the supply usingAC-DC adapter or a battery to get started. The term Uno means “one” in thelanguage of “Italian” and was selected for marking the release of Arduino’sIDE 1.0 software. The R3 Arduino Uno is the 3rd as well as most recent modification of the Arduino Uno. Arduino board and IDE software are the

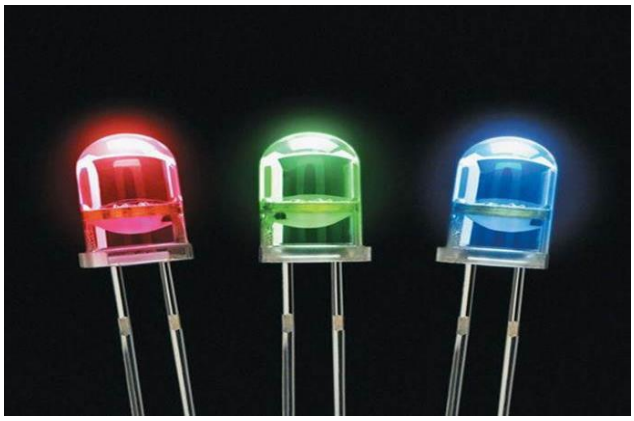
reference versions of Arduino and currently progressed to new releases. The Uno-board is the primary in a sequence of USB-Arduino Board, & the reference model designed for the Arduino platform.

Breadboard :-



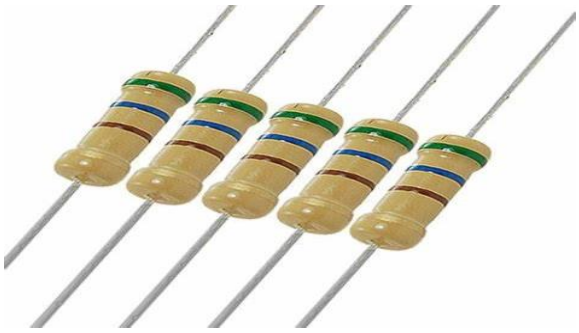
A breadboard is a widely used tool to design and test circuit. You do not need to solder wires and components to make a circuit while using a bread board. It is easier to mount components & reuse them. Since, components are not soldered you can change your circuit design at any point without any hassle. It consist of an array of conductive metal clips encased in a box made of white ABS plastic, where each clip is insulated with another clips. There are a number of holes on the plastic box, arrangedin a particular fashion. A typical bread board layout consists of two types ofregion also called strips. Bus strips and socket strips. Bus strips are usually used to provide power supply to the circuit. It consists of two columns, onefor power voltage and other for ground. Socket strips are used to hold mostof the components in a circuit. Generally it consists of two sections each with 5 rows and 64 columns. Every column is electrically connected from inside.

LED :-



LED (Light Emitting Diode) is an optoelectronic device which works on the principle of electro-luminance. Electro-luminance is the property of the material to convert electrical energy into light energy and later it radiates this light energy. In the same way, the semiconductor in LED emitslight under the influence of electric field. The symbol of LED is formed by merging the symbol of P-N Junction diode and outward arrows. These outward arrows symbolise the light radiated by the light emitting diode.

Resistor :-



A passive electrical component with two terminals that are used for either limiting or regulating the flow of electric current in electrical circuits.

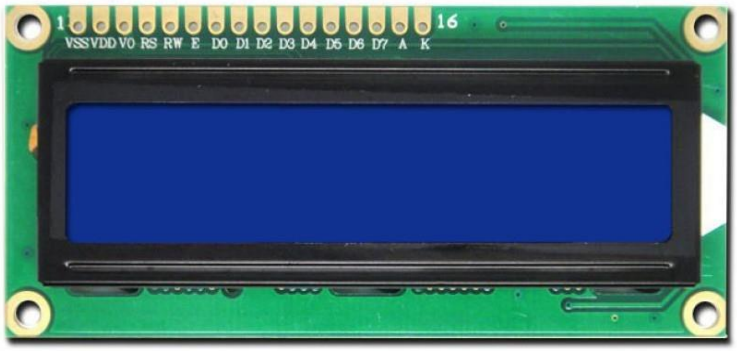
Piezo :-

A piezo is a device that generates a voltage when force is applied or becomes deformed when voltage is supplied.

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.

LCD 16*2 :-



16×2 LCD is one kind of electronic device used to display the message and data. The term LCD full form is Liquid Crystal Display. The display is named 16×2 LCD because it has 16 Columns and 2 Rows. it can be displayed (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots. These displays are mainly based on multi-segment light-emitting diodes. There are a lot of combinations of display available in the market like 8×1, 8×2, 10×2, 16×1, etc. but the 16×2 LCD is widely used. These LCD modules are low cost, and programmer-friendly, therefore,is used in various DIY circuits, devices, and embedded projects.

