# SETHU INSTITUTE OF TECHNOLOGY, KARIAPATTI

**An Autonomous Institution**

**B.E. ELECTRONICS AND COMMUNICATION ENGINEERING**

# Gas Leakage Monitoring and Alerting System for Industries

**INNOVATIVE PROJECT REPORT**

Submitted by


| | |
|---|---|
| G.RAJESH | 92172019104120 |
| S.MUKESHKUMAR | 92172019104096 |
| P.V.NANDHA KUMAR | 92172019104099 |
| B.MOHAMED IBRAHIM | 92172019104090 |


**TEAM ID: PNT2022TMID17318**

**for the course of**

**PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP**
**(Naalaiya Thiran Program)**

# INDEX

# 1.INTRODUCTION

## 1.1 Project Overview

Leakage of any kind of gas has been a concern in recent years, whether it is in a residential setting, a business, a cafe, or a canteen. In thispaper development of an IoT based gas wastage monitoring, leakage detecting and alerting system is proposed. This paper elaborates design such an intelligent system that will help save gas and smartly prevent accidents. The system needs to be integrated with the cooker. The technology includes ultrasonic sensors that determine if the cooker is being utilized for cooking purposes or not. If it is discovered that the cookeris not in use, the system uses an automatic switching off mechanism to cutoff the gas supply. The moment gas leakage will probably be recognized, users will be informed via SMS through GSM, and so that user can solve the issue as soon as possible. The system will monitor flame and fire through flame sensor. When a fire is detected, the buzzer begins to sound. Aside from that, the system also has a cloud storage capability. The usage of gasfor each user each day may be tracked with the aid of this cloud storage solution. At the end of the day, this procedure will assist in detecting per- user natural gas usage. The system has been tested and it is able to monitor gas wastage, leakage and send a SMS to the user. The resulting performance indicated its effectiveness toward saving a significant portionof the wasted gas in domestic.

## 1.2 Purpose

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.

# 2.LITERATURE SURVEY

## 2.1 EXISTING PROBLEM

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.

## 2.2 REFERENCES

**Survey 1:**

Pal-Stefan Murvay,Ioan Silea(2012)
'Journal of Loss Prevention in the Process Industries'
The main purpose of this paper is to identify the state-of-the-art in leak detection and localization methods. Additionally we evaluate the capabilities of these techniques in order to identify the advantages and disadvantages of using each leak detection solution.

**Survey 2:**

**Srinivasan, Leela, Jeyabharathi, Kirthik, Rajasree;(2014) 'Adapted approach for Species Classification'**
In this research paper they told about gas leakage detection and control. In this paper, the gas leakage resulting into fatal inferno has become a serious problem in household and other areas where household gas is handled and used. It alerts the subscriber through the alarm and the status display besides turning off the gas supply valve as a primary safety measure. This simplicity results in a high instruction turnout and spectacular real time interrupt response from a tiny and cost-efficient processor core. The microcontroller provides the data to the coil valve to shut its knob. The coil valve consists of a disc that's in touch with the spring. Once the gas leaks the disc comes in touch with the spring so it stops the flow of gas. Finally the gases area unit thrown out the disc moves so the gas flows. At that point the buzzer starts direful thereby to alert the neighbors. A Buzzer or electronic device is a signal device,

typically electronic,generally used in cars, manage appliances.such as microwave kitchen appliance or game shows.

**Survey 3:**

V Suma, Ramy
a R Shekar, Kumar A Akshay(2019) 'Gas Leakage Detection Based on IOT'
The aim of this paper is to present a new system automatically books a cylinder when the gas is about to empty is by sending a notification to the gas agency using wifi using Internet of Things approach.

**Survey 4:**

Adil Ahmad, Shaik Shaheeda
Department of Information Science and Engineering, Bengaluru Gas Leakage Detection Based System(ICEA2017).
The author has observed gas leakage and LPG levels where gas leakage occurs automatically. The authors suggests that gas leakage is performed by various gas sensors. Whose author has worked on gas leaks and mentions that we can take care if a found using a sensor and gas booking can be done automatically when a small amount of gas is taken closed.

**Survey 5;**

Mohd Abid PG student
Design and Embedded system, VTU PG centre kalaburagi, India IJETER volume 6,issue 4,April (2018).
Through this paper important parameters are used to find the level of gas in the container. The good purpose of this project is to get notification of gas leak to user when gas leakage is started. Arduino was originally created as a tool for fast sampling and activities for students with no knowledge for electronics. This paper uses a microcontroller, buzzer and a gas sensor to detect gas leakage system. When a gas leak is detected by a gas sensor ,the microcontroller turn on the buzzer in critical condition. The author suggest that this message or instruction may be displayed using an LCD display for LPG monitoring.

**Survey 6:**

Kulothungan. S, Gukan. A , Arunprabu.K.B Student, IFET College of Engineering. IJEDR 2019.
The proposed system detects LPG leaks and alerts customers. The alarm starts when the system notice and increases in LPG leakage concentration by sending an alarm and sending a message to specific mobile phone. The device assures safety and prevents explosions. A microcontroller based system based on gas sensor(MQ6) has been developed in proposed system to detect LPG leakage .The unit is also integrated with an alarm unit to detect signal

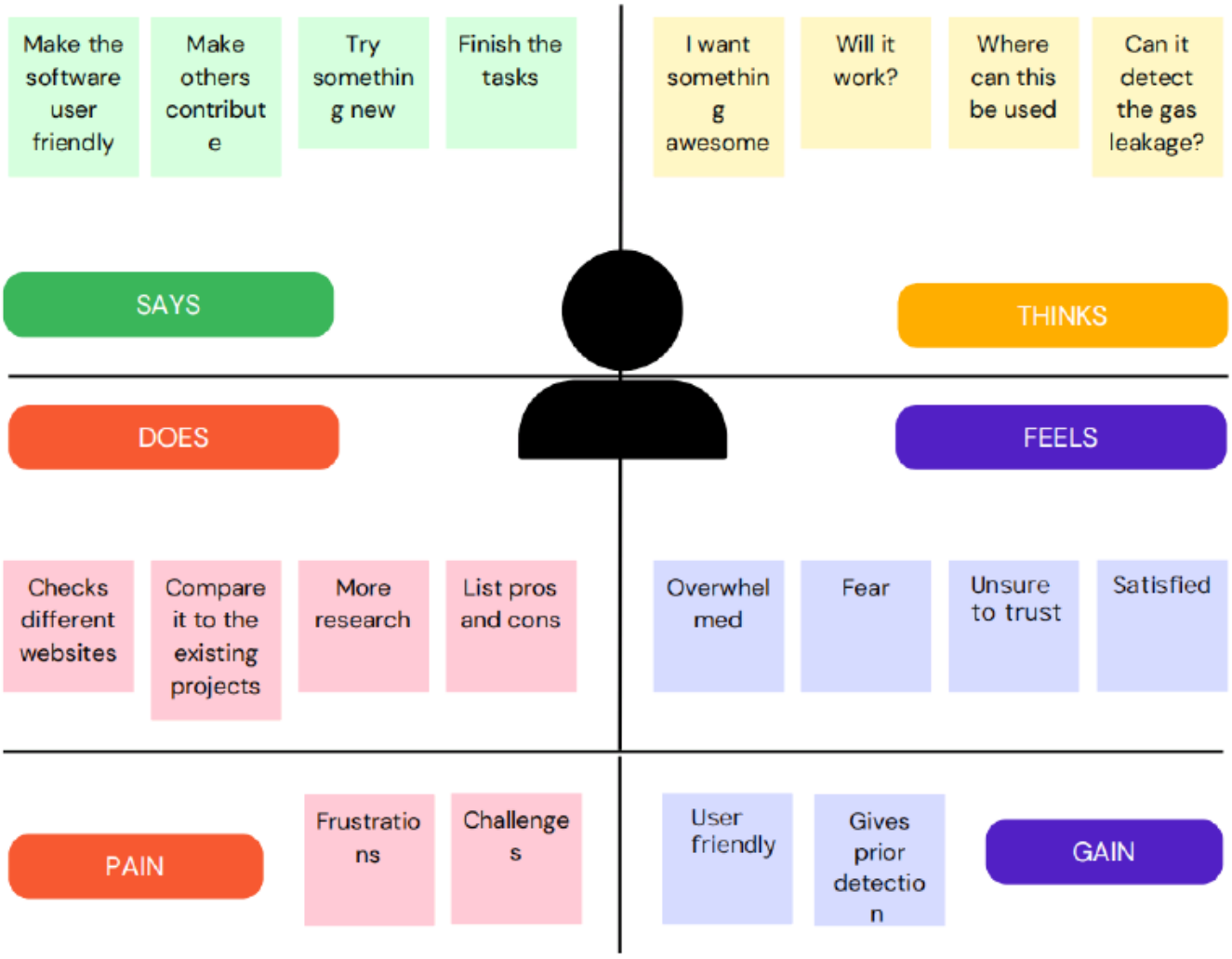
a leak.

