

Team ID	PNT2022TMID19555
Project Title	Gas leakage monitoring and alerting system for industries

GAS LEAKAGE MONITORING AND ALERTING SYSTEM FOR INDUSTRIES

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1.INTRODUCTION

1.1 PROJECT OVERVIEW

Safety plays a major role in today's world and it is necessary that good safety systems are to be implemented in places of education and work. This work modifies the existing safety model installed in industries and this system also be used in homes and offices. Gas Leakages in open or closed areas can prove to be dangerous and lethal. Leakage in any kind of gas are concern in recent years,whether it is an residential area, a cafe, or a canteen or industrial sectors. The traditional Gas Leakage Monitoring Systems though have great precision, fail to acknowledge a few factors in the field of alerting the people about the leakage. Therefore we use latest technology like Internet of Things based Gas leakage monitoring, leakage detecting and alerting system is proposed. The moment gas leakage will probably be recognized, users will be informed via SMS through GSM module. The system will monitor the gas and display through LCD display. Whenever the leakage is detected the buzzer begins sound. Also store the data using cloud data storage. This will detect the harmful gases in environment and alerting to the user through alarm and sending notification.

1.2 PURPOSE

For safety purpose, we use this device. The industries use different types of gases so gas leakage occurs it affect the workers health issue and sometimes it is reason of fire accident.so we have to maintain the gas pipes and monitor the gas if monitor the gas by 24 hrs and leakage occur it alert the buzzer sound and send notification for responsible person.

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
1	A Mobile Gas Detector with an Arduino Microcontroller	It describes hardware synthesis for a mobile gas detector with an Arduino microcontroller. The main aim of this project is to find the dangerous zone where many stationary detectors are unpractical or too expensive. Thus, we present a self-propelled robotic gas detector.	<ul style="list-style-type: none"> • Arduino Mega 2560 MC, • L9110 motor driver, • 2Nos. DC motors, • Wi-Fi module ESP8266, • logic level converter, • MQ2 sensor, • HC-SR04 ultrasonic distance sensor 	Internet of Things	<p>ADVANTAGES</p> <ul style="list-style-type: none"> • Arduino has some sound advantages, such as large user community, free and broad ranges of libraries of codes, relatively <u>low cost</u> components, and so forth. <p>DISADVANTAGES</p> <ul style="list-style-type: none"> • Its disadvantages are its small and a user has to work in a relatively small space. In many broad and multi-purpose projects, its required to look for third party sources in addition to Arduino scripts.

S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
2	Gas Leakage Detection and Alert System using IoT	We design and develop an propose system which include some safety factors. A safety has been a major issue in today's day to day life.	<ul style="list-style-type: none"> • Regulator • Rectifier • LCD Display • Gas Sensor • Wi-fi Module • Arduino UNO 	Internet of Things	<p>ADVANTAGES</p> <ul style="list-style-type: none"> • The sensor-enabled solution helps prevent the high risk of gas explosions and affecting any casualties within and outside the premises. <p>DISADVANTAGES</p> <ul style="list-style-type: none"> • It is affected due to ambient light interference.

S.NO	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
3	Gas Leakage Detector and Warning Generator	The main aim of this project is to find the dangerous zone where many stationary detectors are impractical or too expensive. Thus, we present a self-propelled robotic gas detector. It describes hardware synthesis for a mobile gas detector with an Arduino microcontroller.	<ul style="list-style-type: none"> • Arduino Mega 2560 MC, • L9110 motor driver, • 2Nos. DC motors, • Wi-Fi module ESP8266, • logic level converter, • MQ2 sensor, • HC-SR04 ultrasonic distance sensor 	Internet of Things	ADVANTAGES The sensor-enabled solution helps prevent the high risk of gas explosions and affecting any casualties within and outside the premises. The gas sensors help detect the concentration of the gases present in the atmosphere to avoid hazardous consequences like fire breakouts DISADVANTAGES <ul style="list-style-type: none"> • It has ability to detect wide range of gases.

2.2 REFERENCE

1. dekitan, A. I., Matthews, V. O., & Olasunkanmi, O. (2018). A microcontroller based gas leakage detection and evacuation system. IOP Conference Series: Materials Science and Engineering, 413, 012008. doi: 10.1088/1757-899x/413/1/012008
2. Shrivastava, A., Prabhaker, R., Kumar, R., & Verma, R. GSM based gas leakage detection system. International Journal of Emerging Trends in Electrical and Electronics (IJETEE-ISSN: 2320-9569), 2013; 3(2):42-45.
3. Priya, P. D., & Rao, C. T. Hazardous Gas Pipeline Leakage Detection Based on Wireless Technology. International Journal of Professional Engineering Studies, India, 2014; 2(1).

2.3 PROBLEM STATEMENT

Software Required:

Python IDLE

System Required:

RAM-Minimum 4GB Processor-Min. Configuration OS-Windows/Linux/MAC

Gas Leakage Monitoring & Alerting System for Industries has all the features as explained below

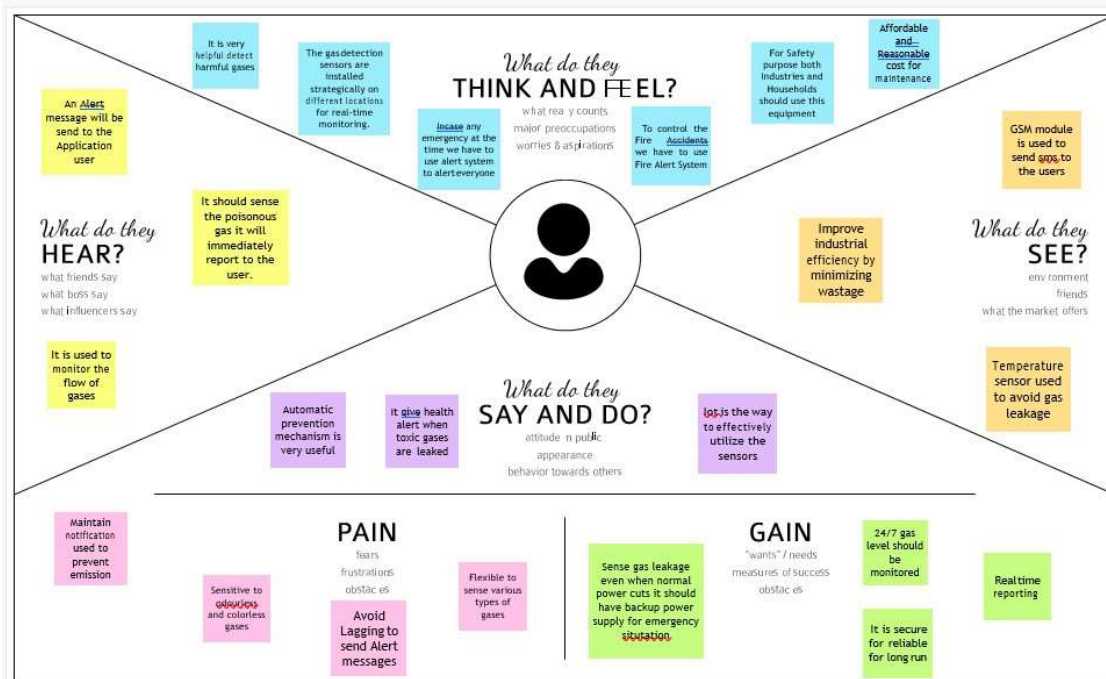
Features:

- This project helps the industries in monitoring the emission of harmful gases
- In several areas, the gas sensors will be integrated to monitor the gas leakage
- If in any area gas leakage is detected the admins will be notified along with the location
- In the web application, admins can view the sensor parameters.

The diagram illustrates the Cloud Services architecture. An IoT Device sends data to the IBM Watson IoT Platform. The platform connects to Node-RED, which is linked to a Web UI and a Cloudant DB. Node-RED also sends data to FAST SMS. A Python Code block (random data) is shown as an input to the system.

3.1 EMPATHY MAP CANVAS


Build empathy and keep your focus on the user by putting yourself in their shoes.



Share your feedback

3.2 IDEATION AND BRAINSTORMING

Template



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
⌚ 1 hour to collaborate
👤 2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

A Team gathering:
Define who should participate in the session and send an invite. Share relevant information or prework ahead.

B Set the goal:
Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools:
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →


1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM

- This project helps the industries in monitoring the emission of harmful gases.
- In several areas, the gas sensors will be integrated to monitor the gas leakage.
- If in any area gas leakage is detected the admins will be notified along with the location.
- In the web application, admins can view the sensor parameters.



Key rules of brainstorming

To run an smooth and productive session:

- 👤 Stay in topic.
- 💡 Encourage wild ideas.
- 🕒 Defer judgment.
- 👂 Listen to others.
- 🗣️ Go for volume.
- 🖼️ If possible, be visual.