Project Design & Planning :-

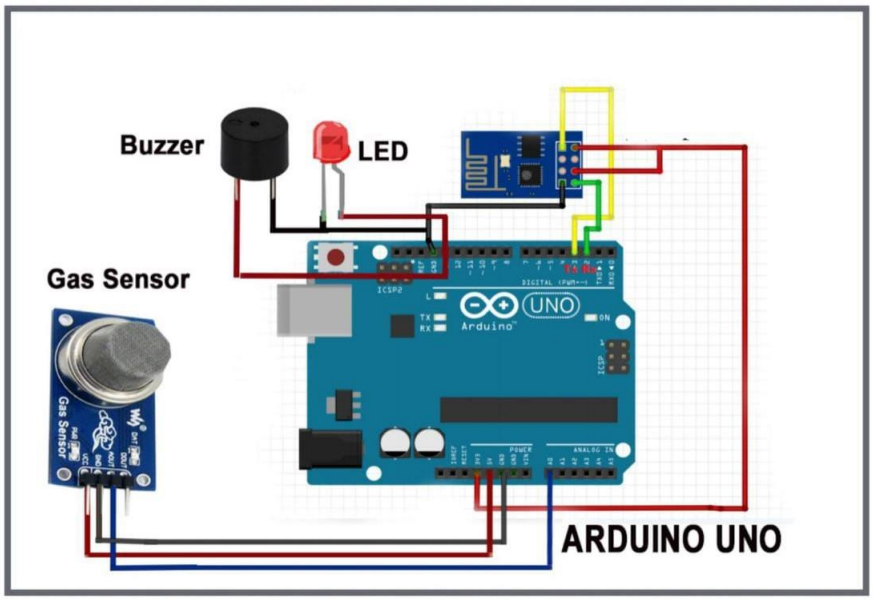
• literature survey :-

Sr. No.	Paper Title	Author Name	Publication Year	Result
1	Internet of Things (IOT) Based Gas Leakage Monitoring and Alerting System with MQ-2 Sensor	Rohan Chandra Pandey, Manish Verma, Lumesh Kumar Sahu	2017	This paper choice of using a real time gas leakage monitoring and Sensing the output levels of gas has been clearly observed bythe help of this system.
2	Gas Leakage Detection and Smart Alerting and Prediction Using IoT	Asmita Varma, Prabhakar S, Kayalvizhi Jayavel	2017	The proposed gas leakage detector is promising in the Field of safety.
3	IOT Based Gas Leakage Detection System with Database Logging, Prediction and Smart Alerting	Chaitali Bagwe, Vidya Ghadi, Vinayshri Naik, Neha Kunte	2018	The system provides constant monitoring and detection of gas leakage along with storage of data in database for predictions and analysis. The IOT components used helps in making the system much more cost effective in comparison with traditional Gas detector systems.
4	Internet of Things (IoT) Based Gas Leakage Monitoring and Alerting System with Mq-6 Sensor	Rohan Chandra Pandey, Manish Verma, Lumesh Kumar Sahu, Saurabh Deshmukh	2018	A discussion on how the aims and objectives are met ispresented. An overall conclusion IOT based toxic gas detector is it has become more efficient, more applicable totoday's applications and smarter.

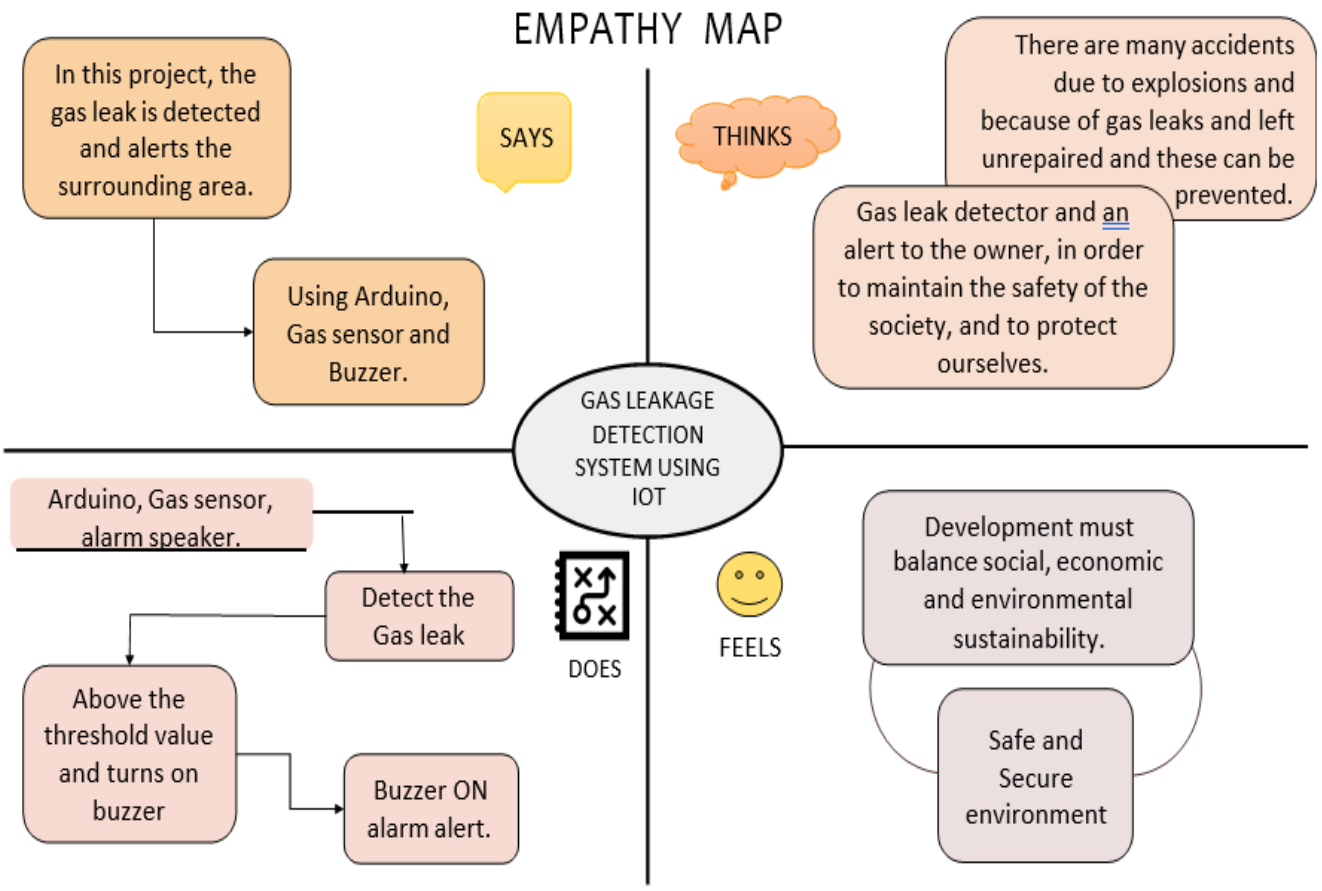
5	Gas Leakage Detection and Smart Alerting System Using IoT	Shitallmade, Priyanka Rajmanes, Aishwarya Gavali	2018	In this paper we use IOT technology for enhancing the existing safety standards. While making this prototype has been to bring a revolution in the field of safety against the leakage of harmful and toxic gases