## 2.3 PROBLEM STATEMENT DEFINITION

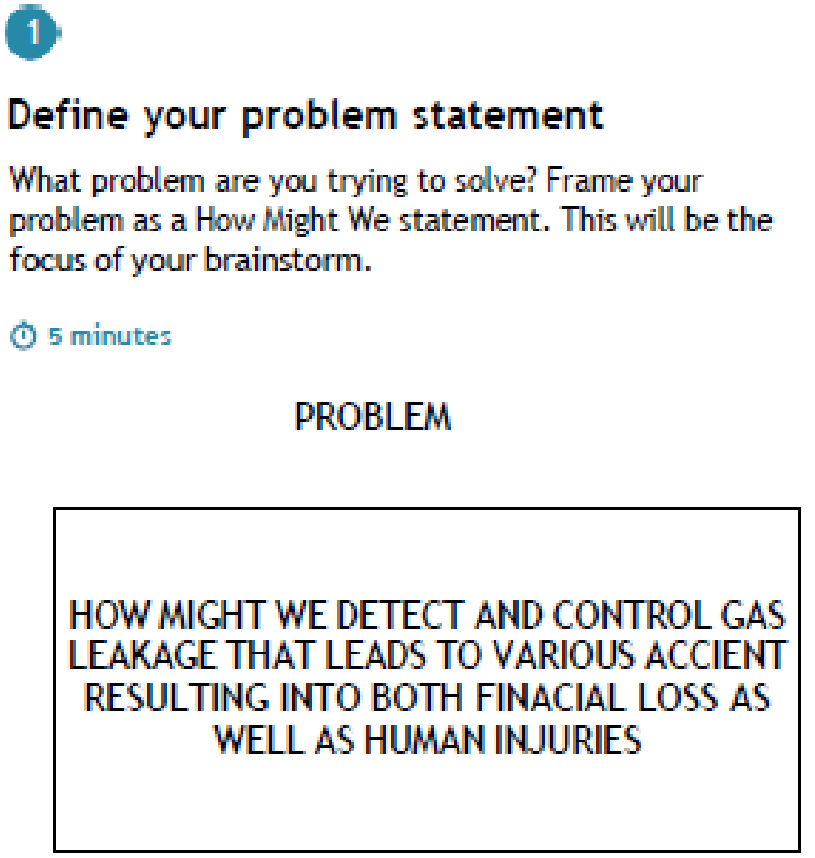
Domestically we use natural gas and it is very useful for burning purposes. If this gas is leaked in our kitchens, offices or factories and not sensed in time, it may lead to a fatal disaster, and may cause human loss. For this purpose, we came forward with an idea of making such an electronic device to sense that leakage and alarm the respective persons to solve that leakage problem and save assets and human lives. It also down our economical rate.

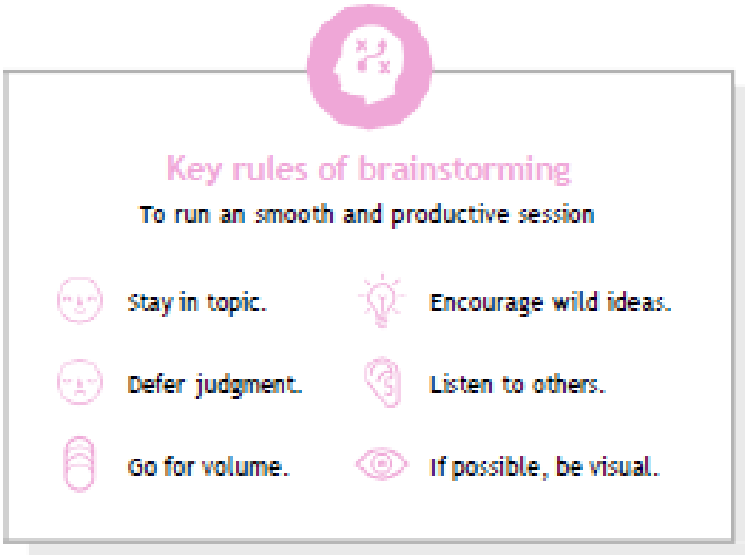
# 3.IDEATION & PROPOSED SOLUTION

## 3.1 Empathy Map Canvas



## 3.2 Ideation & Brainstorming



2

## Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

### RAJESH

- OPENING OF WINDOWS WHENEVER WE FEEL GAS LEAKAGE
- CLOSING THE NOB OF CYLINDER TO PREVENT GAS LEAKAGE
- REGULAR MAINTAINACE OF CYLINDER IN HOTELS
- NOT ALLOWING KINDS OR OTHERS TO SWITCH ON/OFF ANY ELECTRIC DEVICES
- PROTECTING SYSTEM FROM FIRE
- SETTING OF FIRE ALARMS IN HOTELS

### MUKESH

- INCREASING SECURITY IN GAS INDUSTRIES
- USAGE IF FIRE EXTINGUISHERS
- PROPER MAINTAINACE OF NOB
- ALARAM TO INDICATE GAS LEAKAGE IN GAS INDUSTRIES
- PROPER MAINTAINANCE TO AVIOD SHORTT CIRCUIT
- OPENING OF DOORS

### NANDHA

- CAREFUL HANDLING WHILE DELERING THE CYLINDERS
- CHECKING REGULATORS PROPERLY
- ALERTING DOCTOR IN CASE OF EXPLOTION
- EVACUATION EVERYONE IMMEDIATELY IF GAS LEAKAGE IS DETECTED IN HOME/ INDUSTURIES
- REGULARY CHECKING OF GAS CYLINDER
- AVOIDING PHONE CALLS WHEN GAS LEAKAGE IS SENSED

### IBRAHIM

- KEEPING CYLINDER AWAY FROM SUNLIGHT
- AVIOD SWITCHING ON EXHAUSTING FANS WHEN GETS LEAKAGE IS SENSED
- AVIOD PUTTING GAS CYLINDERS TOGETHER/CLOSER
- CALL FIRE SERVICE AWAY FROM HOME WHEN LEAKAGE IS SENSED
- HANDLE CAREFULLY WHILE CHANGING THE CYLINDER IN HOME
- TEACHING KIDS ABOUT GAS LEAKSE SAFETY MEASUREMENTS