2 Brainstorm

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

⌚ 10 minutes

TIP
You can select a sticky note and tap the pencil icon to start drawing!

SHEELA S

- Use different type of sensor to detect the gas
- You can monitor the amount of gases to regularly
- Increase in accuracy level
- detector is used to collect and collects gas
- Use quality pipes to transfer gas
- have any comprehensive message and to user

VIJAY PRABU S

- Use gas sensor to use to monitor status of chemical substances
- Use buzzer alert system
- Insert GSM module to get sms alert for user
- Use natural gas detector is also used to detect the gas in industrial
- Wireless sensor network is used to get message from
- If you have any high concentration gas the sensor is used to detect and send get sensor

VIGNESH KUMAR M

- Use most common gas detector and it indicates to display different sensor
- Gas detector is used to measure the different gas how to measure the data
- LCD monitor is used to display the gas levels
- Natural gas is used to detect the leak detector
- there are three types of gas modules the third you can choose suitable by device
- gas needs to transmit the high transmission quality

NITHESH KUMAR S

- Check temperature and humidity
- Power sensor is present in power up time
- Using the alternative gas to monitor the leaked gas
- Use can be the message from the sensor device
- Remote monitor
- MQ4 sensor detect gas leakage

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 can break it up into smaller sub-groups.

⌚ 20 minutes

ALERTING

- Use GSM module to send the alert notification to concerned user.
- when the gas range reaches the danger level the buzzer arise

MOBILE APP

- Use mobile app to send the alert notification to user.

TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your board.

DETECTOR

- Gas detector is used to detect the gas leakage
- Use natural gas detector is used to detect the gas

SENSOR

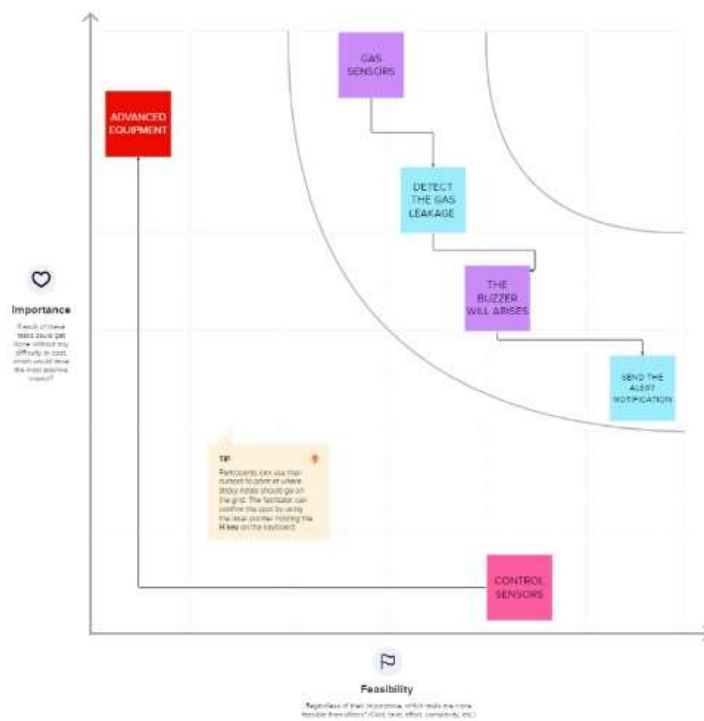
- Use gas sensor to receive the different type of gases
- If you are use customizable gas to detect the of and gas alarm
- Use LCD monitor to display the measure level

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



+

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

- Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

- Strategy blueprint**
Define the components of a new idea or strategy.
[Open the template](#)
- Customer experience journey map**
Understand customer needs, motivations, and obstacles for an experience.
[Open the template](#)
- Strengths, weaknesses, opportunities & threats**
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
[Open the template](#)

[Share template feedback](#)



3.3 PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none">➤ It helps for monitoring the emission of harmful gases.➤ If in any area gas leakage is detected the admins will be notified along with the Location and sent alert message to all workers.➤ Admins can view the sensor Parameters.
2.	Idea / Solution description	<ul style="list-style-type: none">➤ Smart bands are used to alert workers of gas leaks in factories.➤ GSM technique is used to send alert messages to the respective persons and workers, if there is no response it sends the message to fire department.➤ Using offline messaging alert facility alerting people without internet in range of upto 100 meters.
3.	Novelty / Uniqueness	<ul style="list-style-type: none">➤ Visual and Audible alarms are triggered.➤ It is power consumption and it is effective.
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none">➤ Get real-time alerts about the gaseous presence in the atmosphere➤ Prevent fire hazards and explosions➤ Supervise gas concentration levels➤ Ensure worker's health using alert fit band.➤ Cost-effective➤ Get immediate gas leak alerts

5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> ➤ We can introduce product-based approach to earn a good revenue. The greater number of features attract the end users to use our application.
6.	Scalability of the Solution	<ul style="list-style-type: none"> ➤ Our application can be used by the company which located in under the gas leakage area. We use IBM Watson cloud server to collect the live data the current data. we will ensure the safety of the workers. ➤ Not only triggering alarm it also can perform reactive operations like spreading a particular for making the leaked gas inactive.

3.4 PROBLEM SOLUTION FIT

Define CS, fit into CC	<p>1. CUSTOMER SEGMENT(S)</p> <p>❖ In Industry we have to ensure the safety of workers because we don't know the whether the gas leakage is occur.</p> <p>❖ In home, we use gas stove for cooking purpose . To identify the leakage use some external device.</p>	<p>6. CUSTOMER CONSTRAINTS</p> <p>❖ To prevent the gas leakage,the industries must use quality pipes to transfer the gas.</p> <p>❖ Maintenance should be taken atleast once in a month to prevent the gas leakage and services are done by technicians.</p>	<p>5. AVAILABLE SOLUTIONS</p> <p>❖ Use GSM module to your product it will send the alert notification to concerned user.</p> <p>❖ In devices,we use sensor to sense the gas leakage .</p>	Explore AS, differentiate

Focus on J&P, tap into BE, understand RC	<p>2. JOBS-TO-BE-DONE / PROBLEMS</p> <p>J&P</p> <p>In Industries, we transfer the gas through pipe line if we use qualityless pipes it cause gas leakage and if we maintain the cylinder properly it also cause disaster.</p>	<p>9. PROBLEM ROOT CAUSE</p> <p>RC</p> <ul style="list-style-type: none">❖ Sometimes the device gives false alarm it is a problem.❖ We use sensors to sense the gas, sometimes the sensors are not working proper it is also a problem.❖ We use lot of gases in industry it is difficult to identify the difference between the gas it gives a problem.	<p>7. BEHAVIOUR</p> <p>BE</p> <ul style="list-style-type: none">❖ With the help of sensors we identify the gas leakage.❖ Monitor regularly to avoid gas leakage and we use gsm module to send alert notification.	Focus on J&P, tap into BE, understand RC
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Identifying Strong TR & EM	3. TRIGGERS TR <ul style="list-style-type: none"> ➤ Industries must take safety precaution for workers because the workers safety is most important. ➤ Identify the leakage at the time we take necessary measurement incase any emergency. 	10. YOUR SOLUTION SL <p>Incase if leakage occurs, we have to create alternate way to move out the workers.</p>	8. CHANNELS of BEHAVIOUR CH <p>8.1 ONLINE</p> <p>It's a way to maintain the relationship and we make lot of conversation to people.</p> <p>8.2 OFFLINE</p> <p>The product based on gas leakage system is very less and customer prefer to visit and saw the products</p>
	4. EMOTIONS: BEFORE / AFTER EM <ul style="list-style-type: none"> ➤ Before use this product workers feel unsafe to work under the gas areas because if leakage occurs it cause lot of damage. ➤ After use this product workers feel safe and peaceful mind to concentrate on his/her work because the product the detect the leakage it gives alarm signal to alert the workers. 		