Ideation :-

System consists of gas detector sensors, Arduino board, ESP8266 and Cloud server. One Society authority person can register the all flat member user to our system. Society admin can add the details of per flat user such as user name, mobile number, per user flat sensor details information. Society admin can configure the threshold value of each sensor. System hardware can be deployed oneach flat. Sensors can sense the value per time. System can send thevalues to cloud server. Server can Check that the sensor values was existed the threshold value. If sensor value can cross the limit the server can send the command to hardware for buzzing the alarm. Server also sends the notification message to us



Empathy Map :-


EMPATHY MAP
SAYS
THINKS
In this project, the gas leak is detected and alerts the surrounding area.
Using Arduino, Gas sensor and Buzzer.
There are many accidents due to explosions and because of gas leaks and left unrepaired and these can be prevented.
Gas leak detector and an alert to the owner, in order to maintain the safety of the society, and to protect ourselves.
GAS LEAKAGE DETECTION SYSTEM USING IOT
Arduino, Gas sensor, alarm speaker.
Detect the Gas leak
Above the threshold value and turns on buzzer
Buzzer ON alarm alert.
DOES
FEELS
Development must balance social, economic and environmental sustainability.
Safe and Secure environment

Project Design Phase I :-

• Proposed Solution :-

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Workers who are engaged with a busy industries packed with gas either harmful or harmless needs a way to monitor their gas pipelines continuously and detect early if there is any leakage of gas in their surroundings so that they can work efficiently on major crises rather than worrying about monitoring or leakage of gas, this will indeed reduce the manpower of that industry and create a peaceful environment.
2.	Idea / Solution description	Workers who are engaged with a busy industries packed with gas either harmful or harmless needs a way to monitor their gas pipelines continuously and detect early if there is any leakage of gas in their surroundings so that they can work efficiently on major crises rather than worrying about monitoring or leakage of gas, this will indeed reduce the manpower of that industry and create a peaceful environment.
3.	Novelty / Uniqueness	Even though there are many existing solutions for this problem they failed to satisfy the needs of customer. Some of the solutions are only detecting some particular gases where some others

		failed to alert the main department and other solutions are with some delays. Our solution not only notify the industry person but also notify the fire fighters so that can take control over the situation and our solution will alert the workers even there is a small leak of gases.
4.	Social Impact / Customer Satisfaction	Our solution will be very helpful for the workers and the society which is associated or located nearby the industries. Our solution will prevent great disasters like Bhopal Gas Tragedy so that so many lives can be saved. Through this project the workers mental pressure will be reduced so that they can concentrate on other works or by relaxing them.
5.	Business Model (Revenue Model)	The main target of our solution is Industries so we have planned to visit industries and explain them about the benefits of our products. So that they can aware of the importance of this solution and use it.
6.	Scalability of the Solution	Our solution can be integrated for further future use because the solution we have provided will be lay on the basic or initial stage of any upgraded version.