3

## Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

### REQUIREMENT

- SENSORS
- ALARMS
- COMMUNICATION DEVICE
- PROPER MAINTAINCE

### GAIN

- SENDS THE DATA TO USER
- VARIOUS THEMES IN THE APP
- ENVIRONMENALLY FRIENDLY
- PROTECT THE WEALTH OF INDUSTRY

### ALERTING

- ALERTING THROUGH CALL
- ALERTING THROUGH SMS
- ALERTING BY SOUND
- IF ANY GAS LEAK SENSOR DETECT AND GIVE BUZZER SOUND

### PRECAUTION

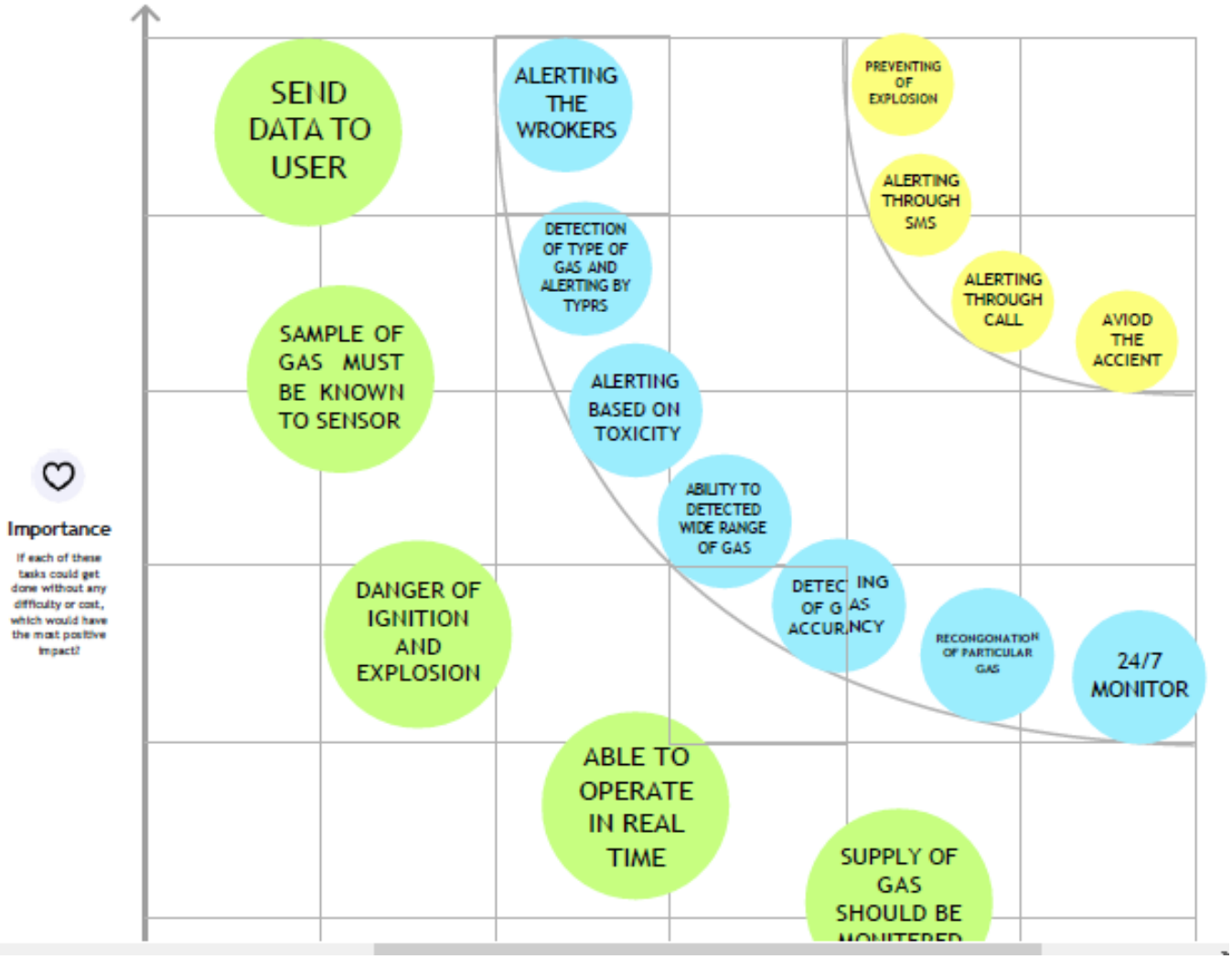
- PROPER MAINTAINACE
- SAFETY MEASUREMENT SHOULD BE TAKEN
- FREQUENT CHECKING
- PROPER CONTROL

