INDUSTRY SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM

NALAIYA THIRANPROJEC T BASED LEARNINGON

PROFESSIONAL READINESS FOR INNOVATION,EMPLOYABILITY AND ENTREPRENEURSHIP

A PROJECT REPORT

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ABSTRACT

The Internet of Things (IoT) is a new sector that aims to connect "things," "people," and "machines" to the internet. Modernization and automation are sweeping the globe, with IoT-based industrial fire management solutions at the forefront. The importance of assessing the state of the industry is vital to the safety and efficiency of the products.The goal of this study is to create an IoT- based industrial fire management system with intelligent sensors. Because of the integration of big data, the IBM cloud can be used to monitor status from anywhereon the planet. Data analysishas been streamlined, allowing for easierIoT monitoring. The proposed technology could be beneficial to manufacturing industries. Adding technology to any kind of manufacturing industry will assure the safety and well-being of the people as well as prevent accidents. Using automation technology reduces the chances of loss and accidents in the machinery world

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INDUSTRY SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM POWERED BY IOT

1. INTRODUCTION

The Internet of Things (IoT) is pervasive across many industries and has an impact on both business operations and everydaylives. IoT stands for the change from computernetworks toan object network where each component of daily social and professional life.

Due to accidents, inadequacies, or plain negligence on the part of industry authorities, there have been countless fatalities, severe injuries, and catastrophic damage that have disrupted people's lives suffering' and future generations. To avoid any future catastrophe like this projectsuggests a cutting-edge checking methodology reliant on the Internet of Things (IoT).

This construction project creates a mechanical observation framework that recognizes anomalous concentrations of gases including carbon monoxide, LPG, butane, and hydrogen that could set off an explosion. Additionally, it displays air volume. Along with monitoring the temperature and cleaning up any pollution the company may have humidity levels.

Integration of data from multiple sensors ensures the industry's safety. The system operatesreliably and steadily. It is the best and most responsible way to monitor fire security.

2.OBJECTIVE:

- Monitoring temperature fluctuations is particularly importantsince different industrial equipment's operations are impacted by temperature variations, which are a physical component of the environment.
- The computer has a microcontroller chip incorporated for managing varioussettings, and a system keeps track of the real-time data collection. On LCD, values from various parameters are compiled and shown.
- A collection of all the code is send into the ESP32.
- Each code stands for a certain parameter, such as air, temperature, pressure, or humidity. The systems platform can be used to implement the intelligent industrial remote monitoring of the power system, intelligent furniture monitoring, intelligent warehouse monitoring, etc. This assuresthe user of the stabilityand dependability of the system.
- It has good social aspectsand is most effective and most economical means of equipment safety monitor.
- It senses changesin temperature, sensessmoke, flame etc., and sends it to control station by android app.
- In the prototype, installations of sensorsin three distinctlocations to identifythe exact location of fire hazards that have taken place.

