Gas Leakage monitoring & Alerting system for Industries

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Introduction:

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 network

LITERATURE SURVEY:

LIU zhen-ya, WANG Zhen-dong, and **CHEN Rong** published on "Intelligent Residential Security Alarm and Remote Control System Based On Single Chip Computer" 2008 .This covers intelligent residential burglar alarm, emergency alarm, fire alarm, toxic gas leakage remote automatic sound alarm, and remote control system.The technology has the ability to activate an

automatic alarm that calls the police hotline on its own. It can also be a voice alarm and shows the location where the alarm was received. Remote power management is possible with this smart security system.

LIU zhen-ya, WANG Zhen-dong, and **CHEN Rong** published on "Intelligent Residential Security Alarm," 2008 are intelligent residential burglar alarm, emergency alarm, fire alarm, hazardous gas leakage remote automatic sound alarm, and remote control system.The project put out the issue of a GAS container running out of gas, which is the most prevalent one we encounter on a daily basis. This document is being presented to raise awareness of the declining to order gas using IOT and to determine the volume of the gas in the container. The booking or order for gas is being the continuous weight measurement is carried out with the aid of IOT and a load cell, which is with a microcontroller interfaced (to compare with an ideal value). It has even been added for convenience.with RF TX and Rx devices that provide the same data. In terms of the safety of We have a MQ-2 (gas sensor), an LM 35 (temperature sensor), and a gas container in the kit.
In this research, we suggested a wireless sensor network (WSN) prototype to track andin a complex interior environment, find gas leaks. In particular, a mobile node is travelling across a structure to track any carbon dioxide (CO2) leaks, supporting and showing the level and thethe leak's exact location. The benefits of cognitive technology were demonstrated all through the demonstration.Multichip routing and networking are investigated.
Many reviews of gas leakage detection methods have been published in the past, either as part ofresearch articles or technical reports on specific leak detection techniques and other gas-related topics.

A. Mahalingam, r. T. Naayagi, and **n. E. Mastorakis** published an affordable gas leakage detector's design and implementation are presented. They provided solutions to numerous issues with earlier gas leak detectors. They stated that a number of standards, including IEEE, BS5730, and IEC, have been developed for the design of a gas leakage detecting system. The recommended UK safety standards have been used for this project. The primary purpose of the suggested alarm system is to find LPG leaks, which are most frequently found in residential and commercial buildings. The technology detects the amount of leakage in addition to the presence of gas (gas leak).

B. B. Did paye and **Prof. S. K. Nanda,** discussed their work on leakage detection and a review of the "Automated unified system for LPG employing microcontroller and GSM module." their piece offered a cutting-edge and creative method for automatic, preventative, and detection of LPG leaks scheduling a refill. In advance, the technology offers automatic LPG regulator controlling if When a leak is found, the system will automatically shut off the power supply's main switch. So it's helpful to avoid the blast and detonation.

Srinivasan, Leela, Jeya bharathi, Kirthik, and Rajasree discussed the detection and control of gas leaks. In this study, gas leaks that cause fatal flames have emerged as a major issue in homes and other settings where domestic gas is utilised and handled. In addition to shutting off

the gas supply valve, it also warns the subscriber via the alarm and the status display.

Hitendra Rawat, Ashish Kushwah, Khyati Asthana, and **Akanksha Shivhare** in 2014 created a framework and provided security measures against criminals, spills, and fire mishaps. When this happens, their deliver SMS messages to the assigned crisis number.

P. Meenakshi Vidya, S. Abinaya, G. Geetha Rajeswari, and **N. Guna**, "Automatic LPG detection and hazard.The real-time gas monitoring and leak detection system were proposed in the article "controlling" published in April 2014.