4

## Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

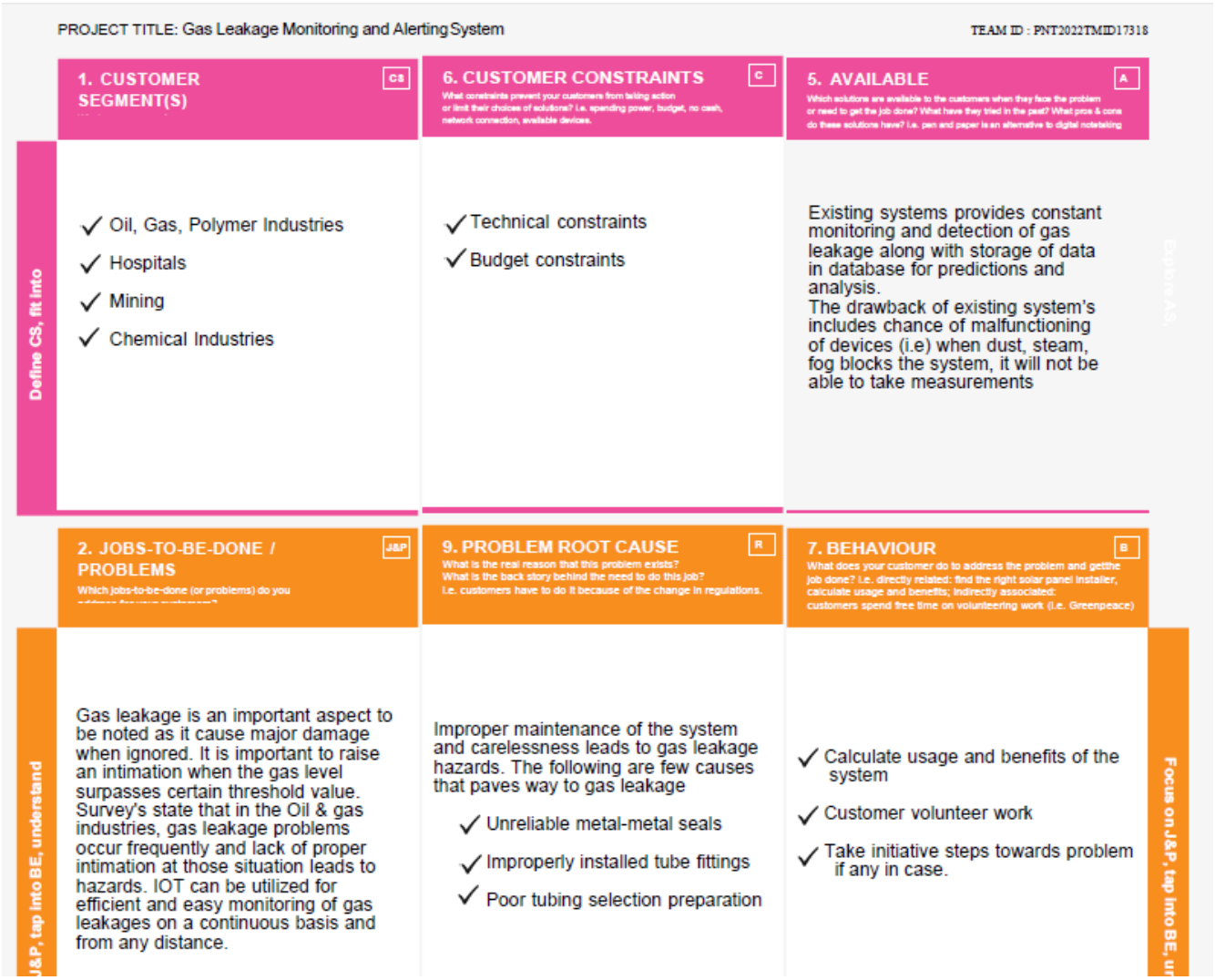


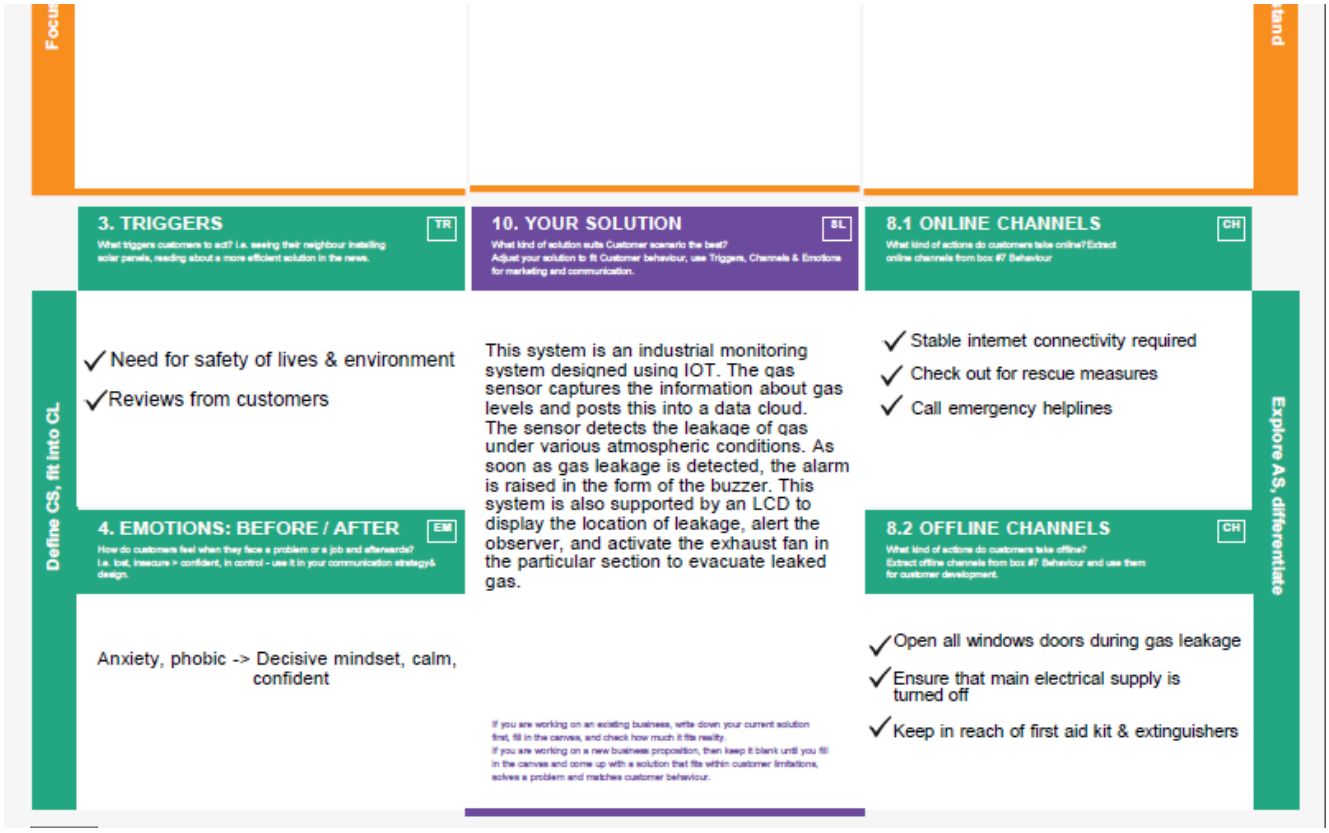
## 3.3 Proposed Solution

| 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 | 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 MQ 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. Thus the system at this stage can only be used asa primary indicator of leakage inside a plant. |
| 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 (RevenueModel) | 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. |

## 3.4 Problem Solution Fit




Focus
Stand
3. TRIGGERS
TR
What triggers customers to act? I.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.
10. YOUR SOLUTION
SL
What kind of solution suits Customer scenario the best?
Adjust your solution to fit Customer behaviour, use Triggers, Channels & Emotions for marketing and communication.
8.1 ONLINE CHANNELS
CH
What kind of actions do customers take online? Extract online channels from box #7 Behaviour
Define CS, fit into CL
Explore AS, differentiate
✓Need for safety of lives & environment
✓Reviews from customers
This system is an industrial monitoring system designed using IOT. The gas sensor captures the information about gas levels and posts this into a data cloud. The sensor detects the leakage of gas under various atmospheric conditions. As soon as gas leakage is detected, the alarm is raised in the form of the buzzer. This system is also supported by an LCD to display the location of leakage, alert the observer, and activate the exhaust fan in the particular section to evacuate leaked gas.
✓Stable internet connectivity required
✓Check out for rescue measures
✓Call emergency helplines
4. EMOTIONS: BEFORE / AFTER
EM
How do customers feel when they face a problem or a job and afterwards?
I.e. lost, insecure > confident, in control - use it in your communication strategy& design.
8.2 OFFLINE CHANNELS
CH
What kind of actions do customers take offline?
Extract offline channels from box #7 Behaviour and use them for customer development.
Anxiety, phobic -> Decisive mindset, calm, confident
✓Open all windows doors during gas leakage
✓Ensure that main electrical supply is turned off
✓Keep in reach of first aid kit & extinguishers
If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

# 4.REQUIREMENT ANALYSIS

## 4.1 Functional requirement

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|---|---|---|
| FR-1 | User Registration | Registration through Gmail<br>Registration through Mobile |
| FR-2 | User Confirmation | Confirmation via Email<br>Confirmation via OTP |
| FR-3 | Detection | The said system can be deployed in homes, hotels, factory units, LPG cylinder storage areas, and so on. The main advantage of this Arduino based application is that it can determine the leakage and send the data over to a site. |
| FR-4 | Monitoring | The leakage can be monitored and can be optimized for detecting toxic gasses. |
| FR-5 | Alerting | Along with monitoring the leakage it can alert the registered user and people in the vicinity are alerted by sounding the buzzer this can help in preventing any disaster. |
| FR-6 | Communication | The registered user is able to get alert from the system through a SMS and can also be able to get notification in app. |