• Proposed Solution Fit :-

Project Title: Gas Leakage monitoring & Alerting system for Industries

Team ID - PNT2022TMID10383

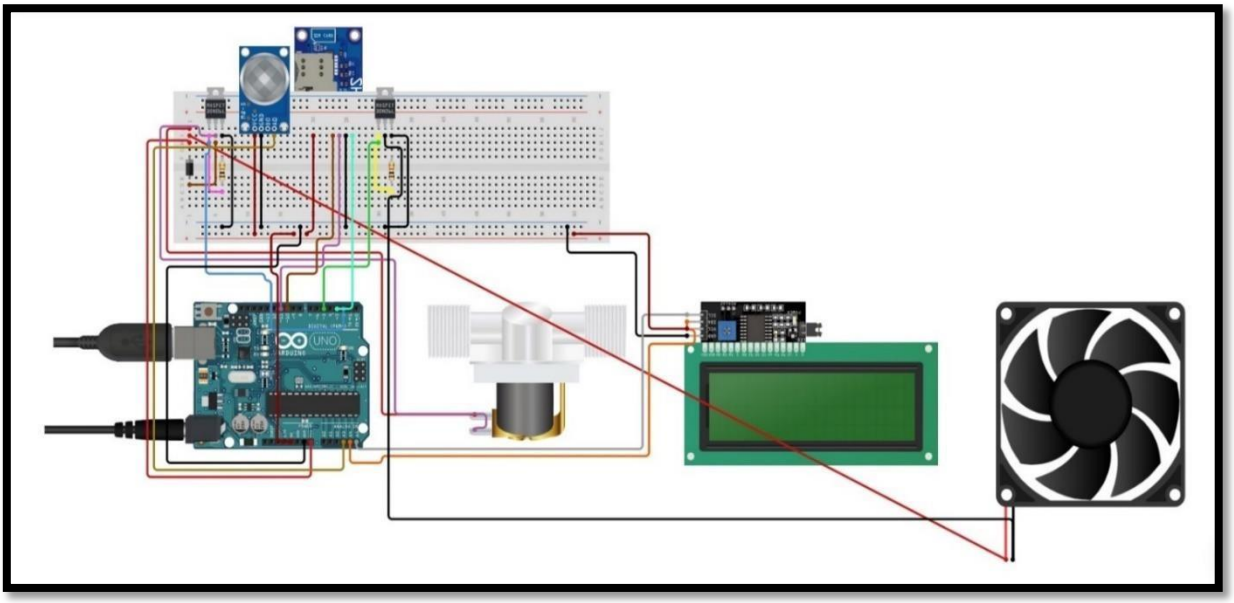
1. CUSTOMER SEGMENT CS • The customers for our project is people Such industries include agriculture, manufacturing, construction, transportation, and communication, among others.	**2. CUSTOMER CONSTRAINTS** • Detect and ventilate the leaked gas. • Turn off gas valve automatically.	**3. AVAILABLE SOLUTIONS** AS • **PROS:** Monitors the gas level in the present atmosphere. • Alert us ,when any gas leakage. • Low power consumption. • **CONS:** The challenge of operating electrical equipment as exhaust fan. • Needs an UPS for uninterrupted
4. JOBS-TO-BE-DONE / PROBLEMS J&P • Detection of gas leak, • Alert surrounding through ALARM, • Send SMS through GSM module.	**5. PROBLEM ROOT CAUSE** RC • The danger happens when gas leaks out. It is dangerous because gas is flammable, which means that if there's a flame or even a spark in the area of a leak, it could cause a fire or explosion. • A gas leak can happen if a gas pipe is damaged or a fitting is loose. • There is a possibility of avoiding such dangerous problems, by ventilating the leaked gas out of the area, and by alerting the people. • Goal of our Project, " Provide the safe and best product using Internet of Things, to people which detects the gas leakage and alert them , and ensure their Safety ".	**6. BEHAVIOUR** BE • Choosing the right sensor • Reliable components • Calculating the usage
7. EMOTIONS: BEFORE / AFTER • Prevents gas leak • Avoid fire accidents • Safe environment	**8. PROPOSED SOLUTION** • Gas detection • Alert alarm • Alert sms	

• Solution Architecture :-

Solution architecture is a complex process – with many sub-processes – that bridgesthe gap between business problems and technology solutions. Its goals are to:

- Detects the gas level in the atmosphere continuously,
- If normal in gas level, green indication, one any high gas level thenfollows,
- To construct a device that protects the people by avoiding explosionsdue to gas leakage.
- The device must be cost effective and user friendly.
- That alert the peoples when there is a gas leak (LPG/PNG)

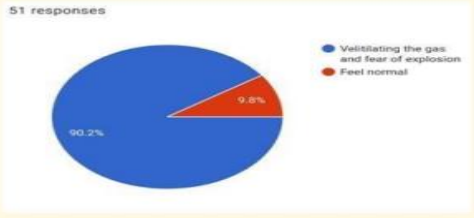
- **Solution Architecture Diagram:**



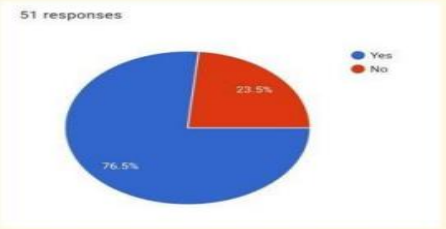
Project Design Phase II :-

- **Customer Journey Map :-**

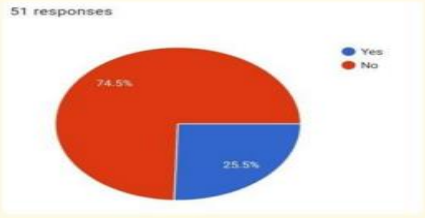
Q1. What are the difficulties you have faced during the gas leaking situations?



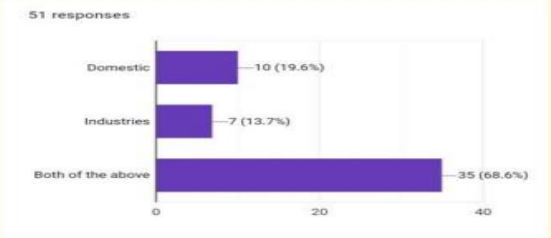
Q2. Do you need any device which will alert you when there is any gas leak and turns on the exhaust system and turns off the valve?



Q3. Have you ever seen any device like this?



Q4. In which places do this device is required?



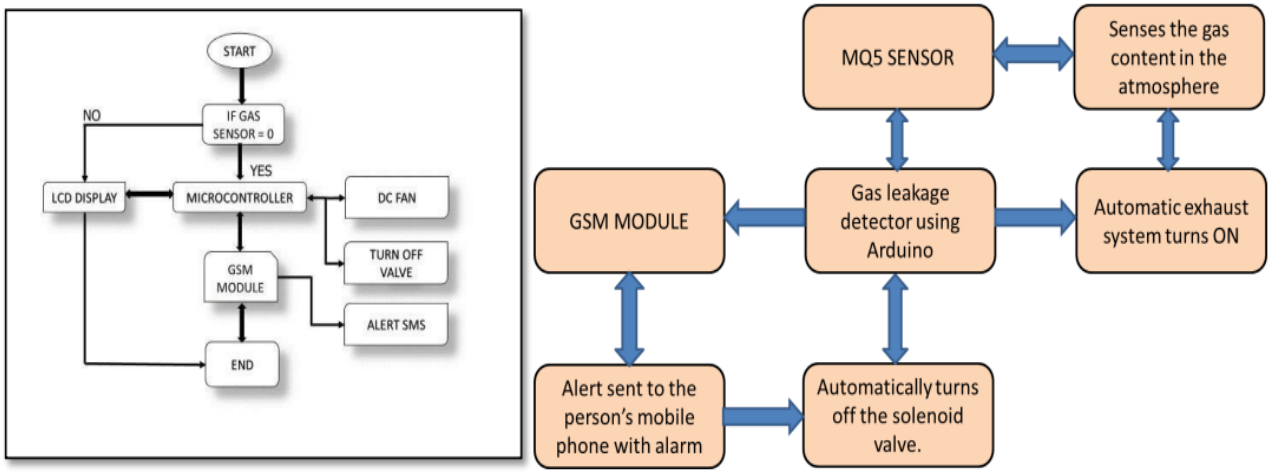
- **Data Flow Diagram :-**

Project Design Phase-II
Data Flow Diagram & User Stories

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Example: (Simplified)