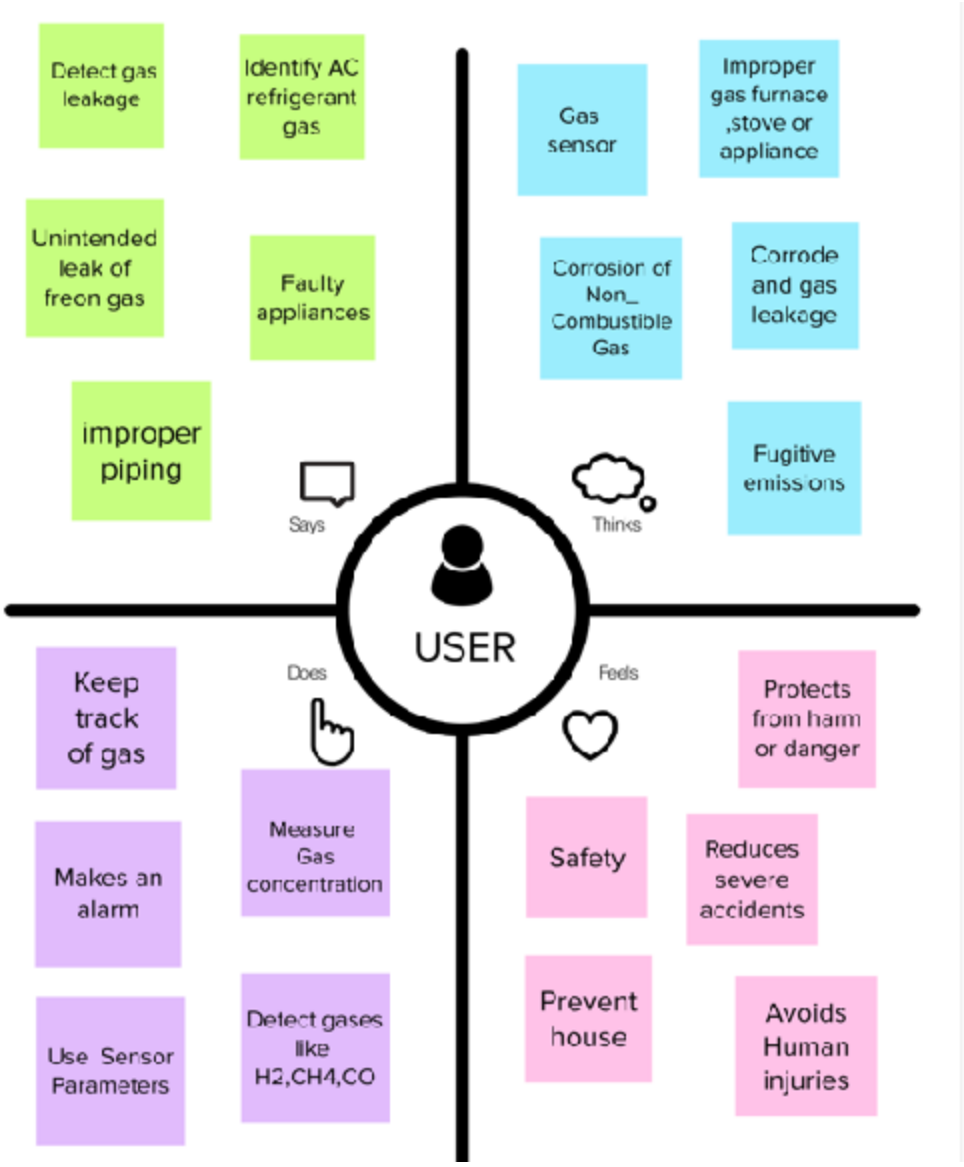
Ch. Manohar Raju and **N. Sushma Rani** on 2008 saw the introduction of an android-based autonomous gas detection and indication robot.The prototype they have suggested shows a small mobile robot that can find gas leaks in dangerous areas. When there is a gas leakage in a certain location, the robot promptly reads the data and sends it to an Android mobile device using Bluetooth. We create an Android application for smartphones running the Android operating system that can immediately
receive data from robots over Bluetooth. Every time a gas leak occurs, the programme alerts us with an indicator, and we can use text or voice instructions to direct the robot's motions when it is connected to Bluetooth. The earlier mobile robots are built on a variety of different technologies.

Pal-Stefan Murvaya and **Ioan Sileaa** (2008) described numerous methods for detecting gas leaks in their survey on gas leak localization approaches. They implement an old or novel method to find thegas. The non-technical, hardware-based solutions that are proposed in this study aim toconsist of active, visual, and acoustic approaches. In their study, they provided a wealth ofGas pipeline leak detection methods are available. Since their invention, some methods have undergone.The development of the initial proposal and some new ones was prompted by improvements in sensor fabrication and processing power. Each detection technique does, however, have benefits and drawbacks. Leak Each category of detection techniques has some benefits and drawbacks in common.For instance, all foreign methods.

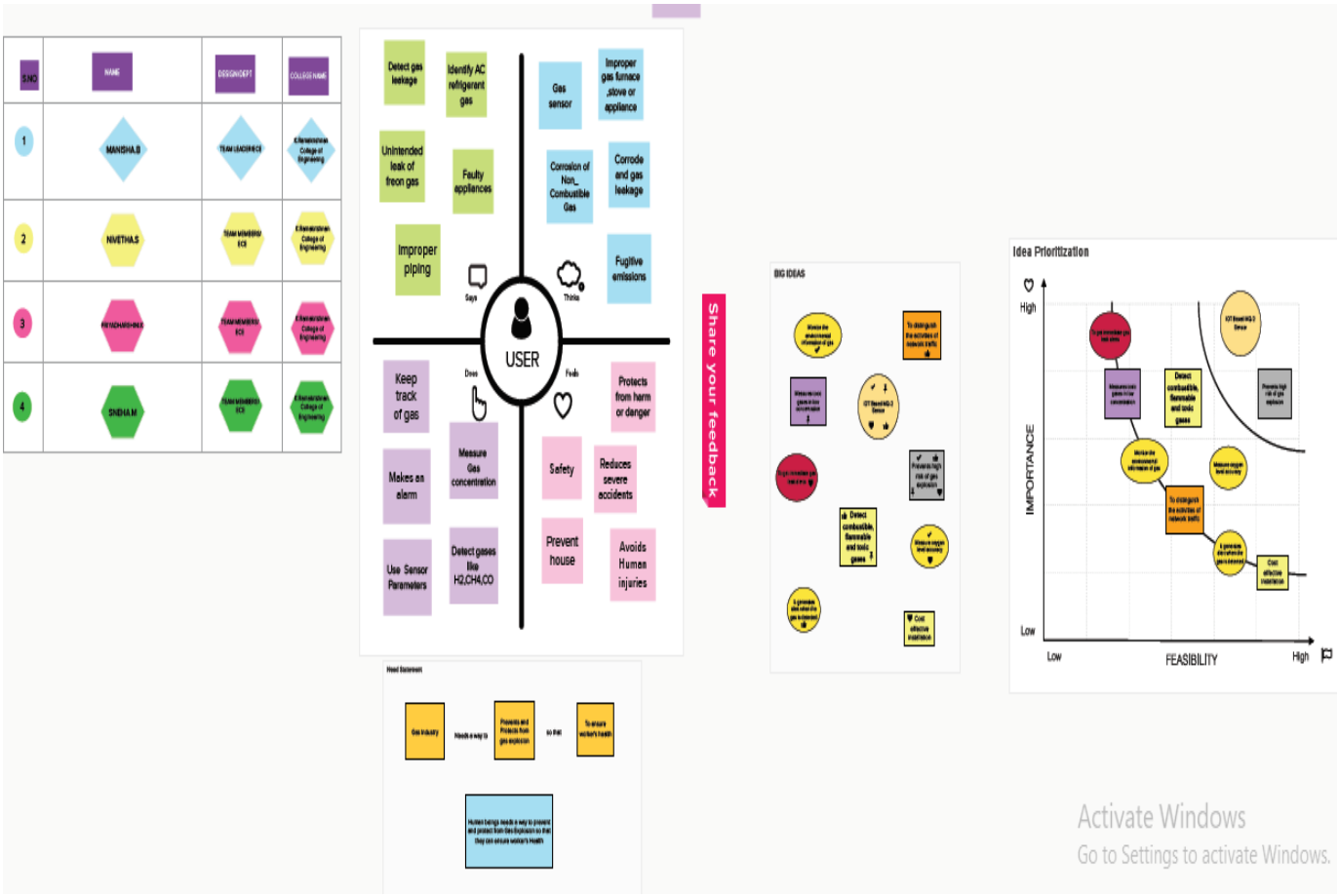
Falohun A.S., Oke A.O., and **Abolaji B.M**. (2016) proposed their method for MQ-9-based integrated circuit-based harmful gas detection. They essentially employed an embedded design in this switches, relays, solenoids, LEDs, tiny or bespoke LCDs are examples of common input and output devices.Radio frequency gadgets, displays, and sensors for information like temperature, humidity, light intensity, etc.The majority of embedded systems lack a keyboard, screen, discs, printers, or any other recognizable input/output (I/O) devices,a personal computer and possibly a device for human connection. The variety and quantity of detectors, as well as Depending on the owner's property, one will choose a particular sort of fire alarm system.protection objectives, property value, and owner's insurance requirements.