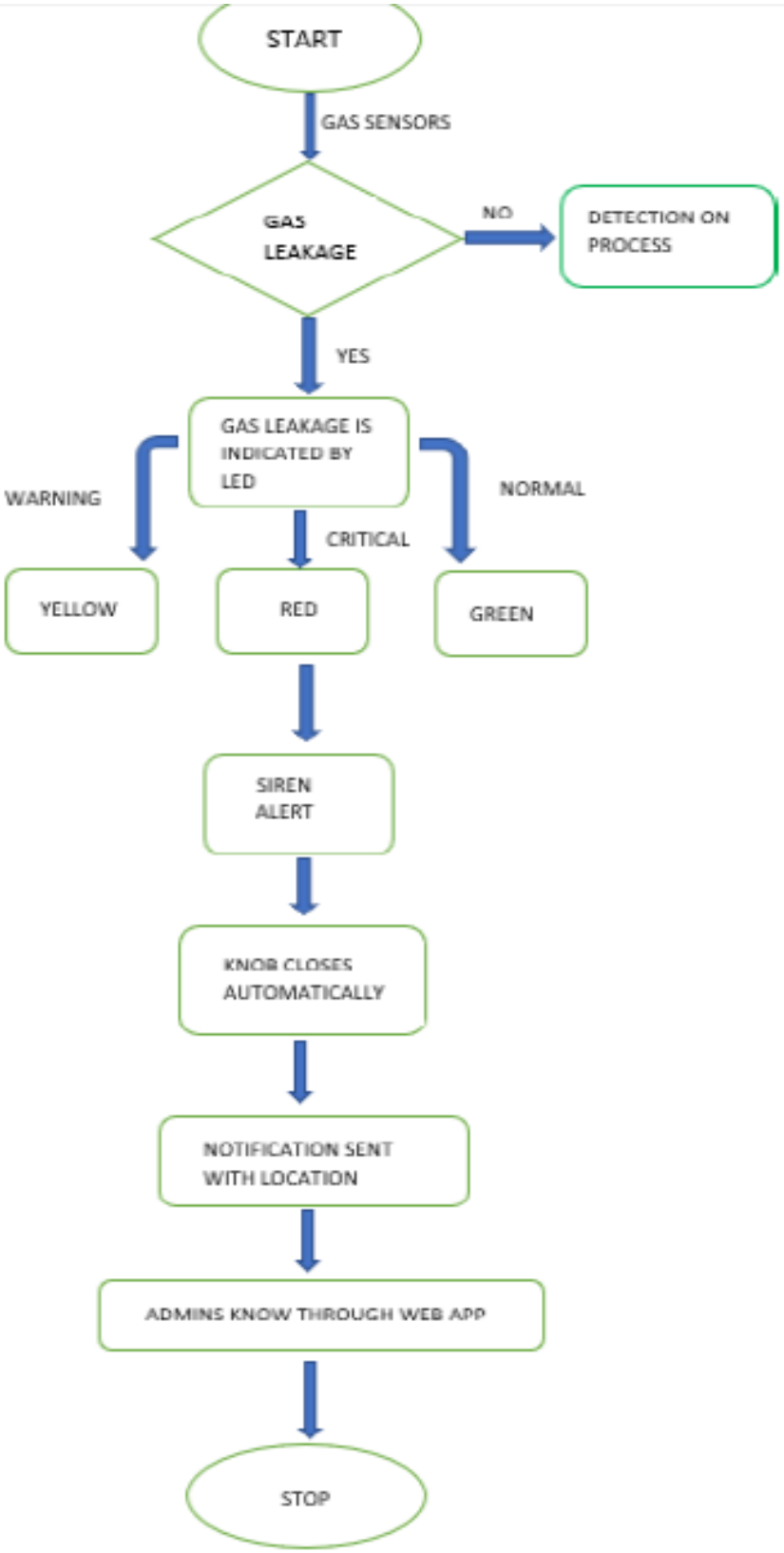
## 4.2 Non functional requirement

| FR No. | Non-Functional Requirement | Description |
|---|---|---|
| NFR-1 | **Usability** | This tool verifies that usability is a special and important perspective to analyse user requirements, which can further improve the tool quality. In the model process with user experience as the core, the analysis of users' usability can indeed help designers better understand users' potential needs, behaviour and experience. |
| NFR-2 | **Security** | By identifying the danger of hazardous gas leakage with prior notification people can evacuate in time. |

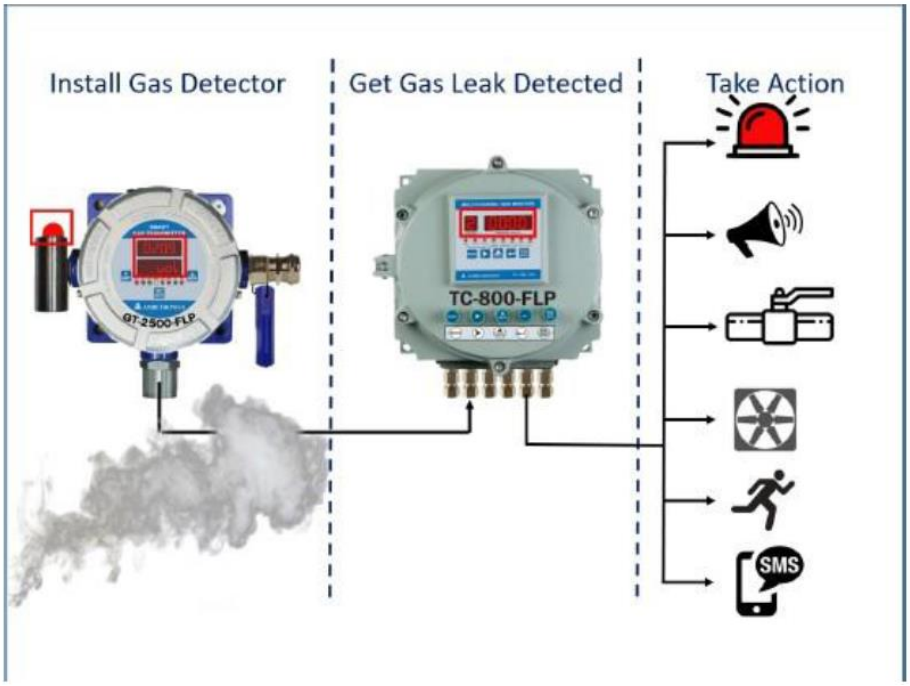
| | | |
|---|---|---|
| NFR-3 | **Reliability** | By the use of various sensors we can detect various gas leakage and can identify the location of the leakage |
| NFR-4 | **Performance** | In this technique the gas sensor sends the signal to the Arduino UNO after detecting the gas leakage . Arduino to other externally connected devices such as buzzer and GSM send vigorous signals. SMS is sent by GSM module to the provided mobile number as a result. IN practice, results are noticed by the people surrounding by the area are alerted by buzzer sound indicate the danger to the people by making beep sound. |
| NFR-5 | **Availability** | By developing & deploying resilient tool we alert the user by sounding the alarm and sending a SMS to a registered user. |
| NFR-6 | **Scalability** | By using this system that detects the gas leakage applicable usefully in the industrial and domestic purpose. In danger situations we are able save lives by using this system. |

# 5.PROJECT DESIGN

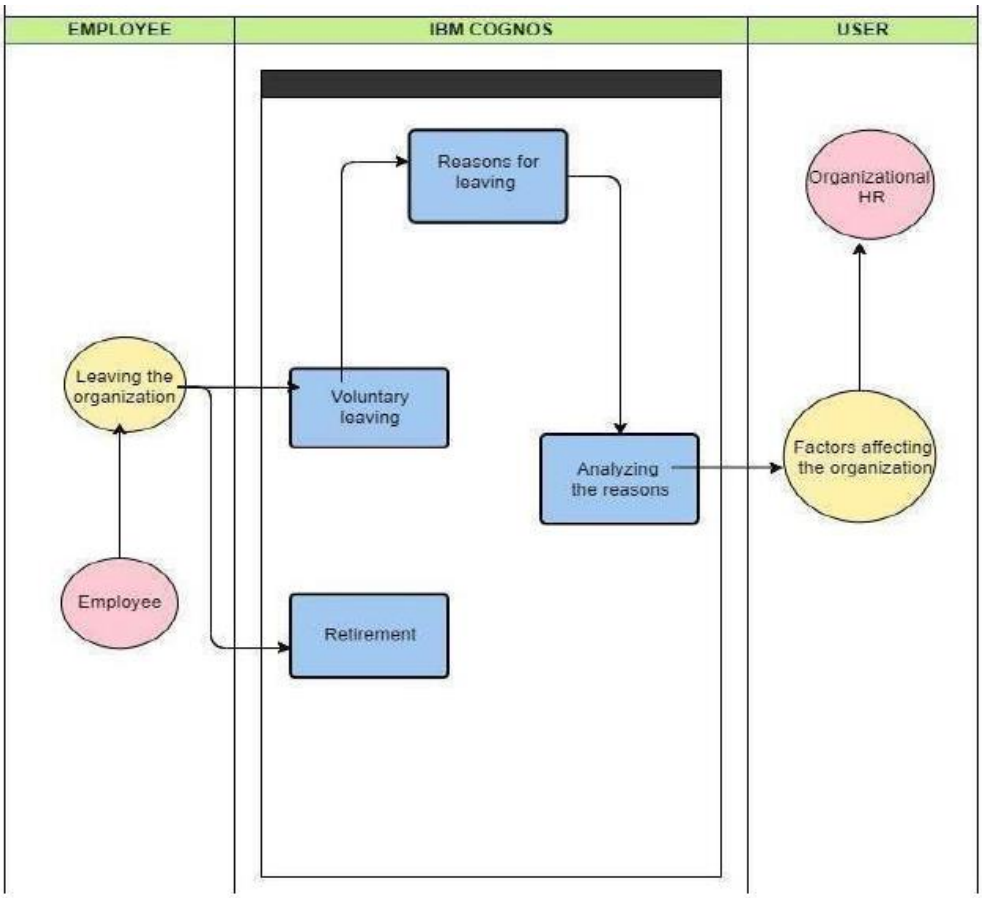
## 5.1 Data Flow Diagrams



## 5.2 Solution Architecture




## Technical Architecture



## 5.3 User Stories

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| Customer (Mobile user) | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access my account / dashboard | High | Sprint-1 |
| | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | I can receive confirmation email & click confirm | High | Sprint-1 |
| | | USN-3 | As a user, I can register for the application through Facebook | I can register & access the dashboard with Facebook Login | Low | Sprint-2 |
| | | USN-4 | As a user, I can register for the application through Gmail | | Medium | Sprint-1 |
| | Login | USN-5 | As a user, I can log into the application by entering email & password | | High | Sprint-1 |
| Customer (Web user) | Registration | USN-1 | As a user, I can register for the application by google. | I can access confirmation email. | High | Sprint-1 |
| | | USN-2 | As a user, I can register for the application by firebox. | I can access confirmation Login. | low | Sprint-2 |
| | Login | USN-3 | As a user, I can register for the application through Gmail | | Medium | Sprint-1 |
| Administrator | Registration | USN-1 | As a user, I can register for the application through Mobile app. | I can access confirmation My account | High | Sprint-1 |
| | | USN-2 | As a user, I can register for the application through Mobile app. | I can access confirmation email | low | Sprint-2 |