4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

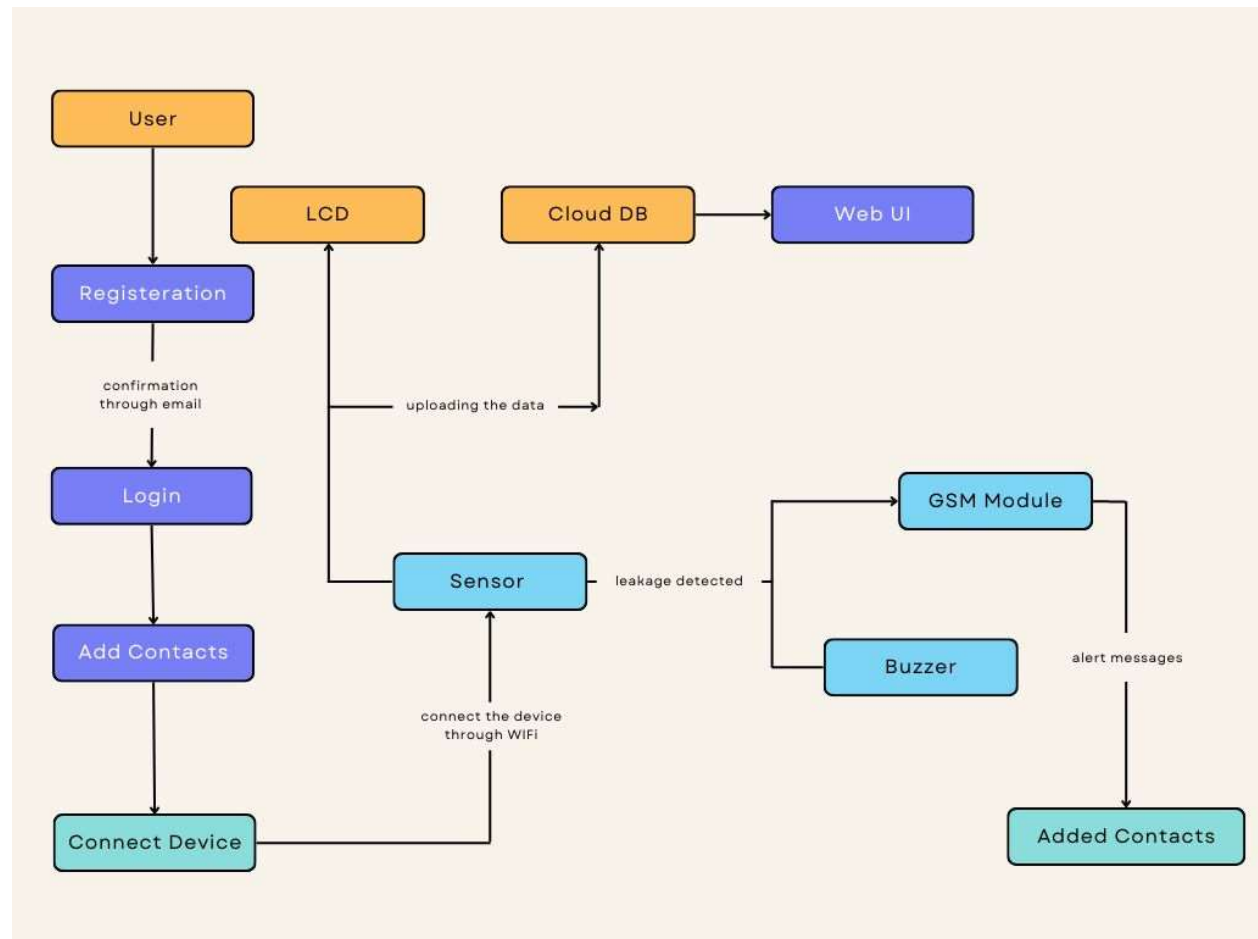
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	❖ Registration through Form ❖ Registration through Gmail
FR-2	User Confirmation	❖ Confirmation via Email ❖ Confirmation via OTP
FR-3	User SIGN IN	❖ User can sign in with username and password
FR-4	Connect the NODEMCU device	❖ Connect the NODEMCU device with application through Wifi.
FR-5	Update contact details	❖ Update the emergency contact number.
FR-6	REALTIME MONITORING	❖ It display the temperature level in pictorial representation using flow chart.
FR-6	Output	❖ In Emergency situation, it sends alert message to emergency contact number. ❖ It sends message to fire service.
FR-7	Review and Feedback	❖ User can share their experience about the app usage. ❖ Provide feedback

4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	<ul style="list-style-type: none">❖ In Industries, we use this device to avoid the fire accidents.❖ The device can be accessed through Wifi.
NFR-2	Security	Only authorised person can access the important details.
NFR-3	Reliability	<ul style="list-style-type: none">❖ Prevent from accidents.❖ Avoid false Alarm.❖ It Should avoid the delay alert message.
NFR-4	Performance	In a gas usage industries, the gas is transferred from one end to another end through pipes at the time gas leakage is possible. We use this device to detect the gas leakage and gives buzzer alarm and send alert message to nearest police station and fire service department.
NFR-5	Availability	This model is used to continuously monitor and display the gas level and check the gas level is exceed or not.
NFR-6	Scalability	Lot of users can access the application at the same time without any inconvenience.

5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAM



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript
2.	IOT Application Logic-1	Device Should be connected to System Using python code.	Python
3.	IOT Application Logic-2	NODEMCU device is connected with IBM Watson Platform.	IBM Watson STT service
4.	IOT Application Logic-3	It is connected with Web UI and alert the user through messages.	IBM Watson Assistant

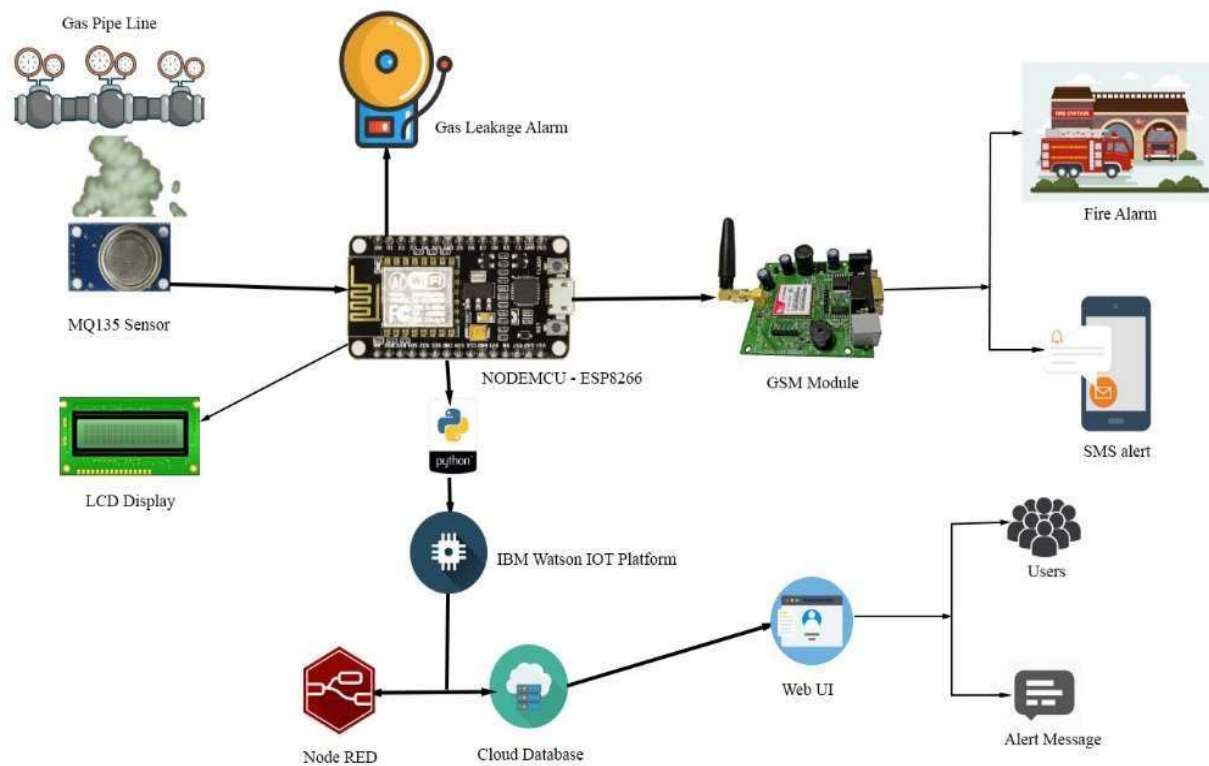
5.	Cloud Database	Database Service on Cloud. Data can be any format based on user.	IBM DB2, IBM Cloudant etc.
6.	File Storage	File Should be named and it contains details of file type, date and time of file is created, memory space.	IBM Block Storage or Other Storage Service or Local Filesystem
7.	External API-1	It is used in device through Wifi communicating and allotting operation efficiency.	Aadhar API, etc.
8.	Machine Learning Model	IOT and machine learning delivers insights otherwise hidden in data for rapid automated response and improved decision making	Object Recognition Model and Danger prediction model etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Without using framework, we lot of manual work to do the task, but using framework provide rapid development and in coding part it reduce the code.	Real time monitoring- Gas leakage is monitored continuously using IOT Zeta.
2.	Security Implementations	GSM module is enabled with devices. If leakage is detected send the alert message to concerned user.	e.g. SHA-256-It is used for encryption security.
3.	Scalable Architecture	Any problem occur, the concerned user can see the problem and real time monitoring the gas levels.	Multiple Data store Technologies , Reliable.
4.	Availability	It continuously monitor the gas level and whether the gas leakage occurs it immediately sends the SMS alert to user	GSM Module
5.	Performance	The leakage detected without any delay it gives fire alarm and it sends SMS alert to user. WEB UI Is also connected with device so it alert the concerned user. We use high quality pipes and	❖ High durable devices with good quality. ❖ Long Lasting Battery

S.No	Characteristics	Description	Technology
		regular maintenance to avoid the leakage.	