IDEATION PHASE:

EMPATHY MAP



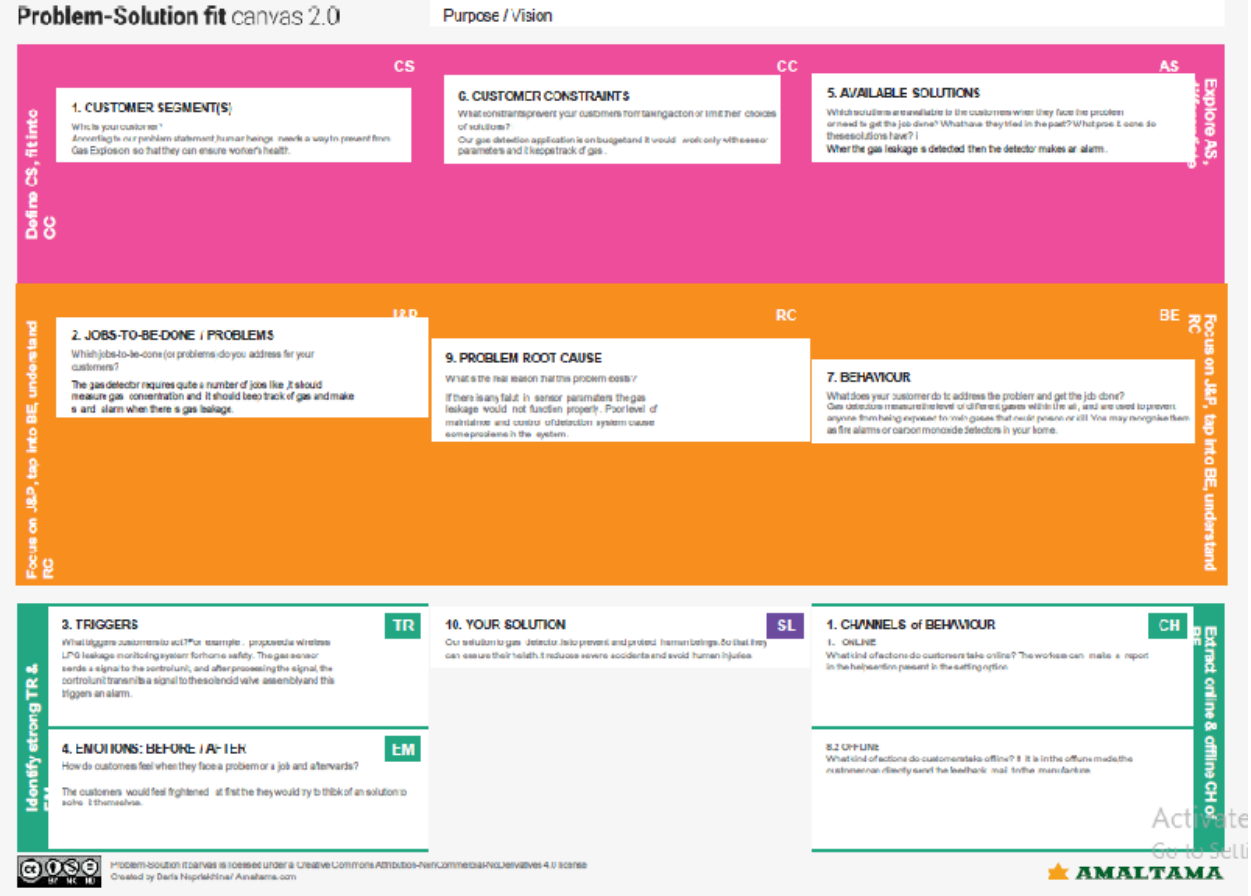
IDEATION :


S.NO
NAME
DEPT
COLLEGE NAME
1
MANISHA.B
2
NIVETHA.S
3
4
SNEHA M
Detect gas leakage
Identify AC refrigerant gas
Gas sensor
Improper gas furnace ,stove or appliance
Unintended leak of freon gas
Faulty appliances
Corrosion of Non_ Combustible Gas
Corrode and gas leakage
Improper piping
Fugitive emissions
Says
Thinks
USER
Does
Feels
Keep track of gas
Protects from harm or danger
Makes an alarm
Measure Gas concentration
Safety
Reduces severe accidents
Use Sensor Parameters
Detect gases like H2,CH4,CO
Prevent house
Avoids Human injuries
Share your feedback
BIG IDEAS
Idea Prioritization
High
Low
IMPORTANCE
FEASIBILITY
Low
High
Activate Windows
Go to Settings to activate Windows.