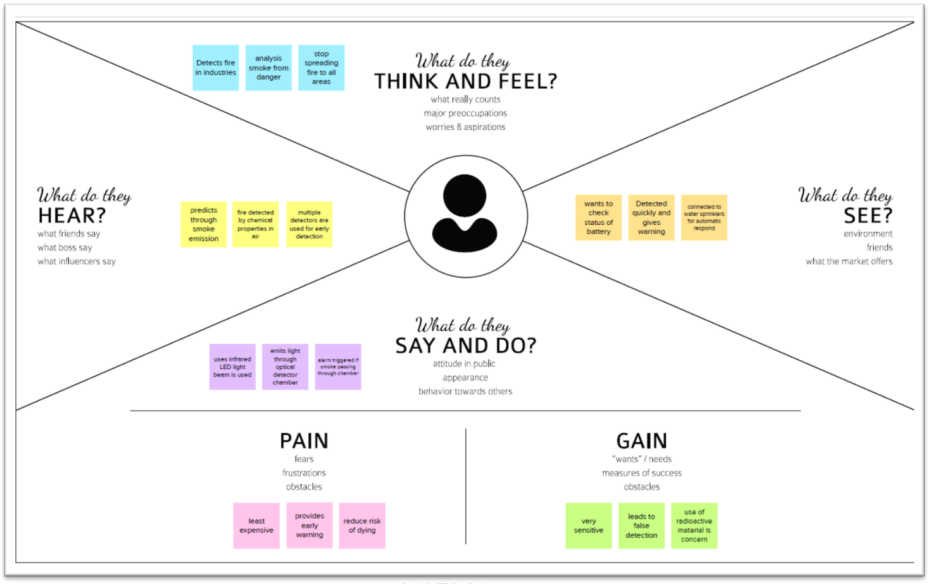
3.IDEATION PHASE

3.1 LITERATURE SURVEY:

The employment of wireless technology is improving people's safety and pleasure in the modern world. IOT, AR, AI, and other wireless technologies are in high demand for adapting to changing lifestyles. Using the same wireless sensors from earlier inventions, we wanted to build a sensor network for the detection and prevention of risks, followed by the eradication of the source that caused the hazard in the first place. The prototype contains sensors for temperature, humidity,fire, and gas.

The variables that can be monitored in advance to stop the occurrence of a major fire include temperature, gas, and humidity. Fire might be avoided if certain parameters are kept under control, and vice versa. We have employed water as an extinguishing agent to put out and put out the fire. A Fast SMS is also included in the prototype. This web application connected web UI and we got output using node red. For instance, if a sensor detects a dangerous gas, such as carbon monoxide, in the environment, the speech module will play the audio output "gas detected." As a result, this prototype can be highly helpful for workers in factories, power plants, etc. Then finally SMS will receive to the user.

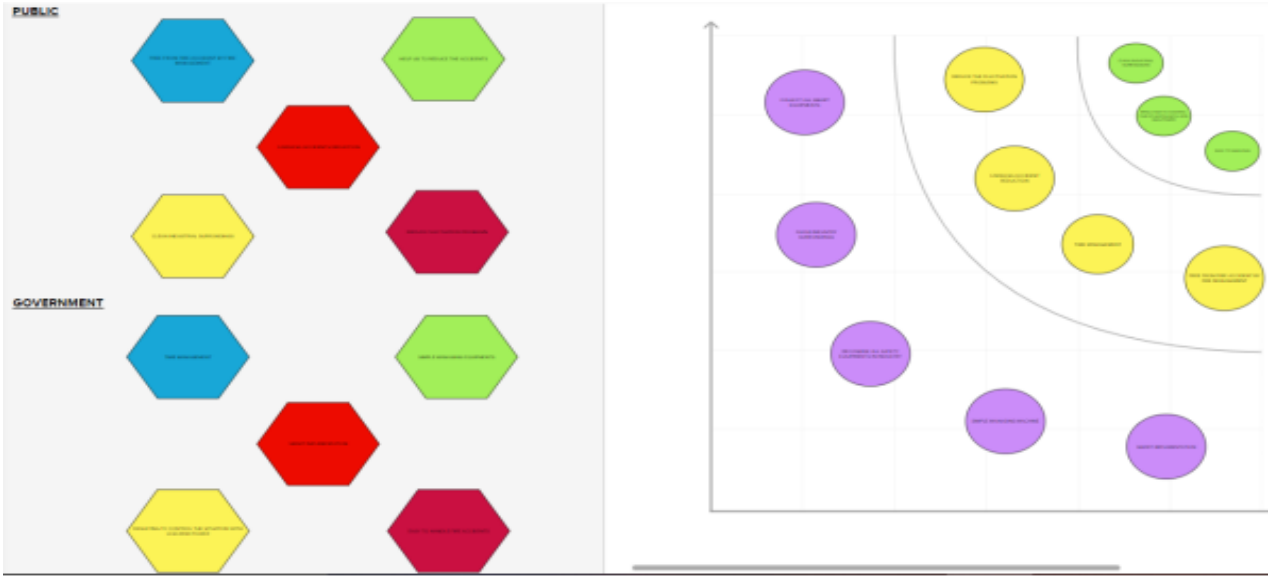
3.2 Empathy Map:



3.3 Ideation:

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A Employee	To Monitor the temperature and environment Pressure and some paramters	It takes long to detect Temperature	Of exploitation to sudden increase of Temperature	Discomfort
PS-2	An Admin	To view the data to take necessary precaution in time	It takes more time to view the data	Of less interaction	Dissatisfied

3.4 Brainstorming:



4.PROJECT DESIGN PHASE 1

4.1Proposed Solution:

S .No	Parameter	Description
1.	Problem Statement (Problem to be solved)	The fire accidents can't be full extinguished by humans, if there are no human nearby, it will destroy the whole things. Sometime it is very difficult task for humans to extinguish the fire. Thus, this system will help to alert and extinguish the fire accident occur in the industries.
2.	Idea / Solution description	If the system detects the level of smoke and temperature in the air that exceeds the safety level it will activate the alarm which includes the buzzer to alert the users at industries of the abnormal condition and to take any necessary action.
3.	Novelty / Uniqueness	Reducing the cost of the smoke and temperature detector and increasing the accuracy percentage.
4.	Social Impact / Customer Satisfaction	These leaks cause safety threats and secondary accidents for those working in industry and the environment .
5.	Business Model (Revenue Model)	It has a huge revenue, when it comes to the market.

4.2 Problem Solution Fit:

Define CS, fit into cc	**1.CUSTOMER SEGMENTS(S)** Who is your customer? • Factory/industry Managers or owner • Entrepreneur • Universities/school • government	**6.CUSTOMER CONSTRAINTS(CC)** • less efficiency management systems • budget • less knowledge on the availability of fire management system.	**5. AVAILABLE SOLUTIONS(AS)** * Immediate dialing of fire service and fire extinguisher are the available solution when the customer face the problem in the past * Pros of the existing solution is they get to operate powerful equipment which can easily stop the fire, maintains safety. The cons are the firefighters safety they undergo high risk, time delay and cannot predict the outbreak of fire.
Focus on J&P tap into BE, understand RC	**2. JOBS-TO-BE-DONE/PROBLEMS** * Unavailability of access for fire officers and poor inconsistencies fire can't be controlled.Fires not only results only in huge loss of Lives and Property but also disrupt production in the Industry, so this project early fire detection, automatic actions are taken immediately without risking anyone's life.	**9.PROBLEM ROOT CAUSE** Industries have a lot of flammable material, exposed wiring, overloaded outlets, overloaded circuits, static discharge etc. This can cause the outbreak of fire. Because of these problem, there will be huge loss of lives and property.system.	**7. BEHAVIOUR** * Find the system that can do early detection of fire, automatically takes control actions when fire occurs, alerts the managers.