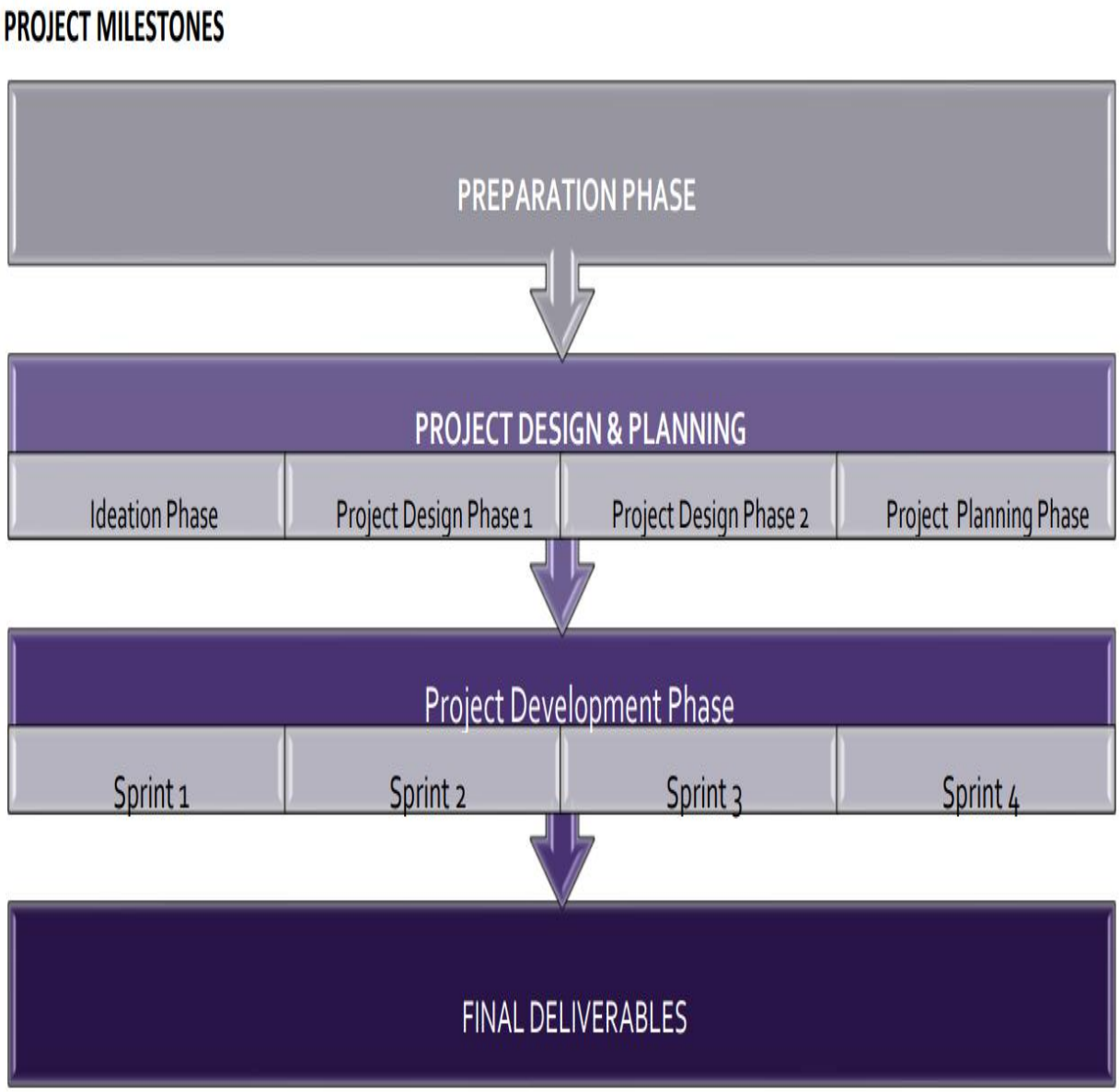


- **Functional Requirements :-**

Business Requirements	User Requirements	Product Requirements
The said system can be deployed in homes, hotels, factory units, LPG cylinder storage areas, and so on. The main advantage of this IoT and Arduino-based application is that it can determine the leakage and send the data over to a site. It can be monitored, and preventive measures can be taken to avoid any disaster.	The gas leakage detection system can be optimized for detecting toxic gasses along with upgrading them with smoke and fire detectors to identify the presence of smoke and fire. Ensuring worker safety is important but making using of the right technology is even more vital.	Detecting gasses is necessary regardless of your business role or individual purpose. Certain technologies at play make such IoT devices what they are, and if you want to indulge in IoT application development, you must know what they are and what purpose they can fulfill.