PROJECT DESIGN PHASE-I :

PROBLEM SOLUTION FIT :

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. LPG and CNG i.e. petroleum gas and compressed natural gas are most commonly used in residential and commercial places for cooking purpose and in various vehicles as a replacement for costly fuels like diesel, petrol . These gases are filled in cylinders which are easily un-damageable.

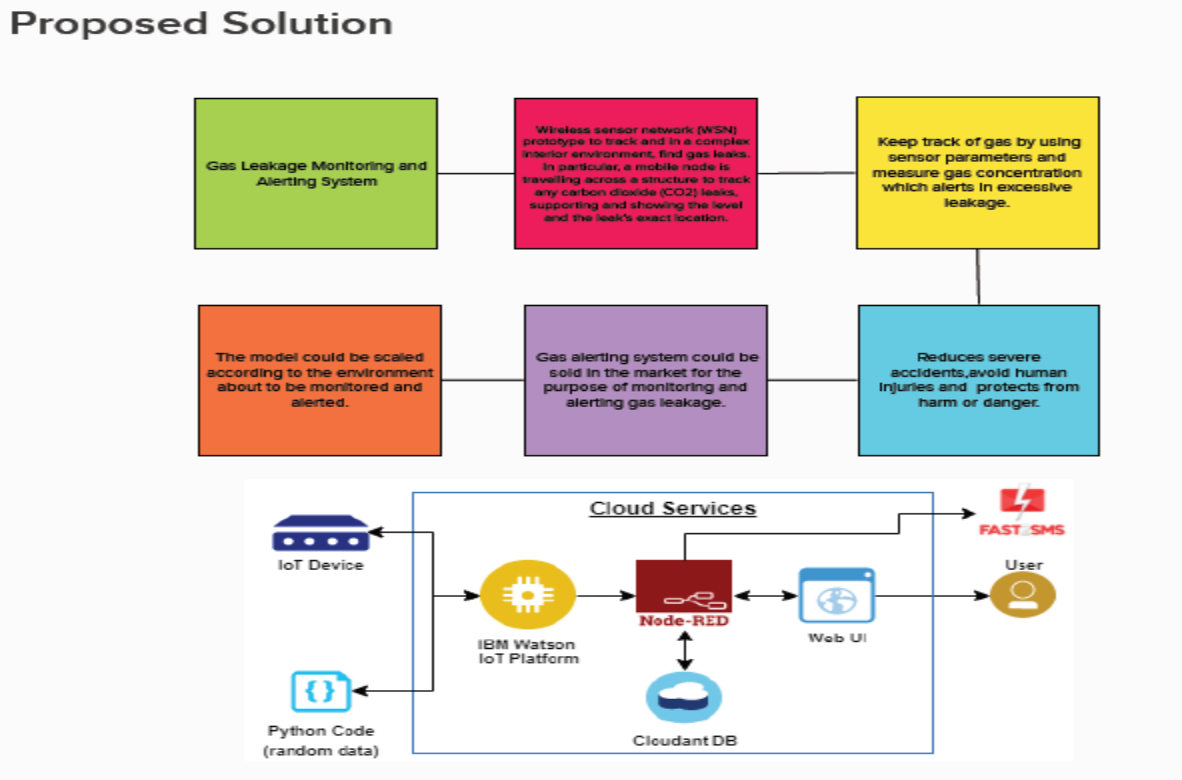


PROPOSED SOLUTION :

Leakage can take place through pipes or regulators or knobs which may cause accidents like suffocation, uneasiness or sometimes International Journal of Scientific Research in Science and Technology may catch fire and short circuit as well. The main aim of this project is developing a system that can detect gas leakage . On detection it will send an alert SMS and the gas supply knob of cylinder will be switched off automatically.

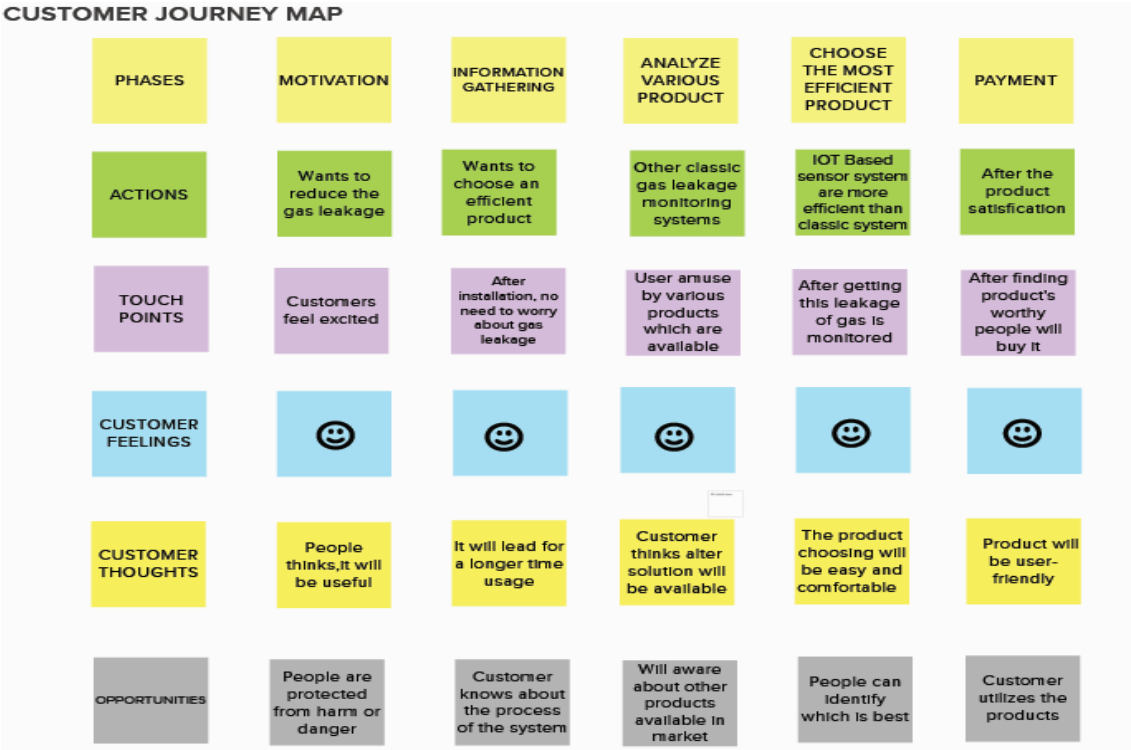
S.No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Gas Leakage Monitoring and Alerting System
2	Idea / Solution description	Wireless sensor network (WSN) prototype to track and in a complex interior environment, find gas leaks. In particular, a mobile node is travelling across a structure to track any carbon dioxide (CO2) leaks, supporting and showing the level and the leak's exact location
3	Novelty / Uniqueness	Keep track of gas by using sensor parameters and measure gas concentration which alerts in excessive leakage.
4	Social Impact / Customer Satisfaction	Reduces severe accidents,avoid human injuries and protects from harm or danger
6	Scalability of the Solution	The model could be scaled according to the environment about to be monitored and alerted