SOLUTION ARCHITECTURE:



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	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	High	Sprint-1
	Login	USN-3	As a user, I can log into the application entering email & password	I can login to my web to my email and password.	High	Sprint-1
	Dashboard	USN-4	As a user, I can login into my account and I can add the members to send alert message	Only added contact numbers can receive SMS alerts.	High	Sprint-1
Customer (Web user)	Registration	USN-1	As a user, I can register for to creating account by entering my email, password, and confirming my password.	I can access my account.	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the web user.	I can receive confirmation email.	High	Sprint-1
	Login	USN-3	As a user, I can log into the website entering email & password	Only valid credentials must be acceptable.	High	Sprint-1
	Dashboard	USN-4	As a user, I can login into my	Only added contact numbers	High	Sprint-1

USER STORIES:

USER TYPE	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
			account and I can add the members to send alert message	can receive sms alerts.		
Administrator	Admin	USN-1	As a Admin, He/ She can add the members those who want to receive alert message.	The Admin have authority can add members and edit the details.	High	Sprint-1
		USN-2	As a Admin, He/ She can monitor real time.	The admin can monitor the process by 24/7 hrs.	High	Sprint-1

6.PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

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	10	6 Days	24 Oct 2022	29 Oct 2022	10	29 Oct 2022
Sprint-2	12	6 Days	31 Oct 2022	05 Nov 2022	12	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	10	6 Days	14 Nov 2022	19 Nov 2022	10	19 Nov 2022

Velocity:

Imagine we have a 6-day sprint duration, and the velocity of the team is 13(approx) (points per sprint). Let's calculate the team's average velocity(AV) per iteration unit(story points per day)

$$AV = \text{Sprint duration} / \text{Velocity} = 13/6=2.2$$

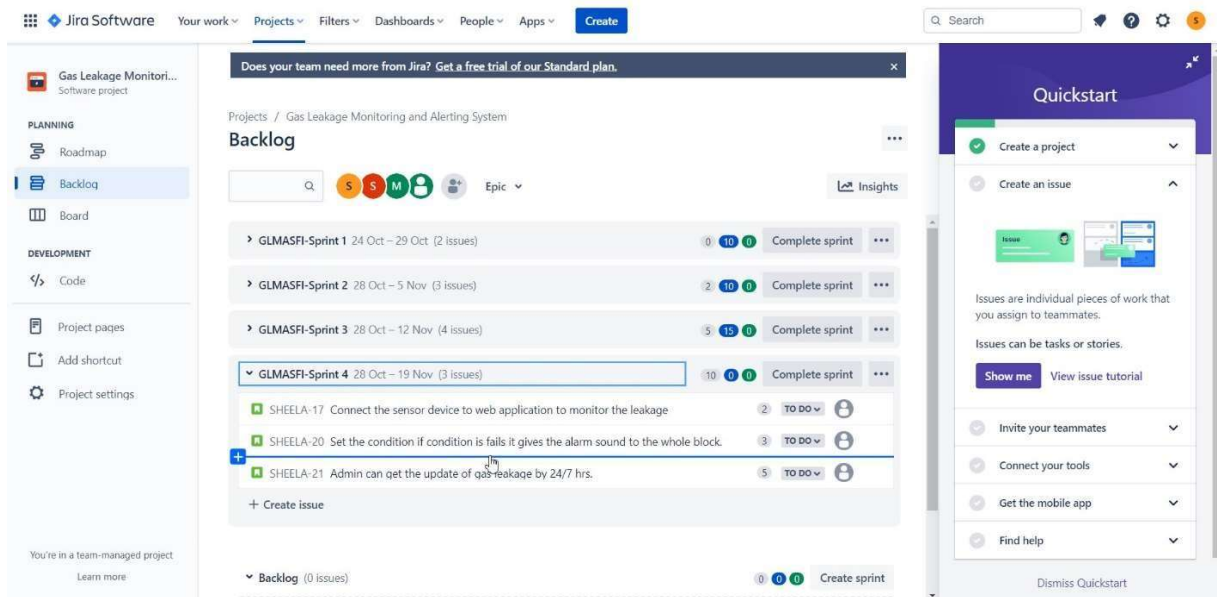
6.2 SPRINT DELIVERY SCHEDULE

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration (Mobile user)	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	5	High	Sheela S
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	5	Medium	Vijay Prabu S
Sprint-2	Login (Mobile User)	USN-3	As a user, I can log into the application entering email & password	5	Low	Vignesh Kumar M
Sprint-2		USN-4	Connect the sensor device to Mobile application to monitor the gas leakage	2	High	Nithish Kumar S
Sprint-2	Dashboard (Mobile User)	USN-5	As a user, I can login into my account and I can add the members to send alert message	5	High	Sheela S
Sprint-3	Registration (Web User)	USN-6	As a user, I can register for to creating account by entering my email, password, and confirming my password.	5	High	Vignesh Kumar M
Sprint-3		USN-7	As a user, I will receive confirmation email once	5	High	Nithish Kumar S

			I have registered for the web user.			
Sprint-3	Login(Web User)	USN-8	As a user, I can log into the website entering email & password	5	Medium	Vijay Prabu S

6.3 REPORTS FROM JIRA

1. Image showing the backlogs create in the JIRA Software (PETA Spring1, PETA Spring2, PETA Spring3, PETA Spring4)



2. Image Showing the User Stories in the respective sprints.

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Projects / Gas Leakage Monitoring and Alerting System

Backlog

Search [S] [S] [M] [Epic] Insights

- GLMASFI-Sprint 1 24 Oct – 29 Oct (2 issues) 0 10 0 Complete sprint
- GLMASFI-Sprint 2 28 Oct – 5 Nov (3 issues) 2 10 0 Complete sprint
- GLMASFI-Sprint 3 28 Oct – 12 Nov (4 issues) 5 15 0 Complete sprint
- GLMASFI-Sprint 4 28 Oct – 19 Nov (3 issues) 10 0 0 Complete sprint

Backlog (0 issues) 0 0 0 Create sprint

Your backlog is empty.

+ Create issue

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- Create an issue
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Projects / Gas Leakage Monitoring and Alerting System

Backlog

Search [S] [S] [M] [Epic] Insights

- GLMASFI-Sprint 1 24 Oct – 29 Oct (2 issues) 0 10 0 Complete sprint
 - SHEELA-1 As a user, I can register for the application by e... REGISTRATION FOR MOBILE USER IN REVIEW
 - SHEELA-2 As a user, I will receive confirmation email on... REGISTRATION FOR MOBILE USER IN PROGRESS
- GLMASFI-Sprint 2 28 Oct – 5 Nov (3 issues) 2 10 0 Complete sprint
- GLMASFI-Sprint 3 28 Oct – 12 Nov (4 issues) 5 15 0 Complete sprint
- GLMASFI-Sprint 4 28 Oct – 19 Nov (3 issues) 10 0 0 Complete sprint

Backlog (0 issues) 0 0 0 Create sprint

Your backlog is empty.

+ Create issue

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- Create an issue
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Dismiss Quickstart

Jira Software

Your work

Projects

Filters

Dashboards

People

Apps

Create

Gas Leakage Monitori...
Software project

PLANNING

Roadmap

Backlog

Board

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Code

Project pages

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Projects / Gas Leakage Monitoring and Alerting System

Backlog

S S M

Epic

Insights

GLMASFI-Sprint 1 24 Oct – 29 Oct (2 issues)

0 10 0

Complete sprint

GLMASFI-Sprint 2 28 Oct – 5 Nov (3 issues)

2 10 0

Complete sprint

SHEELA-3 As a user, I can log into the application entering em... LOGIN FOR MOBILE USER

5

IN PROGRESS

5

SHEELA-16 Connect the sensor device to the Mobile application to monitor the leakage

2

TO DO

5

SHEELA-4 As a user, I can login into my account and I can add ... LOGIN FOR MOBILE USER

5

IN PROGRESS

M

+ Create issue

GLMASFI-Sprint 3 28 Oct – 12 Nov (4 issues)

5 15 0

Complete sprint

GLMASFI-Sprint 4 28 Oct – 19 Nov (3 issues)

10 0 0

Complete sprint

Backlog (0 issues)

0 0 0

Create sprint

Quickstart

Create a project

Create an issue

Issue

Issues are individual pieces of work that you assign to teammates.