Project Planning :-

- ## Milestone and Activity List :-



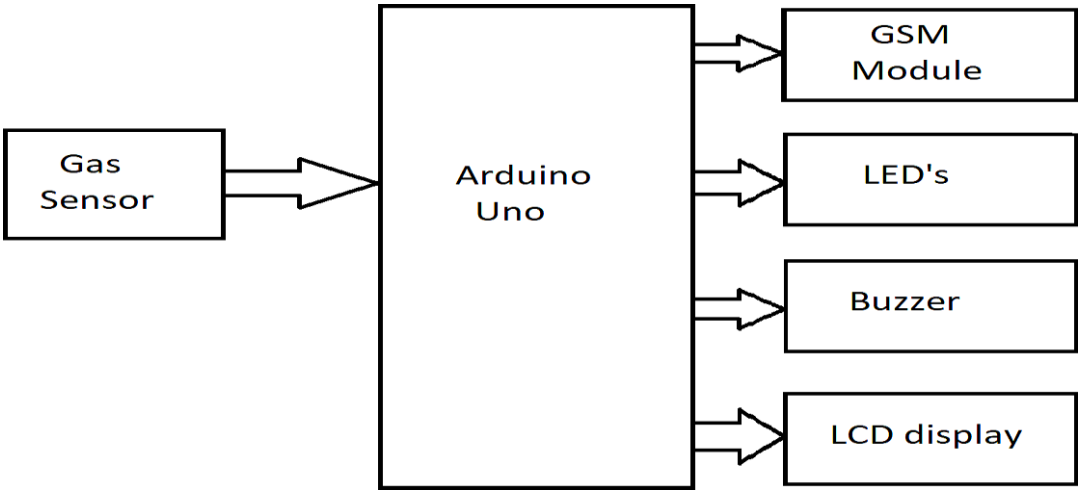
- **Sprint Delivery Plan :-**

SPRINT PLAN

STEP 1	Identify the problem
STEP 2	Prepare a abstract, problem statement
STEP 3	List a required object needed
STEP 4	Create a code and run it
STEP 5	Make a prototype
STEP 6	Test with the created code and check the designedprototype is working
STEP 7	Solution for the problem is found

Proposed method :-

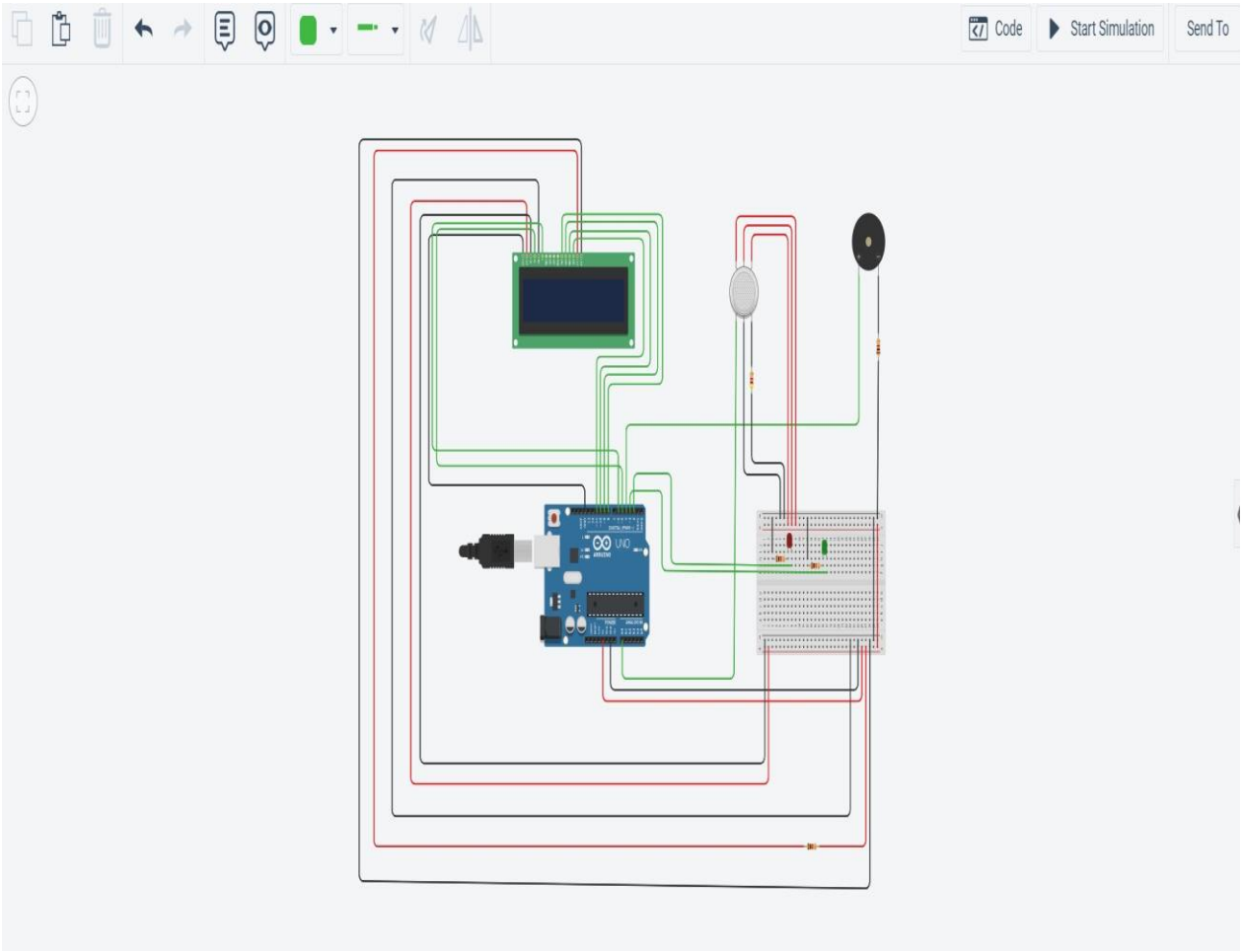
Arduino UNO (Atmega-328) is the main unit of the system which performs the following tasks. A signal conditioning of the Arduino UNO is done by output signal of the sensor, provided input to Arduino. The detection results displayed on LCD. Indicates the people of danger in work place, factory, home. Buzzer activity with beep(siren) sound is made. Also send alert SMS to the in charge of the plant whose number is saved in SIMcard by using GSM modem. The SMS received depends upon the leak of gas in the detection area of the sensor.