SOLUTION ARCHITECTURE:

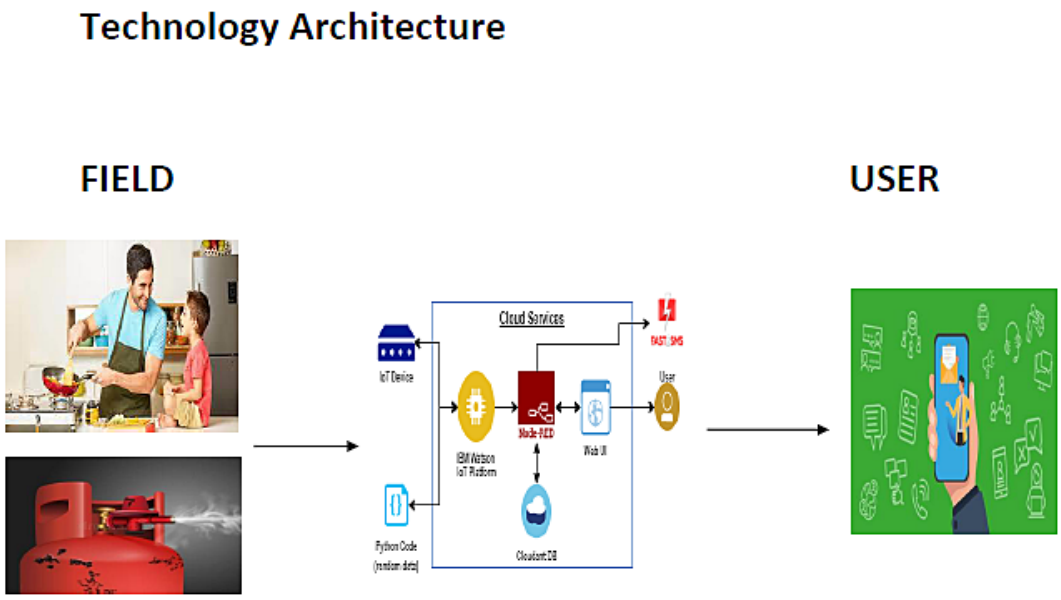


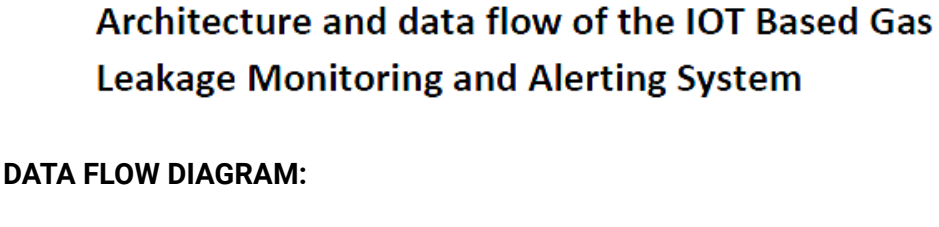
PROJECT DESIGN PHASE-II:

CUSTOMER JOURNEY MAP:

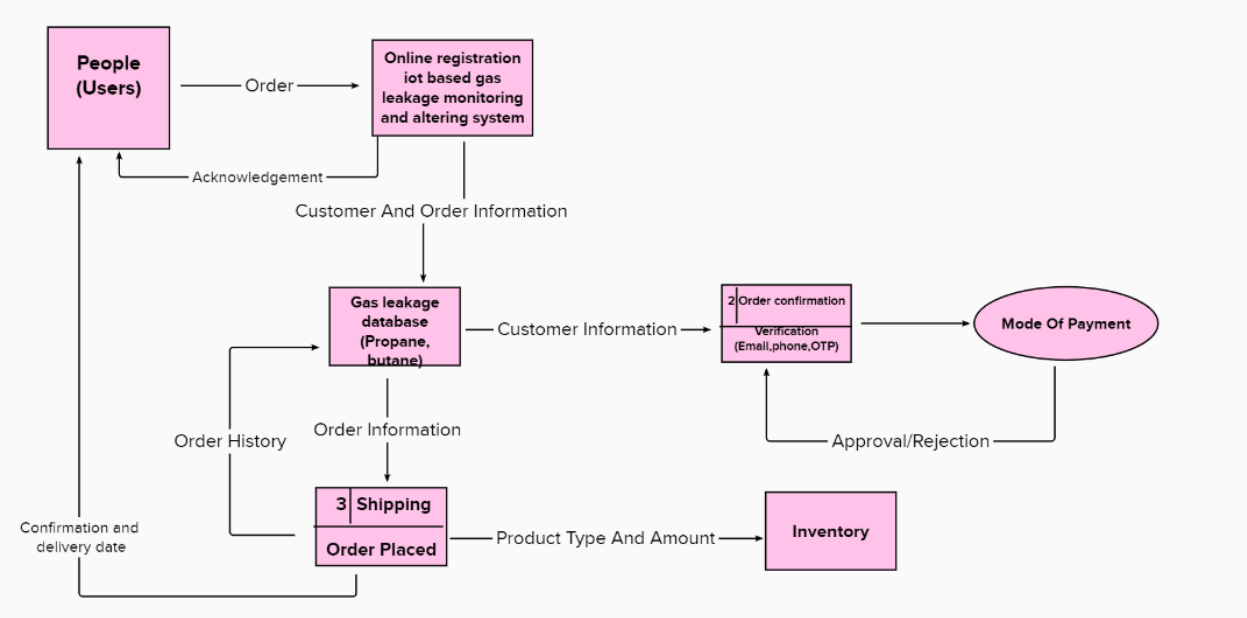


TECHNOLOGY ARCHITECTURE:





DATA FLOW DIAGRAM:



SOLUTION REQUIREMENTS (FUNCTIONAL & NON-FUNCTIONAL)

FUNCTIONAL REQUIREMENTS:

FR No	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Requirements	Static signboards will be replaced with smart linked sign boards that meet all criteria.
FR-2	User Registration	Manual Registration Through a Website or Gmail
FR-3	User Confirmation	Phone Confirmation ,Email confirmation ,OTP authentication
FR-4	Payments options	Bank Transfer
FR-5	Product Delivery and installation	The installation fee will be determined by the length of the road.
FR-6	Product Feedback	Through a website via Gmail

NON-FUNCTIONAL REQUIREMENTS:

FR No.	Non-Functional Requirement	Description
FR-1	Usability	Have clear product instructions and a selfexplanatory product that is simple to use.
NFR-2	Security	Cloud data must be contained within the network, collapsing to be Real-time avoidance should be avoided, and the board should be constantly monitored.
NFR-3	Reliability	Hardware is frequently tested.
NFR-4	Performance	The smart board must provide a better user experience and deliver accuracy output.
NFR-5	Availability	All of the functions that the user demands will be provided, depending on the needs of the consumer.
NFR-6	Scalability	The model could be scaled according to the environment about to be monitored and alerted.

PROJECT PLANNING PHASE:

PREPARE MILESTONE AND ACTIVITY LIST:

PROJECT PLANNING PHASE

Prepare Milestone And Activity List

DATE	18 NOVEMBER 2022
TEAM ID	**PNT2022TMID11027**
PROJECT NAME	Gas leakage monitoring and alerting system

SPRINT DELIVERY PLAN:

PROJECT PLANNING PHASE

SPRINT DELIVERY PLAN

DATE	18 NOVEMBER 2022
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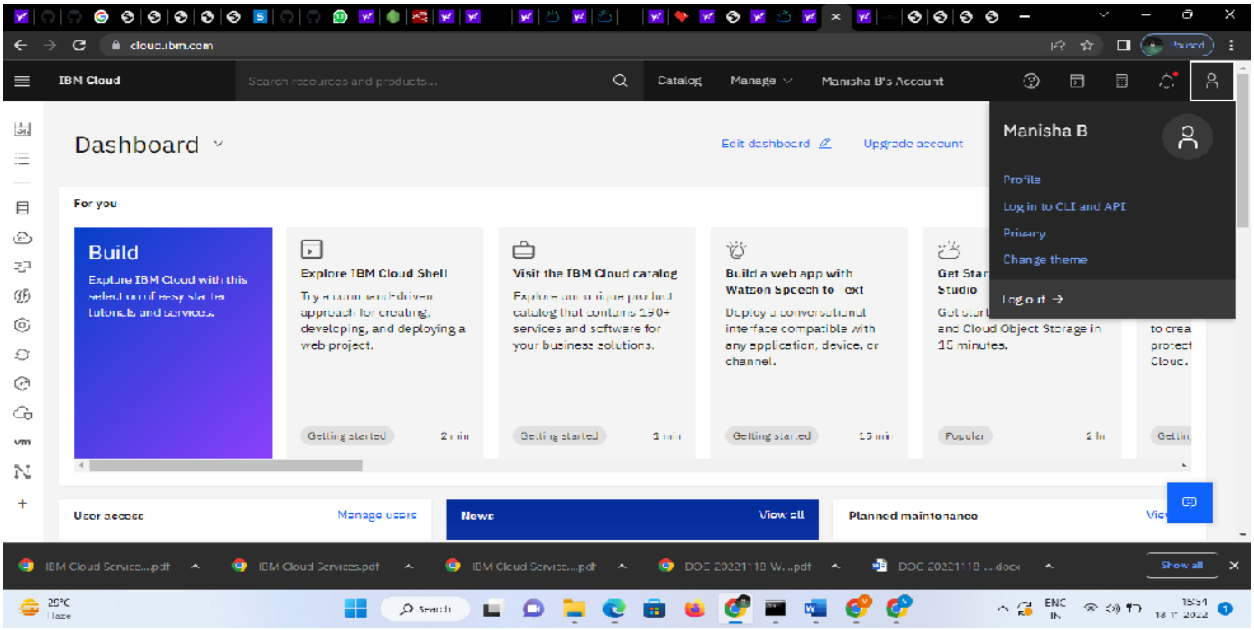
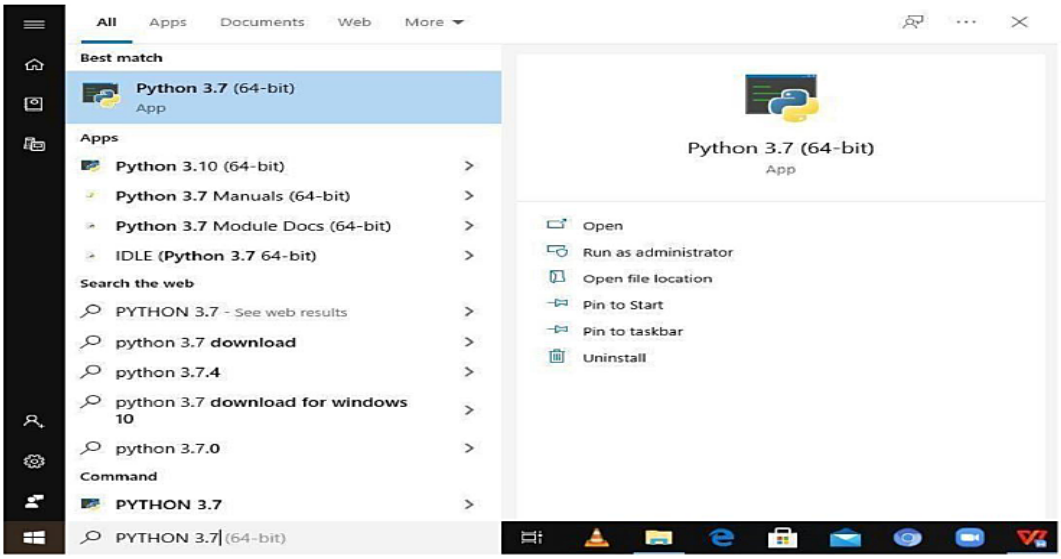
PROJECT NAME	Gas leakage monitoring and alerting system