Issues can be tasks or stories.

Show me

View issue tutorial

Invite your teammates

Connect your tools

Get the mobile app

Find help

Dismiss Quickstart

Jira Software

Your work

Projects

Filters

Dashboards

People

Apps

Create

Gas Leakage Monitori...
Software project

PLANNING

Roadmap

Backlog

Board

DEVELOPMENT

Code

Project pages

Add shortcut

Project settings

You're in a team-managed project

Does your team need more from Jira? Get a free trial of our Standard plan.

Projects / Gas Leakage Monitoring and Alerting System

Backlog

S S M

Epic

Insights

GLMASFI-Sprint 1 24 Oct – 29 Oct (2 issues)

0 10 0

Complete sprint

GLMASFI-Sprint 2 28 Oct – 5 Nov (3 issues)

2 10 0

Complete sprint

GLMASFI-Sprint 3 28 Oct – 12 Nov (4 issues)

5 15 0

Complete sprint

SHEELA-6 As a user, I can register for to creating account by ... REGISTRATION FOR WEB USER

5

IN REVIEW

5

SHEELA-8 As a user, I will receive confirmation email once I have... REGISTRATION FOR WEB USER

5

TO DO

5

SHEELA-9 As a user, I can log into the website entering email & p... LOGIN FOR WEB USER

5

IN PROGRESS

5

SHEELA-10 As a user, I can login into my account and I can add th... LOGIN FOR WEB USER

5

IN PROGRESS

M

+ Create issue

GLMASFI-Sprint 4 28 Oct – 19 Nov (3 issues)

10 0 0

Complete sprint

Quickstart

Create a project

Create an issue

Issue

Issues are individual pieces of work that you assign to teammates.

Issues can be tasks or stories.

Show me

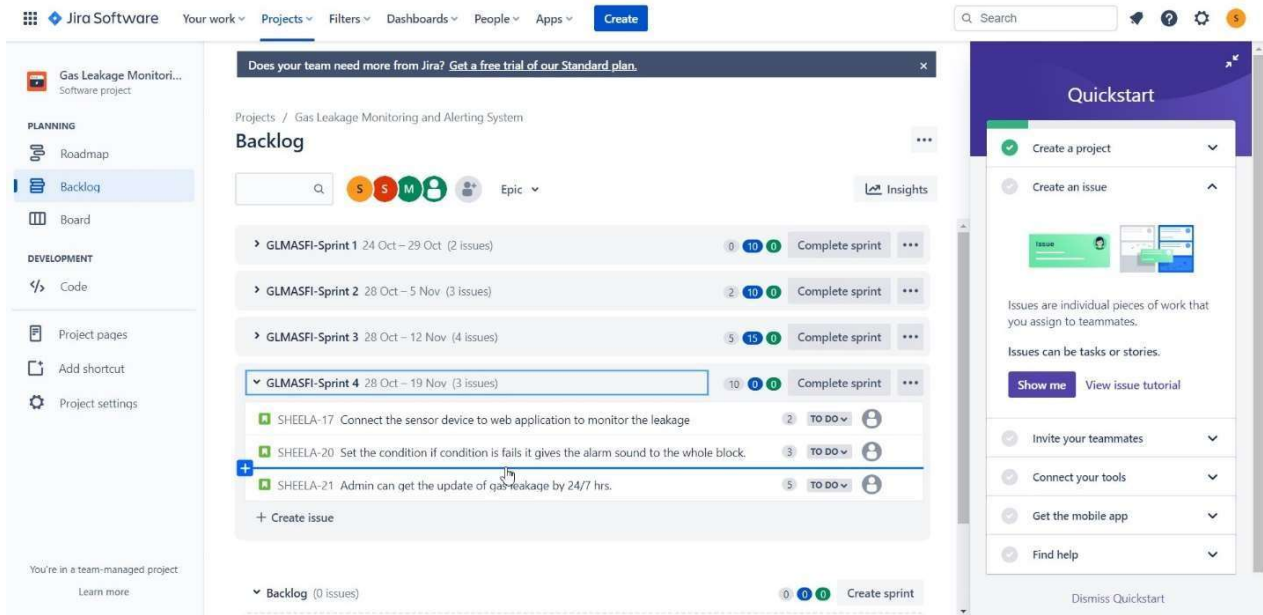
View issue tutorial

Invite your teammates

Connect your tools

Get the mobile app

Find help



3. Image showing the workspace progress in the sprint

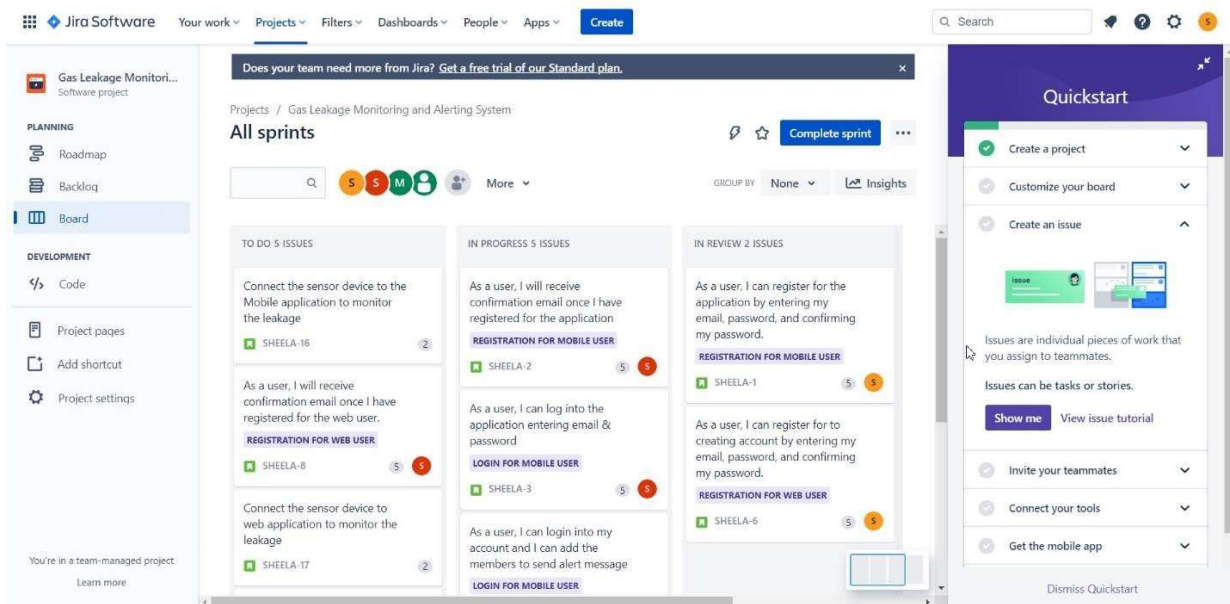
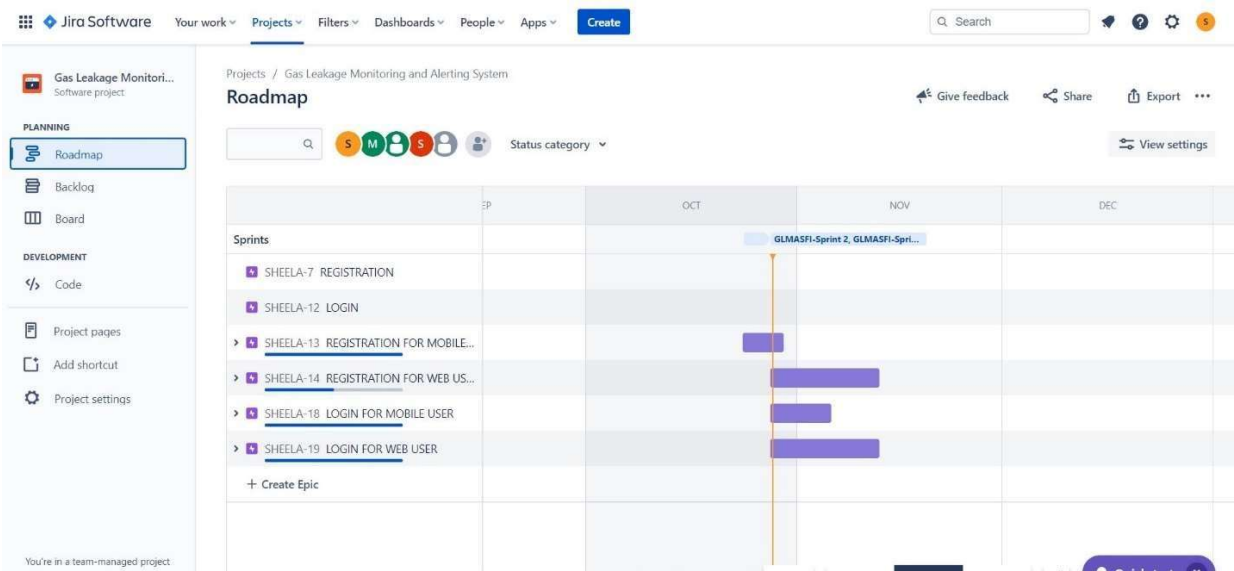