Solution Statement :-

The system can be taken as a small attempt in connecting the existing primary gas detection methods to a mobile platform integrated with IoT platforms. The gases are sensed in an area of 1m radius of the rover and the sensor output datas are continuously transferred to the local server. The accuracy of sensors are not upto the mark thus stray gases are also detected which creates an amount of error in the outputs of the sensors, especially in case of methane. Further the availability and storage of toxic gases like hydrogen sulphide also creates problems for testing the assembled hardware. As the system operates outside the pipeline, the complication of system maintenance and material selection of the system in case of corrosive gases is reduced. Thus the system at this stage can only be used as a primary indicator of leakage inside a plant.

Circuit Diagram :-



Project Development Phase :-

• Sprint 1:-

```
#include <LiquidCrystal.h>


LiquidCrystal lcd(6, 7, 8, 9, 10, 11);float
gasPin = A0;
float gasLevel;
int ledPin = 2;
int buttonPin = 3;
int buzzPin = 4; int
buttonState; int
fan = 5;


void setup(){ pinMode(ledPin,
OUTPUT);
pinMode(buttonPin, INPUT);
pinMode(gasPin,INPUT);
pinMode(fan,OUTPUT);
Serial.begin(9600); lcd.begin(16,
2); lcd.setCursor(0,0);
lcd.print(" Welcome");
```

```
lcd.setCursor(0,2);
lcd.print(" Youtube");
delay(500); lcd.clear();
 }

 void loop(){
// Read the value from gas sensor and button
gasLevel = analogRead(gasPin);
buttonState = digitalRead(buttonPin);

// call the function for gas detection and button work
gasDetected(gasLevel);
buzzer(gasLevel);
exhaustFanOn(buttonState);
 }

 // Gas Leakage Detection & Automatic Alarm and Fan ONvoid
 gasDetected(float gasLevel){
   if(gasLevel >= 300){
    digitalWrite(buzzPin,HIGH);
    digitalWrite(ledPin,HIGH);
    digitalWrite(fan,HIGH);
    lcd.setCursor(0,0); lcd.print("GAS:");
```

```
      lcd.print(gasLevel);
     lcd.setCursor(0,2);
     lcd.print("FAN ON");
     delay(1000);
     lcd.clear();
    }else{
     digitalWrite(ledPin,LOW);
     digitalWrite(buzzPin,LOW);
     digitalWrite(fan,LOW);
     lcd.setCursor(0,0);
     lcd.print("GAS:");
     lcd.print(gasLevel);
     lcd.setCursor(0,2);
     lcd.print("FAN OFF");
     delay(1000);
     lcd.clear();
}
 }
 //BUZZER
 void buzzer(float gasLevel){
 if(gasLevel>=300)
{
for(int i=0; i<=30; i=i+10)
{
tone(4,i);
```

```
  delay(400);
  noTone(4);
  delay(400);
  }
  }
   }
    // Manually Exhaust FAN ON
void exhaustFanOn(int buttonState){
  if(buttonState == HIGH){
  digitalWrite(fan,HIGH);
  lcd.setCursor(0,0); lcd.print("Button
  State:"); lcd.print(buttonState);
  lcd.setCursor(0,2);
       lcd.print("FAN ON");
       delay(10000);
       lcd.clear();
  }
   }
```

● Sprint 2 :-

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(6, 7, 8, 9, 10, 11);float
gasPin = A0;
float gasLevel;
int ledPin = 2;
int buttonPin = 3;int
buzzPin = 4; int
buttonState; int fan
= 5;

void  setup(){ pinMode(ledPin,
OUTPUT);
pinMode(buttonPin, INPUT);
pinMode(gasPin,INPUT);
pinMode(fan,OUTPUT);
Serial.begin(9600); lcd.begin(16,
2); lcd.setCursor(0,0); lcd.print("
Welcome");
```

```
lcd.setCursor(0,2);
lcd.print(" Youtube");
delay(500);
lcd.clear();
 }

 void loop(){
// Read the value from gas sensor and button
gasLevel = analogRead(gasPin);
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gasDetected(gasLevel);
buzzer(gasLevel);
exhaustFanOn(buttonState);
 }

 // Gas Leakage Detection & Automatic Alarm and Fan ONvoid
 gasDetected(float gasLevel){
   if(gasLevel >= 300){
    digitalWrite(buzzPin,HIGH);
    digitalWrite(ledPin,HIGH);
    digitalWrite(fan,HIGH);
    lcd.setCursor(0,0);
    lcd.print("GAS:");
```

```
      lcd.print(gasLevel);
     lcd.setCursor(0,2);
     lcd.print("FAN ON");
     delay(1000); lcd.clear();
    }else{ digitalWrite(ledPin,LOW);
     digitalWrite(buzzPin,LOW);
     digitalWrite(fan,LOW);
     lcd.setCursor(0,0);
     lcd.print("GAS:");
     lcd.print(gasLevel);
     lcd.setCursor(0,2);
     lcd.print("FAN OFF");
     delay(1000);
     lcd.clear();
}
  }
  //BUZZER
  void buzzer(float gasLevel){
  if(gasLevel>=300)
{
for(int i=0; i<=30; i=i+10)
{
tone(4,i);
```