PREREQUISITES:

IBM CLOUD SERVICES:



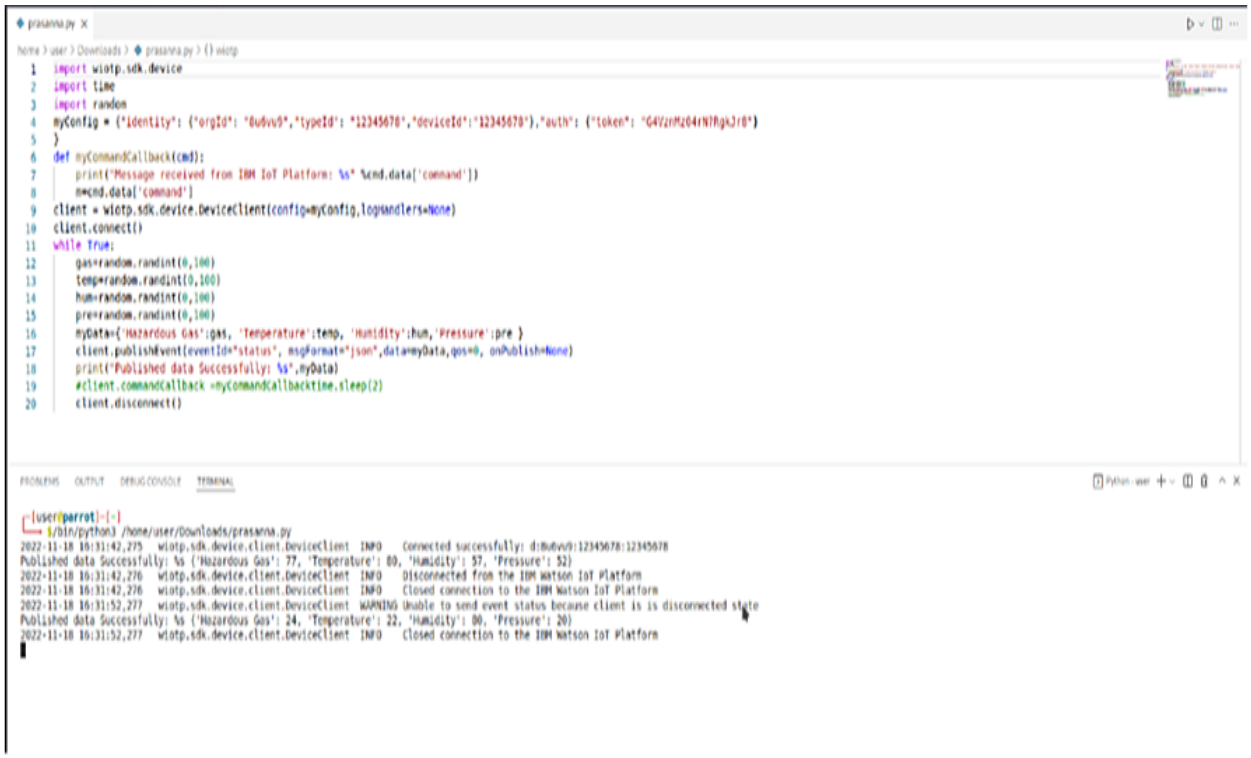
SOFTWARE:



CODE:

```
import wiotp.sdk.device
import time
import random
myConfig = {"identity": {"orgId": "8u6vu9","typeId":
"12345678","deviceId":"12345678"},"auth": {"token":
"G4VznMz04rN?RgkJr8"}
}
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:
    gas=random.randint(0,100)
    temp=random.randint(0,100)
    hum=random.randint(0,100)
    pre=random.randint(0,100)
    myData={'Hazardous Gas':gas, 'Temperature':temp,
'Humidity':hum,'Pressure':pre }
    client.publishEvent(eventId="status",
msgFormat="json",data=myData,qos=0, onPublish=None)
    print("Published data Successfully: %s",myData)
    #client.commandCallback =myCommandCallbacktime.sleep(2)
    client.disconnect()
```