Image Showing the RoadMap of Sprint



7.SOLUTIONING

7.1 FEATURE 1

IBM Watson IoT Platform

Browse Action Device Types Interfaces

Add Device

Browse Devices

All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
1234	Disconnected	abcd	Device	Nov 6, 2022 1:14 PM	
device1	Disconnected	ESP32	Device	Oct 31, 2022 7:57 PM	

Items per page 50 | 1-2 of 2 items

1 of 1 page

7.2 FEATURE 2

Node-RED

Flow 1

IBM IoT

Temperature

Humidity

msg payload

msg

Temperature

Humidity

get data

webpage

http

debug

all nodes

11/16/2022, 12:52:25 AM node: 914fa2be51decfe
2/type/gasleakage114/did/device114/ev/status/fmt/json :
msg.payload : number

34

11/16/2022, 1:12:47 AM
msg : string[97]

"Error loading library entry '':
TypeError: Cannot read properties of
undefined (reading 'length')"

11/16/2022, 1:12:47 AM
msg : error

"TypeError: Cannot read properties of
undefined (reading 'length')"

11/16/2022, 1:13:01 AM
msg : string[97]

"Error loading library entry '':
TypeError: Cannot read properties of
undefined (reading 'length')"

11/16/2022, 1:13:01 AM
msg : error

"TypeError: Cannot read properties of
undefined (reading 'length')"

8.TESTING

8.1 TEST CASES

Publish data to IBM cloud

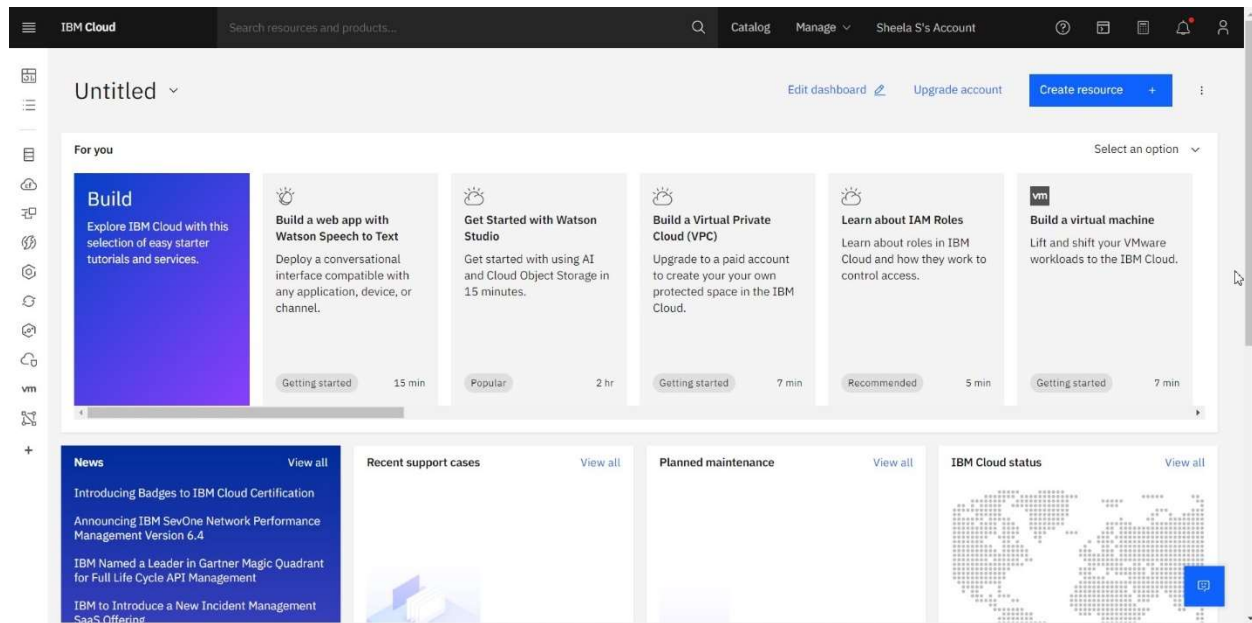
The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. The main content area displays a table of devices. The device 'device114' is selected, and its details are shown in a modal window. The details include:

Identity	Device Information	Recent Events	State	Logs
Device ID	device114			
Device Type	gasleakage114			
Date Added	Nov 5, 2022 10:34 AM			
Added By	vijayprabhu.19c114@nandhaengg.org			
Connection Status	Connected			
	Connection Time: Nov 16, 2022 12:44 AM			
	Client Address: 122.178.75.58			
	SecureToken			

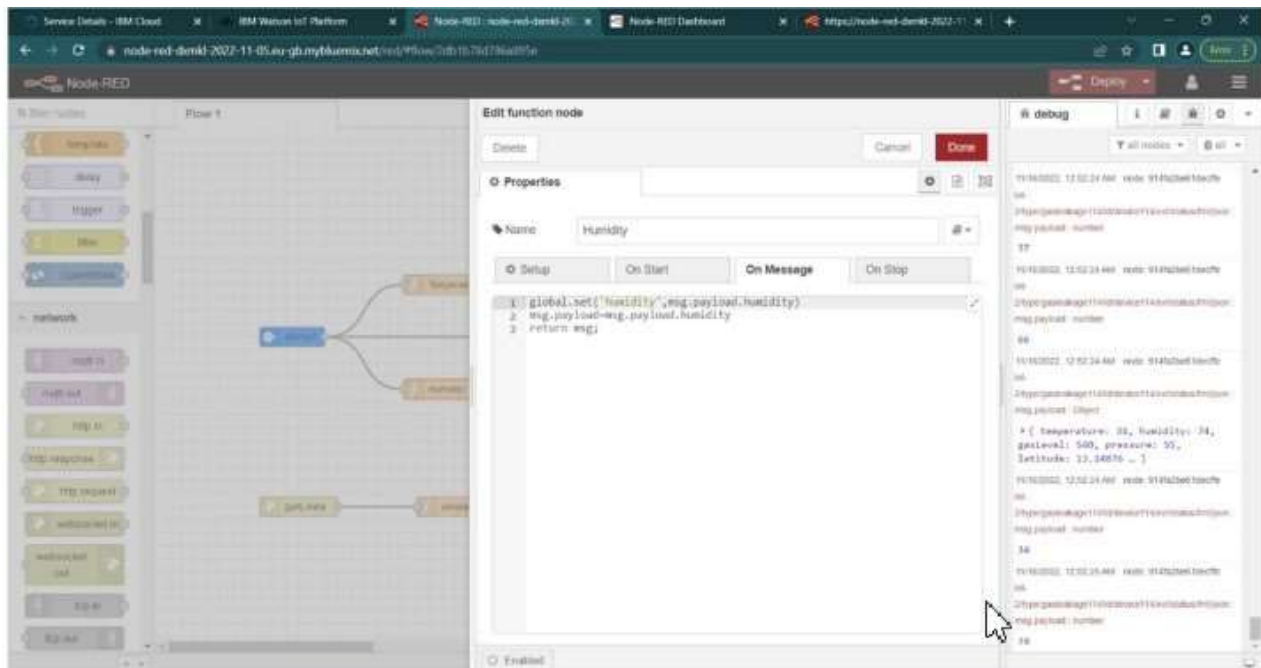
The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. The main content area displays a table of recent events for the selected device. The events are listed in a table with columns: Event, Value, Format, and Last Received.