```
  delay(400);
  noTone(4);
  delay(400);
  }
  }
   }
    // Manually Exhaust FAN ON
void exhaustFanOn(int buttonState){
  if(buttonState == HIGH){
  digitalWrite(fan,HIGH); lcd.setCursor(0,0);
  lcd.print("Button State:");
  lcd.print(buttonState); lcd.setCursor(0,2);
       lcd.print("FAN ON");
       delay(10000); lcd.clear();
  }
   }
```

● Sprint 3 :-

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(6, 7, 8, 9, 10,
11);float gasPin = A0;
float
gasLevel;int
ledPin = 2;
int buttonPin =
3;int buzzPin =
4; int
buttonState; int
fan = 5;

void setup(){
  pinMode(ledPin, OUTPUT);
  pinMode(buttonPin, INPUT);
  pinMode(gasPin,INPUT);
  pinMode(fan,OUTPUT);
  Serial.begin(9600);
  lcd.begin(16, 2);
  lcd.setCursor(0,0);
  lcd.print(" Welcome");
  lcd.setCursor(0,2);
  lcd.print(" Youtube");
```

```
delay(500);
lcd.clear();
 }

 void loop(){
// Read the value from gas sensor and
buttongasLevel = analogRead(gasPin);
buttonState = digitalRead(buttonPin);

// call the function for gas detection and button
workgasDetected(gasLevel);
buzzer(gasLevel);
exhaustFanOn(buttonState
);
 }

 // Gas Leakage Detection & Automatic Alarm and
 Fan ONvoid gasDetected(float gasLevel){
   if(gasLevel >= 300){
    digitalWrite(buzzPin,HIGH
    );
    digitalWrite(ledPin,HIGH);
    digitalWrite(fan,HIGH);
    lcd.setCursor(0,0);
    lcd.print("GAS:");
    lcd.print(gasLevel);
    lcd.setCursor(0,2);
    lcd.print("FAN ON");
    delay(1000);
```

```
    lcd.clear();
   }else{
    digitalWrite(ledPin,LOW);
    digitalWrite(buzzPin,LOW)
    ;digitalWrite(fan,LOW);
    lcd.setCursor(0,0);
    lcd.print("GAS:");
    lcd.print(gasLevel);
    lcd.setCursor(0,2);
    lcd.print("FAN OFF");
    delay(1000);
    lcd.clear();
}
 }
 //BUZZER
 void buzzer(float
 gasLevel){
 if(gasLevel>=300)
{
for(int i=0; i<=30; i=i+10)
{
tone(4,i);
delay(400);
noTone(4);
delay(400);
}
}
 }
```

```
   // Manually Exhaust FAN ON
void exhaustFanOn(int
 buttonState){if(buttonState ==
 HIGH){ digitalWrite(fan,HIGH);
 lcd.setCursor(0,0);
 lcd.print("Button State:");
 lcd.print(buttonState);
 lcd.setCursor(0,2);
      lcd.print("FAN ON");
      delay(10000);
      lcd.clear();
 }
  }
```

● Sprint 4 :-

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(6, 7, 8, 9, 10,
11);float gasPin = A0;
float
gasLevel;int
ledPin = 2;
int buttonPin =
3;int buzzPin =
4; int
buttonState; int
fan = 5;

void setup(){
  pinMode(ledPin, OUTPUT);
  pinMode(buttonPin, INPUT);
  pinMode(gasPin,INPUT);
  pinMode(fan,OUTPUT);
  Serial.begin(9600);
  lcd.begin(16, 2);
  lcd.setCursor(0,0);
  lcd.print(" Welcome");
  lcd.setCursor(0,2);
  lcd.print(" Youtube");
```

```
delay(500);
lcd.clear();
 }

 void loop(){
// Read the value from gas sensor and
buttongasLevel = analogRead(gasPin);
buttonState = digitalRead(buttonPin);

// call the function for gas detection and button work
gasDetected(gasLevel);
buzzer(gasLevel);
exhaustFanOn(buttonState
);
 }

 // Gas Leakage Detection & Automatic Alarm and
 Fan ONvoid gasDetected(float gasLevel){
   if(gasLevel >= 300){
    digitalWrite(buzzPin,HIGH
    );
    digitalWrite(ledPin,HIGH);
    digitalWrite(fan,HIGH);
    lcd.setCursor(0,0);
    lcd.print("GAS:");
    lcd.print(gasLevel);
    lcd.setCursor(0,2);
    lcd.print("FAN ON");
    delay(1000);
```

```
    lcd.clear();
   }else{
    digitalWrite(ledPin,LOW);
    digitalWrite(buzzPin,LOW)
    ;digitalWrite(fan,LOW);
    lcd.setCursor(0,0);
    lcd.print("GAS:");
    lcd.print(gasLevel);
    lcd.setCursor(0,2);
    lcd.print("FAN OFF");
    delay(1000);
    lcd.clear();
}
 }
 //BUZZER
 void buzzer(float
 gasLevel){
 if(gasLevel>=300)
{
for(int i=0; i<=30; i=i+10)
{
tone(4,i);
delay(400);
noTone(4);
delay(400);
}
}
 }
```

```
   // Manually Exhaust FAN ON
void exhaustFanOn(int
 buttonState){if(buttonState ==
 HIGH){ digitalWrite(fan,HIGH);
 lcd.setCursor(0,0);
 lcd.print("Button State:");
 lcd.print(buttonState);
 lcd.setCursor(0,2);
      lcd.print("FAN ON");
      delay(10000);
      lcd.clear();
 }
  }
```

Conclusion :-

After this project performance, can conclude that detection of the LPG gas leakage is incredible in the project system. Applicable usefully in the industrial and domestic purpose. In danger situations we are able to save the life by using this system. An alert is indicated by the GSM module.A sensor node senses gas like CO2, oxygen, propane. The estimated range of transmission and consumption of power is obtained. The simple procedures and Arduino UNO Micro controller area used to build the sensor.