# 6. PROJECT PLANNING & SCHEDULING

## 6.1 Sprint Planning & Estimation

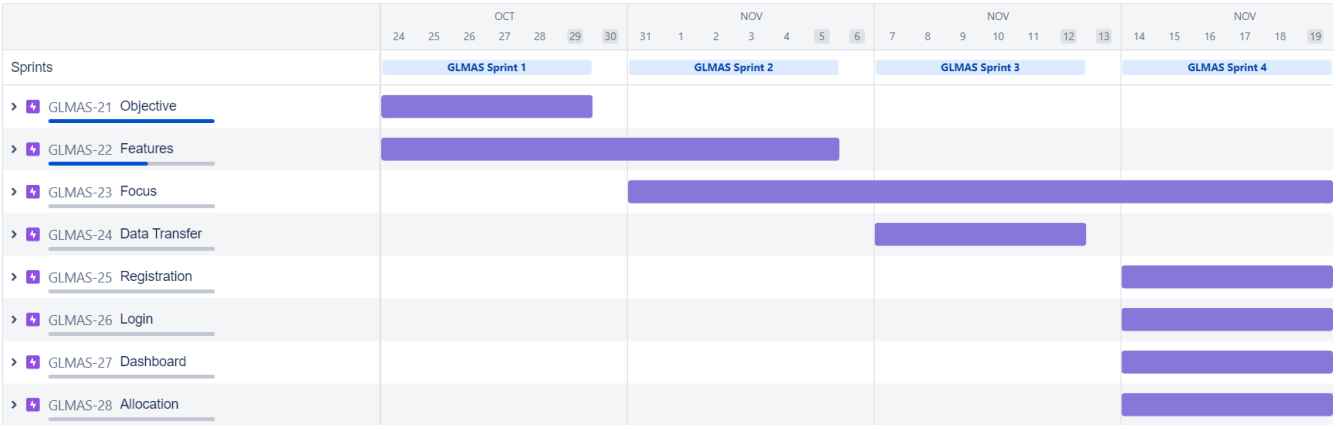
| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-1 | Objective | USN-1 | As a system, the gas sensor should detect the gas | 8 | High | Rajesh,Ibrahim |
| Sprint-1 | Features | USN-2 | As a system, the gas sensor values should be displayed in a LCD screen | 2 | Low | Nandha |
| Sprint-1 | Features | USN-3 | As a system, as soon as the detected gas reaches the threshold level, the red color LED should be turned ON. | 5 | High | Mukesh |
| Sprint-1 | Features | USN-4 | As a system, as soon as the detected gas reaches the threshold level, the siren should be turned ON. | 5 | High | Ibrahim |
| Sprint-2 | Focus | USN-5 | As a system, it should the send the location where the gas is detected | 8 | High | Mukesh,Rajesh |
| Sprint-2 | Focus | USN-6 | As a system, it should also send the alerting SMS to the registered phone number | 2 | Low | Ibrahim |
| Sprint-2 | Features | USN-7 | As a system, the gas leakage pipe should be closed automatically once there it attains the threshold value | 5 | Medium | Rajesh |
| Sprint-2 | Features | USN-8 | As a system, it will indicate that the gas leakage pipe is closed in the LCD screen and send SMS to the registered mobile number. | 5 | Medium | Nandha |
| Sprint-3 | Data Transfer | USN-9 | As a program, it should retrieve the API key of the IBM cloud to send the details of the system. | 2 | Low | Rajesh |
| Sprint-3 | Data Transfer | USN-10 | As a system, it should send the data of sensor values along with latitudes and longitudes to the IBM cloud | 5 | Medium | Mukesh |
| Sprint-3 | Data Transfer | USN-11 | As a cloud system, the IBM cloud should send the data to NodeRed | 2 | Medium | Nandha |
| Sprint-3 | Data Transfer | USN-12 | As a system, it should collect the data from the NodeRed and give it to the backend of the mit app. | 3 | Medium | Rajesh |
| Sprint-3 | Data Transfer | USN-13 | As an application, it should display the details of the gas level and other details to the user through the frontend of the mit app. | 8 | High | Mukesh,Nandha |
| Sprint-4 | Registration | USN-14 | As a user, I must first register my email and mobile number in the website | 2 | High | Nandha |

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-4 | Registration | USN-15 | As a user, I must receive confirmation mail and SMS on registration | 2 | Medium | Muukesh |
| Sprint-4 | Login | USN-16 | As a user, I can login into the web application through email and password. | 3 | High | Rajesh |
| Sprint-4 | Dashboard | USN-17 | As a user, I can access the dashboard and make use of available resources. | 2 | Medium | Ibrahim |
| Sprint-4 | Focus | USN-18 | As a user, I must receive an SMS once the leakage is detected. | 5 | High | Ibrahim |
| Sprint-4 | Allocation | USN-19 | As an admin, I must receive information about the leakage along with location and share exact location and route to the person. | 3 | High | Rajesh |
| Sprint-4 | Allocation | USN-20 | As an admin, I must allot particular person to look after the leakage in a particular location. | 3 | High | Rajesh |

## 6.2 Sprint Delivery Schedule

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-1 | 20 | 6 Days | 24 Oct 2022 | 29 Oct 2022 | 20 | 29 Oct 2022 |
| Sprint-2 | 20 | 6 Days | 31 Oct 2022 | 05 Nov 2022 | 20 | 05 Nov 2022 |
| Sprint-3 | 20 | 6 Days | 07 Nov 2022 | 12 Nov 2022 | 20 | 12 Nov 2022 |
| Sprint-4 | 20 | 6 Days | 14 Nov 2022 | 19 Nov 2022 | 20 | 19 Nov 2022 |

## 6.3 Reports from JIRA



# 7.CODING AND SOLUTIONING

```
#include
<LiquidCrystal.h>
                          LiquidCrystal lcd(5,6,8,9,10,11);

                          int redled = 2;
                          int greenled = 3;
                          int buzzer = 4;
                          int sensor = A0;
                          int sensorThresh = 400;


                          void setup()
                          {
                          pinMode(redled, OUTPUT);
                          pinMode(greenled,OUTPUT);
                          pinMode(buzzer,OUTPUT);
                          pinMode(sensor,INPUT);
                          Serial.begin(9600);
                          lcd.begin(16,2);
                          }


                          void loop()
                          {
                            int analogValue = analogRead(sensor);
                            Serial.print(analogValue);
                            if(analogValue>sensorThresh)
                            {
                              digitalWrite(redled,HIGH);
                              digitalWrite(greenled,LOW);
                              tone(buzzer,1000,10000);
                              lcd.clear();
                              lcd.setCursor(0,1);
                              lcd.print("ALERT");
                              delay(1000);
                              lcd.clear();
                              lcd.setCursor(0,1);
                              lcd.print("EVACUATE");
                              delay(1000);
                            }
                            else
                            {
```

```
    digitalWrite(greenled,HIGH);
    digitalWrite(redled,LOW);
    noTone(buzzer);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("SAFE");
    delay(1000);
    lcd.clear();
    lcd.setCursor(0,1);
    lcd.print("ALL CLEAR");
    delay(1000);
  }

}
```