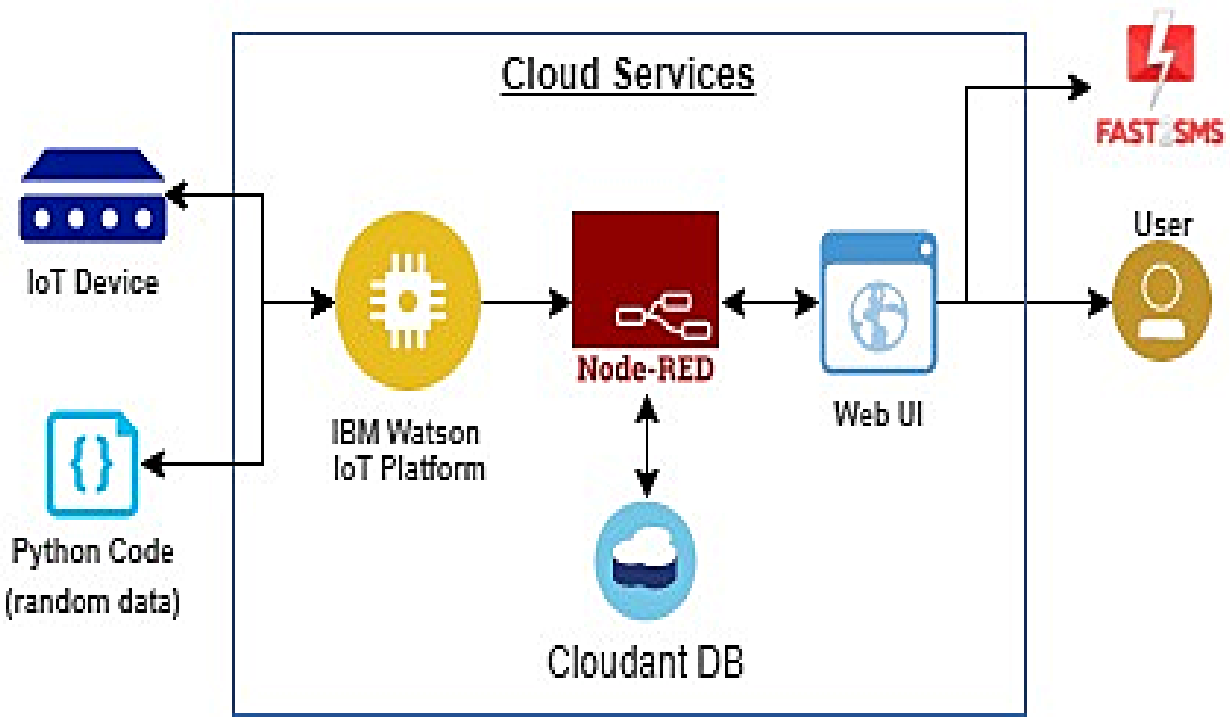
	3.TRIGGERS(TR) The loss of lives, damages to the property, disrupts production in the industry. **4.EMOTIONS: BEFORE/AFTER** Injury or Death: A fire in an industry that results in injury or death will have huge consequences on the business owner or manager responsible for the safety of their employees and, or customers, the family of anyone who is injured or dies and the businesses ability to trade and their reputation. Fire Insurance Claims: If a fire breaks out in a industry and the Fire Safety Legislation and recommendations have not been followed then this can and are likely to invalidate a businesses insurance. Cost: If an insurance claim is invalidated then the cost of the repairs to the property and claims can be huge.	**10. YOUR SOLUTION** This system gives an early warning of a developing or unexpected emergency situation when smoke or fire is detected. This permits a safe and speedy evacuation of the premises and helps to protect all workers. Then it takes automatic control measures based on the temperature readings and if any gasses are present the exhaust fans are powered ON, if any flame is detected the sprinklers will be switched on automatically. Emergency alerts are notified to the authorities and Fire station.	**8.CHANNEL OF BEHAVIOUR** 8.1 ONLINE The managers or staff can continuously monitor the reading like temperature, gas, flame level and can record these data. 8.2 OFFLINE In offline, in case of fire, evacuation of workers, providing the best escape route can be taken.

4.3 Solution Architecture:

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

- Find the best tech solutionto solve existingbusiness problems.
- Describe the structure, characteristics, behavior, and other aspectsof the software to project stakeholders.
- Define features, development phases, and solutionrequirements.
- Provide specifications accordingto which the solution is defined, managed,and delivered.