OUTPUT:

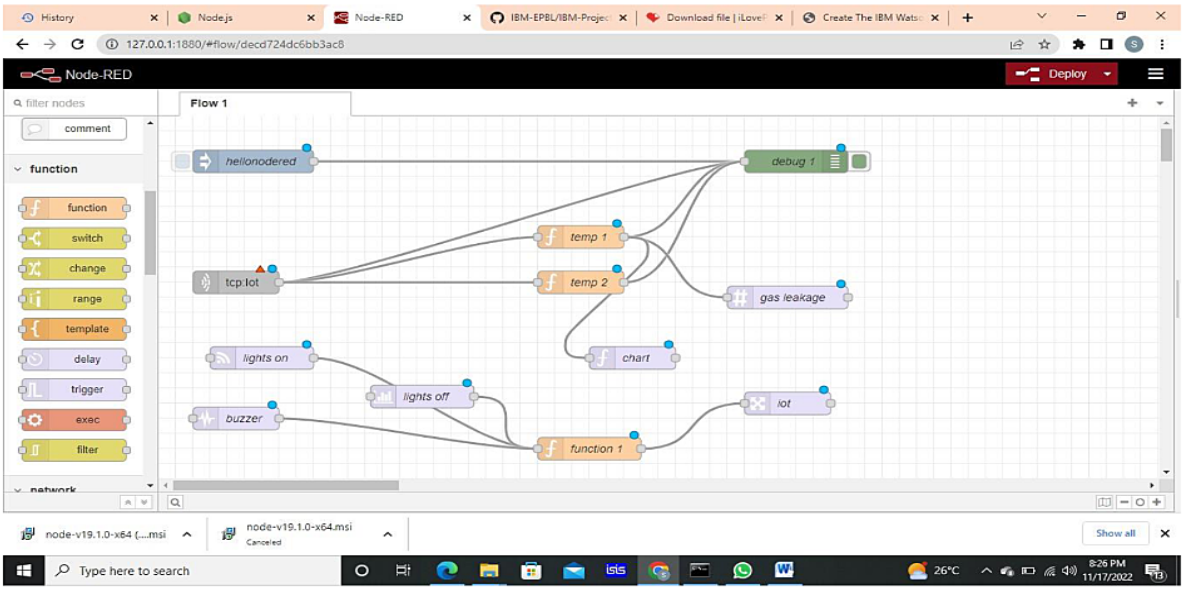


```
prasanna.py
home > user > Downloads > prasanna.py > {} wiotp
1  import wiotp.sdk.device
2  import time
3  import random
4  myConfig = {"identity": {"orgId": "6u6vu9","typeId": "12345678","deviceId":"12345678"},"auth": {"token": "G4VznMz64rN?RgkJr8"}
5  }
6  def myCommandCallback(cmd):
7      print("Message received from IBM IoT Platform: %s" %cmd.data['command'])
8      m=cmd.data['command']
9  client = wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
10 client.connect()
11 while True:
12     gas=random.randint(0,100)
13     temp=random.randint(0,100)
14     hum=random.randint(0,100)
15     pre=random.randint(0,100)
16     myData={'Hazardous Gas':gas, 'Temperature':temp, 'Humidity':hum,'Pressure':pre }
17     client.publishEvent(eventId="status", msgFormat="json",data=myData,qos=0, onPublish=None)
18     print("Published data Successfully: %s",myData)
19     #client.commandCallback =myCommandCallbacktime.sleep(2)
20     client.disconnect()

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

[user@parrot]~[~]
└─$ /bin/python3 /home/user/Downloads/prasanna.py
2022-11-18 16:31:42,275  wiotp.sdk.device.client.DeviceClient  INFO    Connected successfully: d:6u6vu9:12345678:12345678
Published data Successfully: %s {'Hazardous Gas': 77, 'Temperature': 89, 'Humidity': 57, 'Pressure': 52}
2022-11-18 16:31:42,276  wiotp.sdk.device.client.DeviceClient  INFO    Disconnected from the IBM Watson IoT Platform
2022-11-18 16:31:42,276  wiotp.sdk.device.client.DeviceClient  INFO    Closed connection to the IBM Watson IoT Platform
2022-11-18 16:31:52,277  wiotp.sdk.device.client.DeviceClient  WARNING Unable to send event status because client is is disconnected state
Published data Successfully: %s {'Hazardous Gas': 24, 'Temperature': 22, 'Humidity': 80, 'Pressure': 20}
2022-11-18 16:31:52,277  wiotp.sdk.device.client.DeviceClient  INFO    Closed connection to the IBM Watson IoT Platform
```

DEVELOP THE WEB APPLICATION USING NODE-RED:



OUTPUT:

Use Dashboard Nodes for Creating UI

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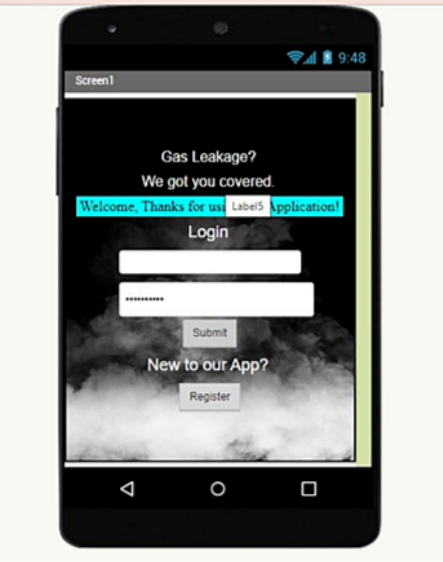
FINAL APP:



OUTPUT:

YouTube Link: https://youtu.be/VnQN2rssoSI