## FEATURE:

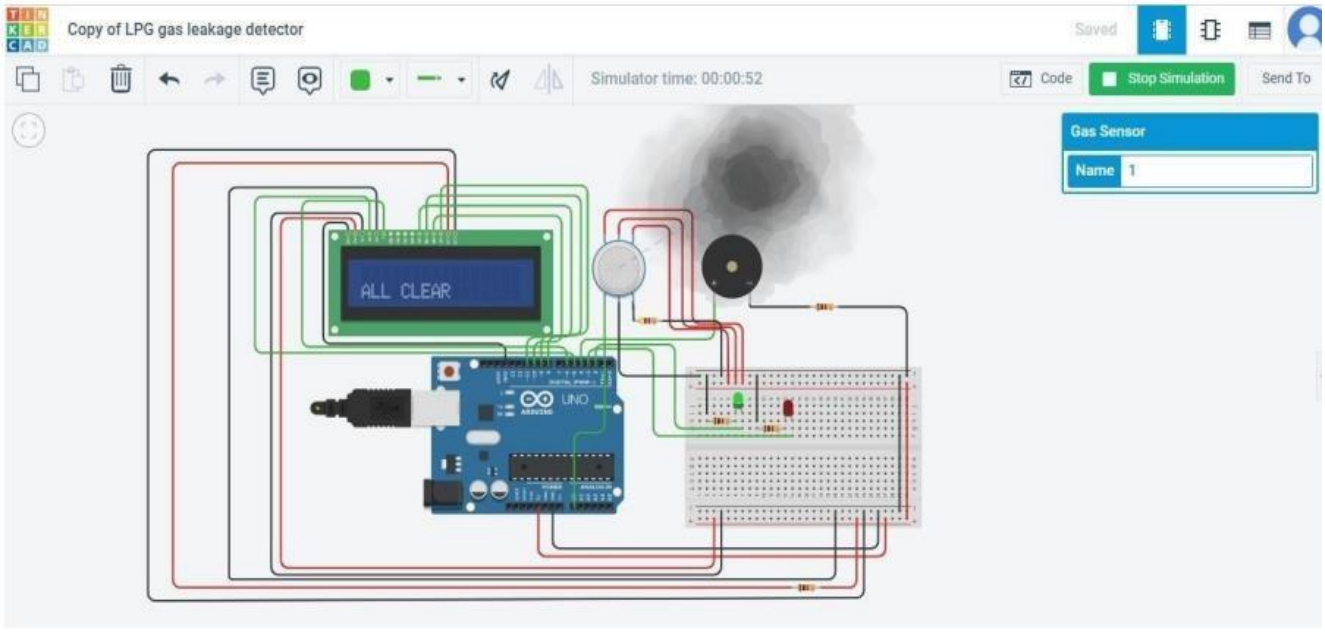
The system might be viewed as a modest attempt to link up the principal gas detection techniquesnow in use with a mobile platform coupled with IoT platforms. One metre around the rover, the gases are detected, and the sensor output data is continually sent to the nearby server. Stray gasesare also detected because of the sensors' subpar precision, which introduces some inaccuracy into their results, particularly in the case of methane. Additionally, the storage and availability of hazardous gases like hydrogen sulphide makes it difficult to test the integrated gear. The complexity of system maintenance and material selection for the system in the event of corrosivegases is reduced because the system operates outside the pipeline. The system can only be used asa primary indicator of leakage inside a plant at this point.

## 8.TESTING

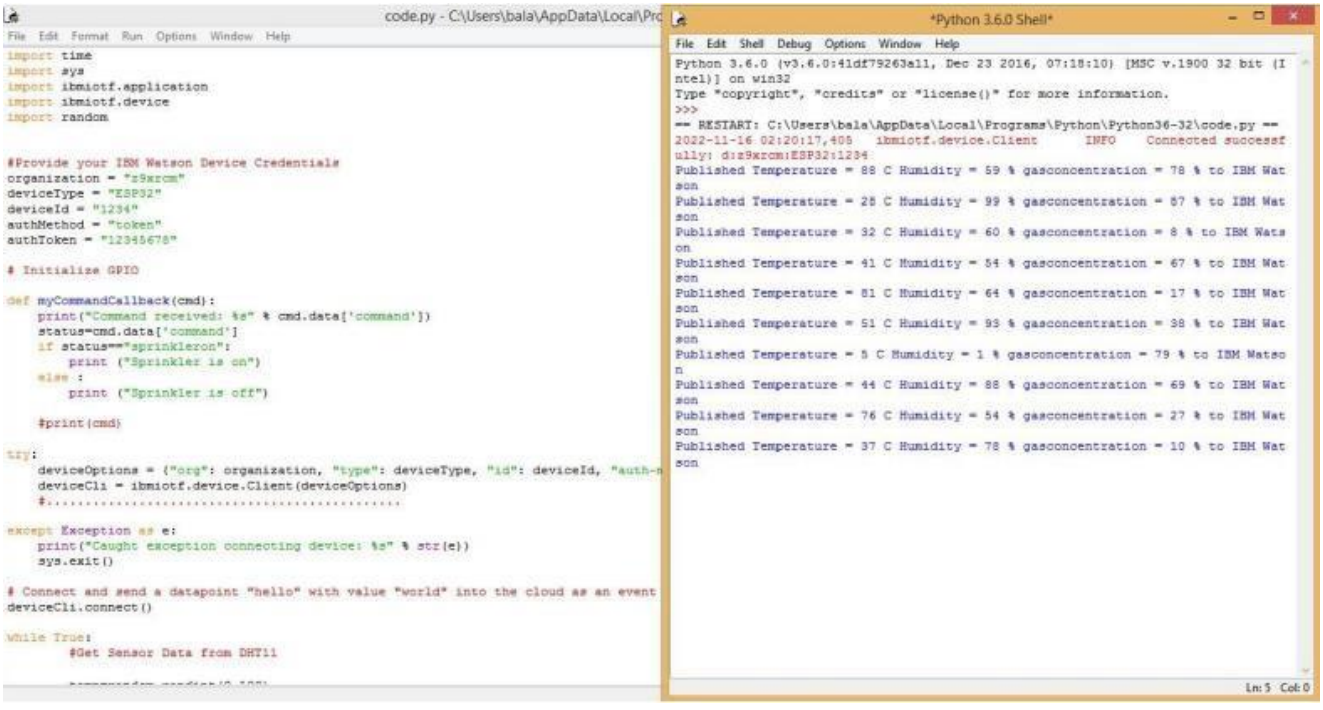
### TEST CASES:

| sno | parameter | Values | Screenshot |
|---|---|---|---|
| | | | |
| 1 | Model summary | - | |
| 2 | accuracy | Training accuracy-95%<br>Validation accuracy-72% | |
| 3 | Confidence score | Class detected-80%<br>Confidence score-80% | |