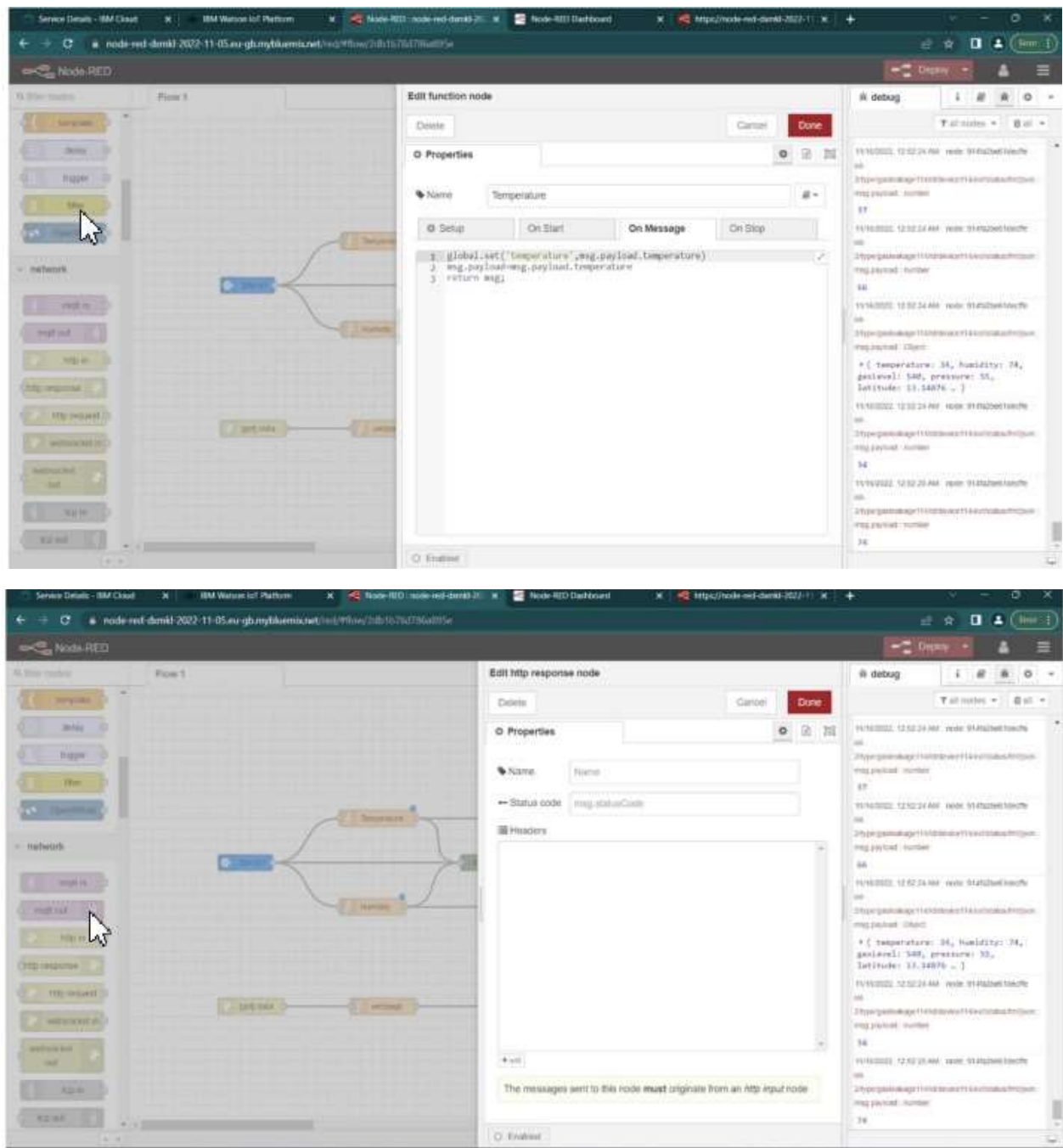
Event	Value	Format	Last Received
status	{"temperature":34,"humidity":79,"gasLevel":530...	json	a few seconds ago
status	{"temperature":37,"humidity":76,"gasLevel":719...	json	a few seconds ago
status	{"temperature":39,"humidity":78,"gasLevel":773...	json	a few seconds ago
status	{"temperature":39,"humidity":80,"gasLevel":755...	json	a few seconds ago
status	{"temperature":37,"humidity":75,"gasLevel":571...	json	a few seconds ago

IBM CLOUD USED TO STORE DATA:

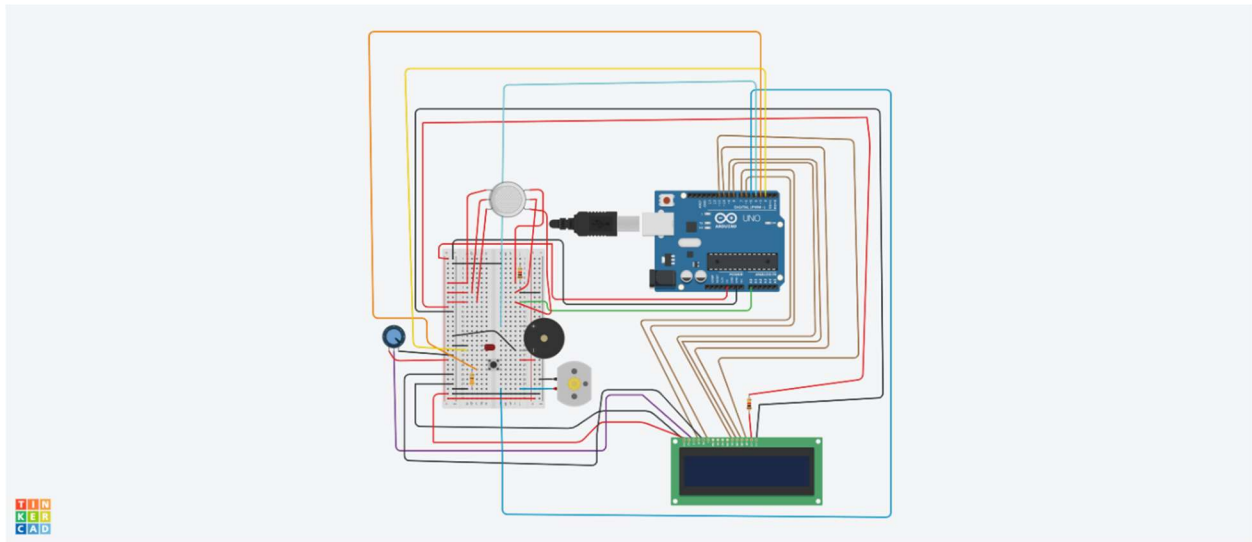


DEVELOP A WEB APPLICATION USING NODE-RED:





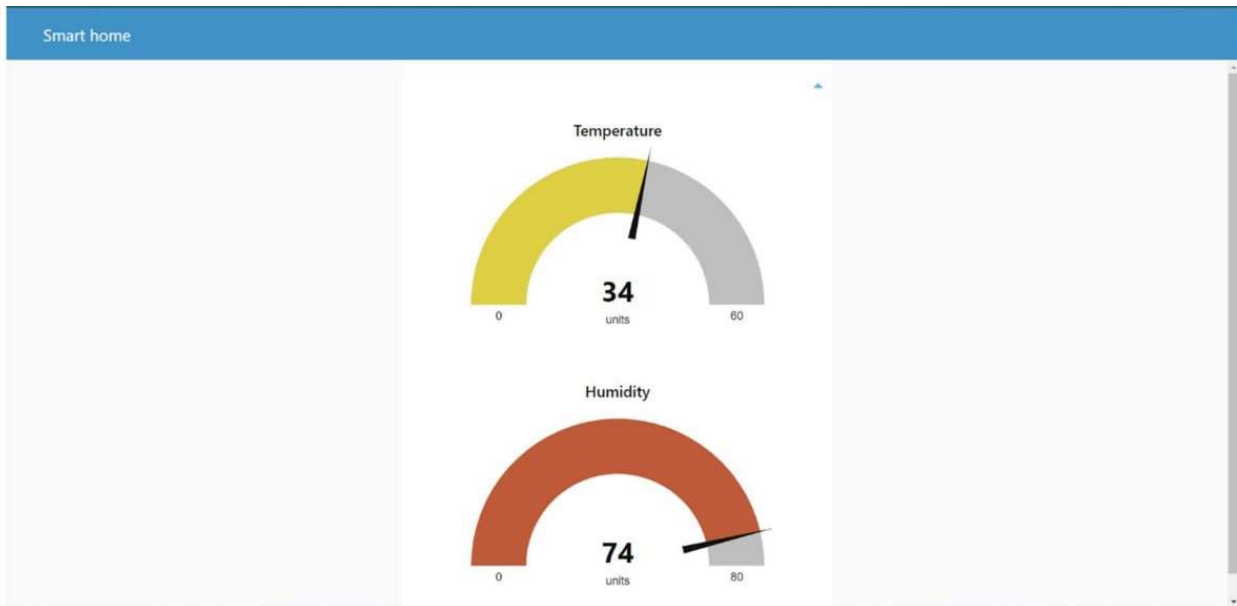
USING TINKERCAD CREATE A CIRCUIT:



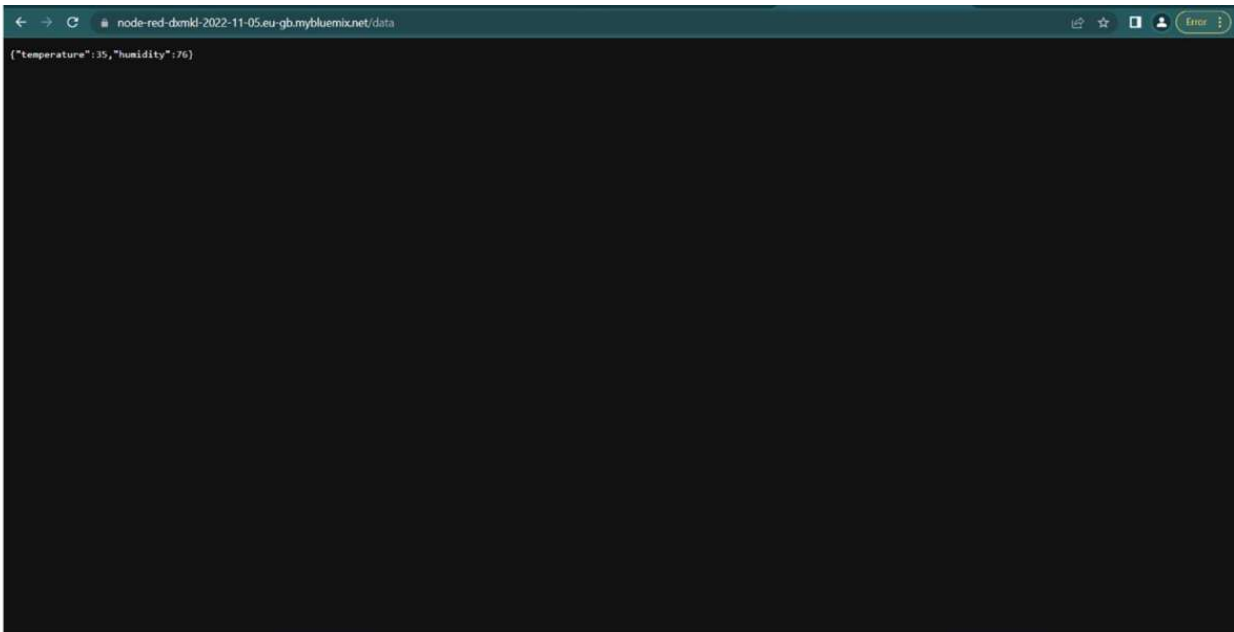
9.RESULTS

9.1 PERFORMANCE METRICS

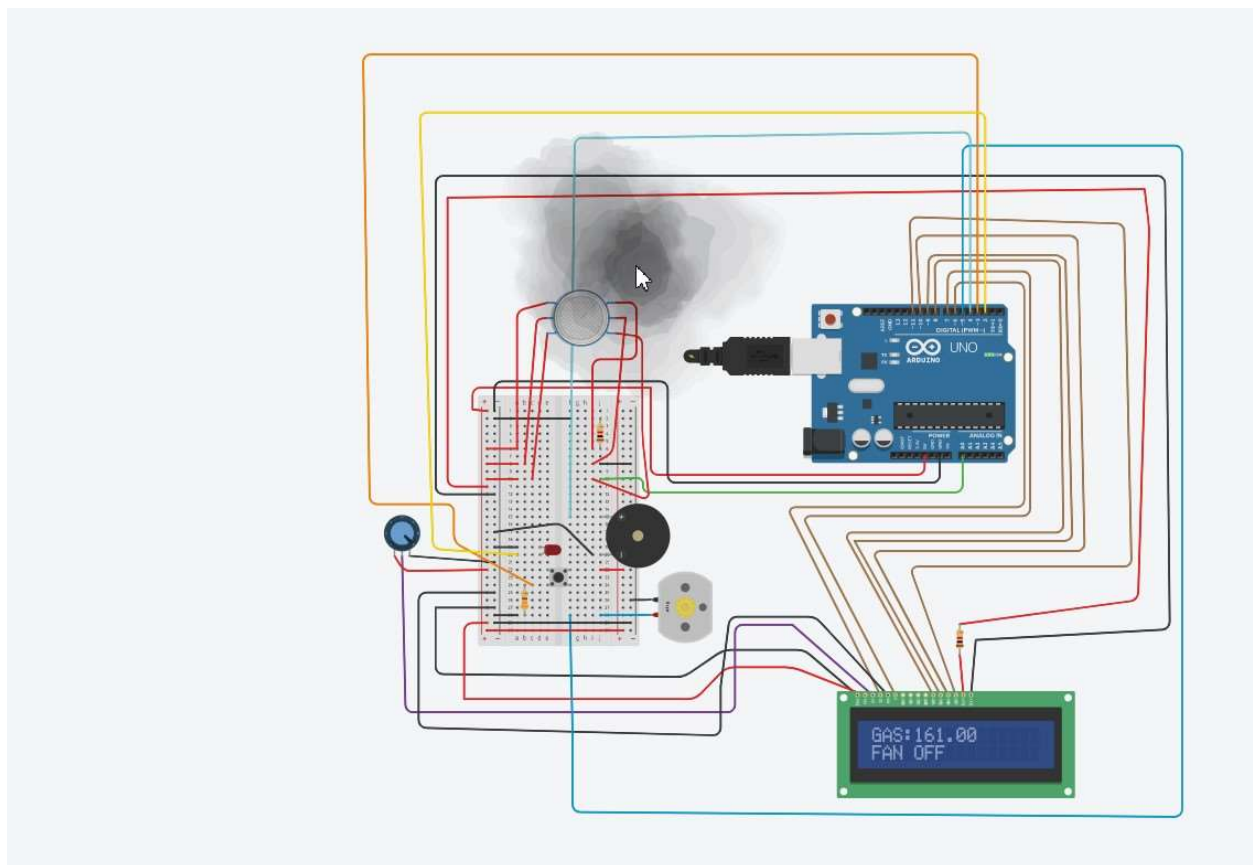
DASHBOARD:



RESULT:



CIRCUIT SIMULATION RESULT:



10.ADVANTAGES & DISADVANTAGES

ADVANTAGES

Some of the advantage of using gas leakage monitoring and alerting system for industries are:

- Get real-time alerts about the gaseous presence in the atmosphere
- Prevent fire hazards and explosions
- Supervise gas concentration levels
- Ensure worker's health
- Real-time updates about leakages
- Get immediate gas leak alerts

DISADVANTAGES

Some of the disadvantages are:

- Sending late notification
- Sometimes false alarm occurs
- Using IOT devices so costly

11.CONCLUSION

This project aims to develop a monitoring and alerting system to meet safety standards and avoid free accidents caused by leakage. The system detects gas in the atmosphere and will continuously update and display the gas value, which the user can easily see via the mobile app. This system has a faster response rate and can disseminate critical information faster than manual methods. In the event of a leak, the system alerts and responds quickly by sending SMS to the appropriate authority

.

12.FUTURE SCOPE

In IOT have different types of devices like sensors. We use only gas sensor to sense the leakage in addition to use temperature sensor. The

temperature sensor can be used which detects the high-pressure gas and display the alert SMS when a high temperature is reached.

13.APPENDIX

SOURCE CODE:

PYTHON CODE:

```
#IBM Watson IOT Platform
#pip install wiotp-sdk
import wiotp.sdk.device
import time
import random

myConfig = {
    "identity": {
        "orgId": "fytwic",
        "typeId": "gasleakage114",
        "deviceId":"device114"
    },
    "auth": {
        "token": "01234567"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
```



```
client.connect()
```

```
while True:
```

```
    temp=random.randint(32,40)
```

```
    hum=random.randint(60,80)
```

```
    gas=random.randint(500,800)
```

```
    pres=random.randint(20,80)
```

```
    myData={'temperature':temp, 'humidity':hum, 'gasLevel':gas, 'pressure':pres,  
'latitude':13.148760, 'longitude':80.229100}
```

```
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,  
onPublish=None)
```

```
    print("Published data Successfully: %s", myData)
```

```
    client.commandCallback = myCommandCallback
```

```
    time.sleep(2)
```

```
client.disconnect()
```

FOR CIRCUIT:

```
#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("PNT2022TMID19555");
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 ON
```

```
void gasDetected(float gasLevel){
  if(gasLevel >= 200){
    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(100);  
    lcd.clear();  
}  
}
```

//BUZZER

```
void buzzer(float gasLevel){  
    if(gasLevel>=200)  
    {  
        for(int i=0; i<=30; i=i+10)  
        {  
            tone(4,i);
```

```
    delay(300);  
    noTone(4);  
    delay(4300);  
  }  
}  
}
```

// 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();  
  }  
}
```

GITHUB PROJECT LINK:

LINK- <https://github.com/IBM-EPBL/IBM-Project-32504-1660210420>