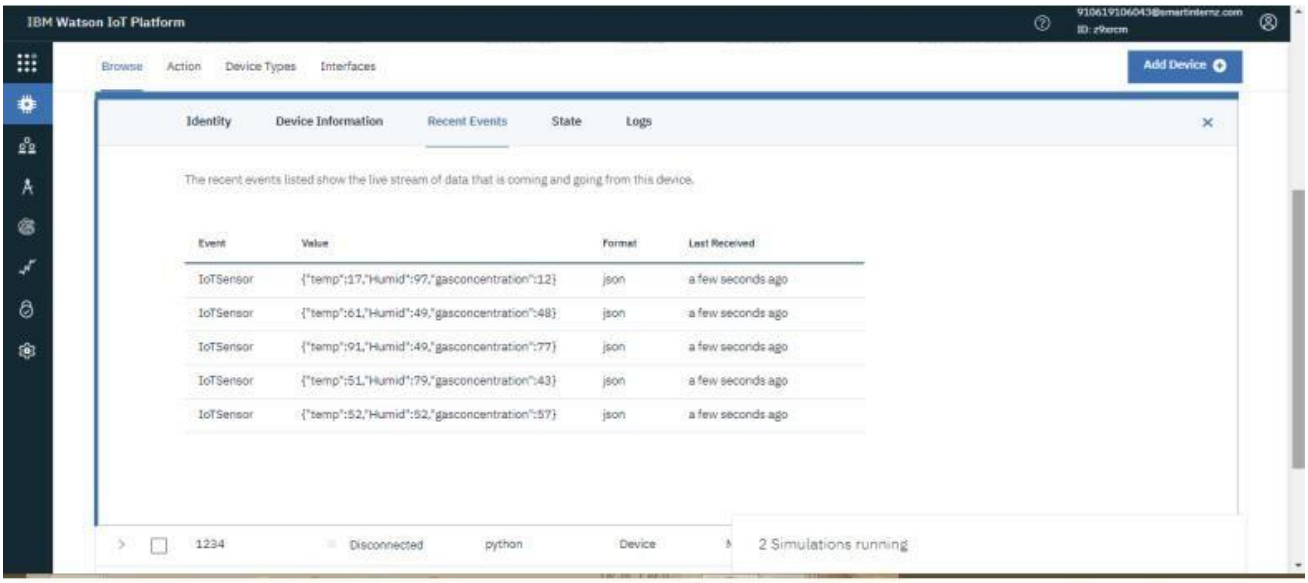
**TINKERCAD:**



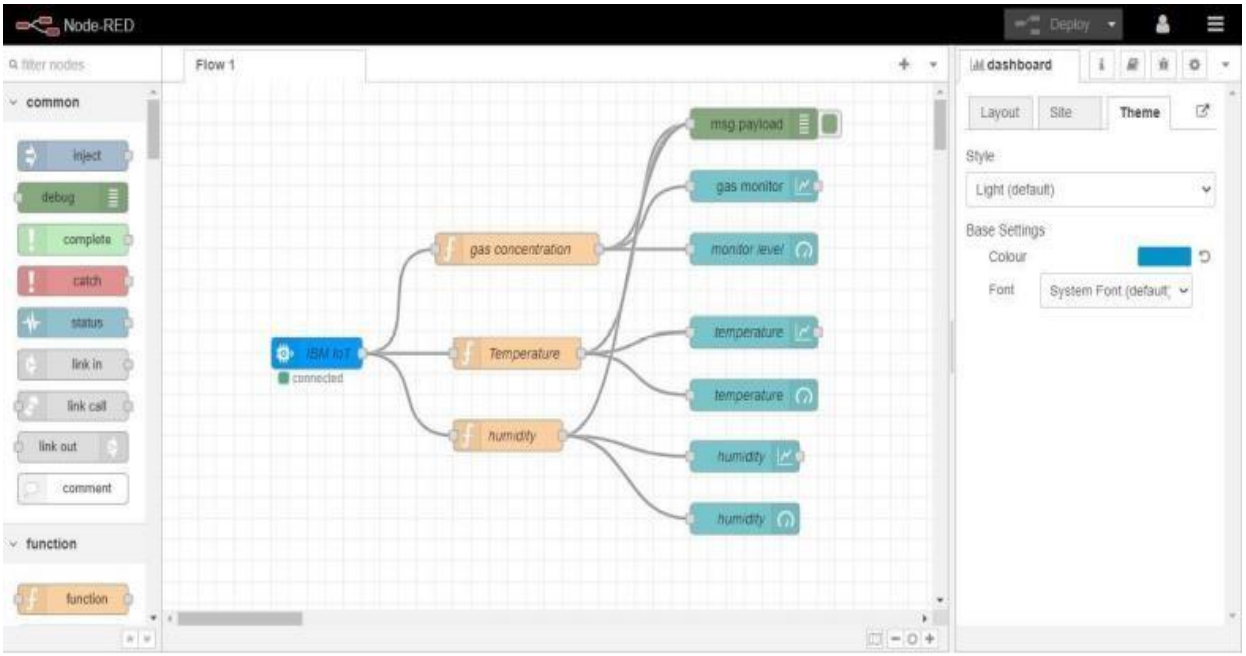

# PYTHON CODE EXECUTION:

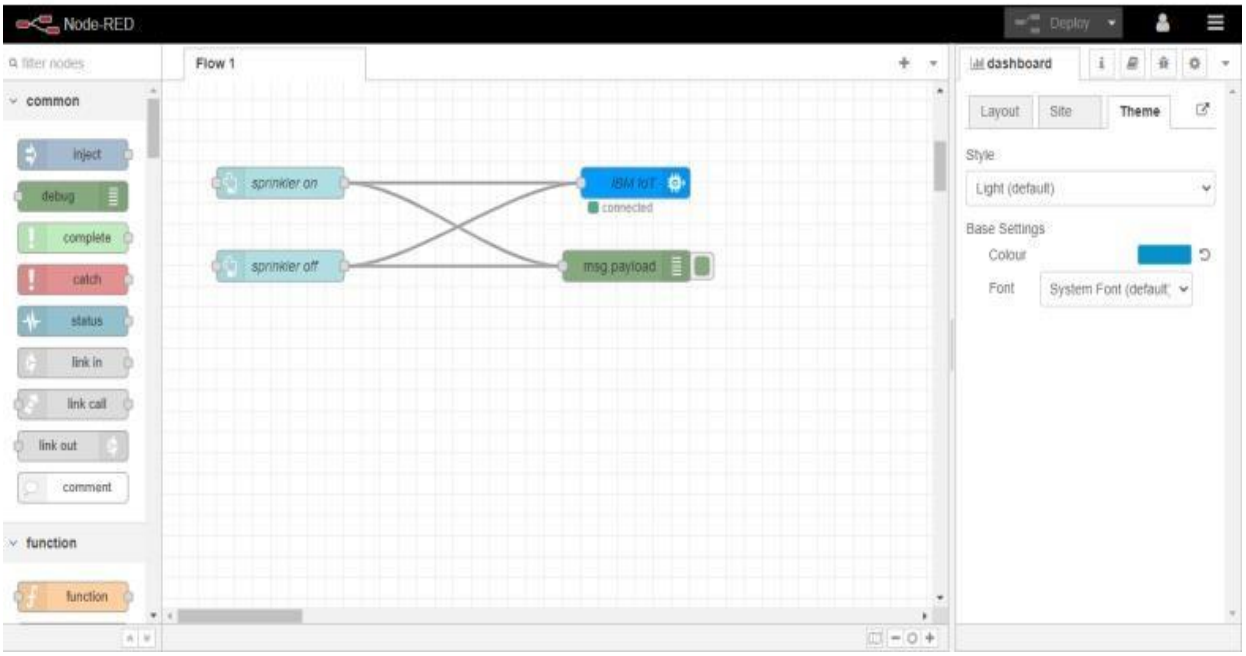


RECENT EVENTS IN IBM WATSON IOT PLATFORM:




**NODE RED FLOW:**



**DASHBOARD CREATED USING NODE:**


## 11.CONCLUTION

Gas escape could result in severe accidents which ends in material losses and human injuries. Gas escape happens chiefly because of poor maintenance of apparatus and inadequate awareness of the individuals. Thus LPG escape detection are useful to stop accidents and to avoid wasting human lives. This paper conferred LPG escape detection and alert system. This technique triggers buzzer and displays the severity of the escape to alert individuals once LPG escape is detected. This technique is incredibly straightforward nevertheless reliable.

It leaves United States with the additional scope of improvement. Battery utilized in this technique is of 5V that isn't that a lot of tolerable, in future improvement, we are able to use a much bigger, reversible one, which may sustain the gas detection module for an extended amount of your time, with alert whenever battery runs out' In additional modification, additionally to solely escape detectionwe are able to resolve the concentration of the gas too. The paper includes a smart viability to be launched in industrial market, tiny scale industries having multiple cylinders hold on. With additional improvement in style the system will be created additional handy and price effective for the users.

# APPENDIX:

## SOURCE CODE:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(5,6,8,9,10,11);
int redled = 2;
int greenled = 3;
int buzzer = 4;
int sensor = A0;
int sensorThresh = 400;
void setup()
{
pinMode(redled, OUTPUT);
pinMode(greenled,OUTPUT);
pinMode(buzzer,OUTPUT);
pinMode(sensor,INPUT);
Serial.begin(9600);
lcd.begin(16,2);
}
void loop()
{
  int analogValue = analogRead(sensor);
  Serial.print(analogValue);
  if(analogValue>sensorThresh)
  {
```

```
  digitalWrite(redled,HIGH);
  digitalWrite(greenled,LOW);
  tone(buzzer,1000,10000);
  lcd.clear();
  lcd.setCursor(0,1);
  lcd.print("ALERT");
  delay(1000);
  lcd.clear();
  lcd.setCursor(0,1);
  lcd.print("EVACUATE");
  delay(1000);
 }
 else
 {
  digitalWrite(greenled,HIGH);
  digitalWrite(redled,LOW);
  noTone(buzzer);
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("SAFE");
  delay(1000);
  lcd.clear();
  lcd.setCursor(0,1);
  lcd.print("ALL CLEAR");
  delay(1000);
 }
}
```