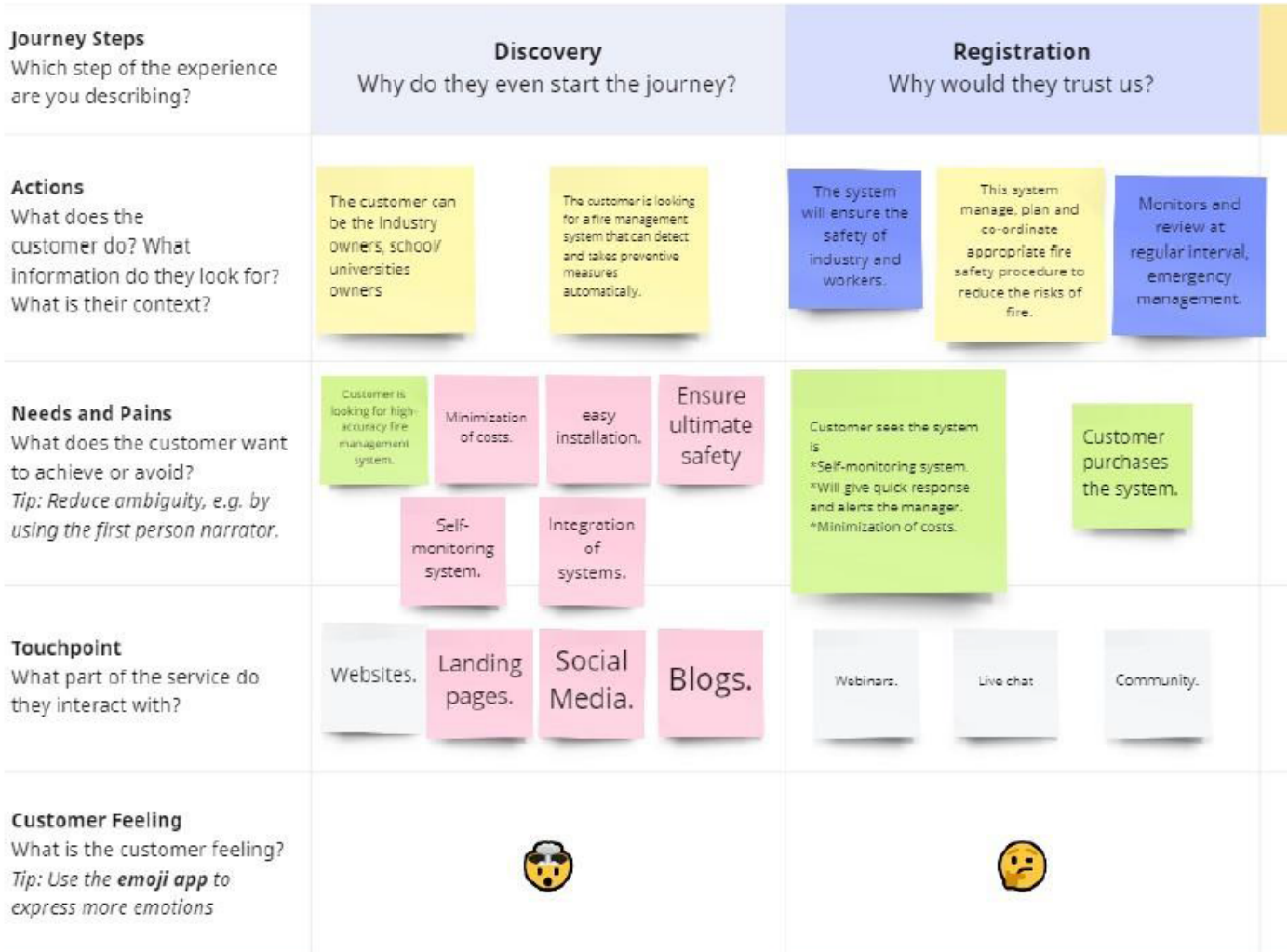
Example - Solution Architecture Diagram:

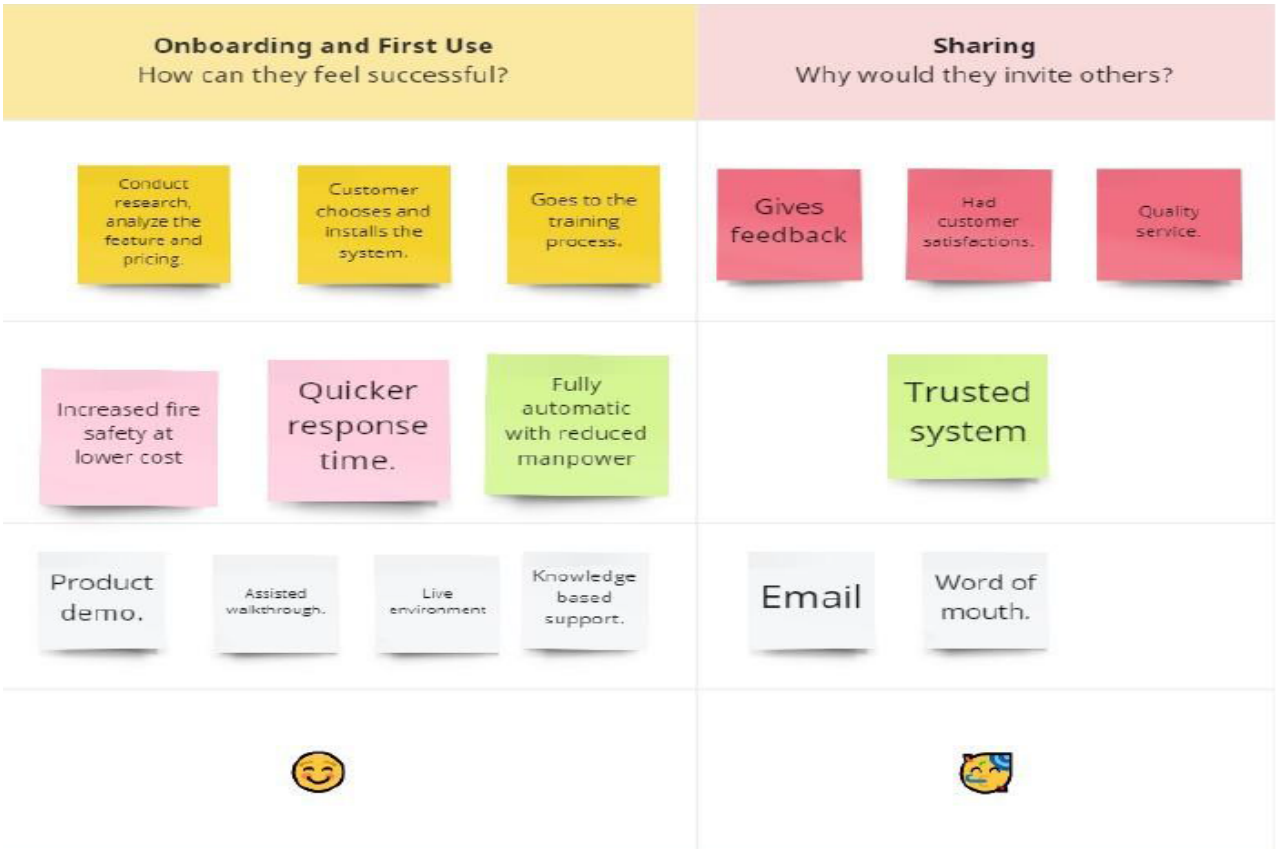


Industry Specific Intelligent Fire Management System

5. PROJECT DESIGN PHASE 2

5.1 Customer Journey Map:





5.2. Solution Requirements:

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	**Functional Requirement (Epic)**	**Sub Requirement (Story / Sub-Task)**
FR-1	User visibility	Emergency alerts through Fast SMS.
FR-2	User reception.	The data like amount of temperature smoke content and gas levels are received via SMS
FR-3	User Understanding	Based on the data, the user understands that if any of the data is above the threshold value, then there is a fire burst.
FR-4	User action	In case of fire bursts, the user needs to take actions like find the escape route, evacuate the workers and take necessary actions to control the fire.

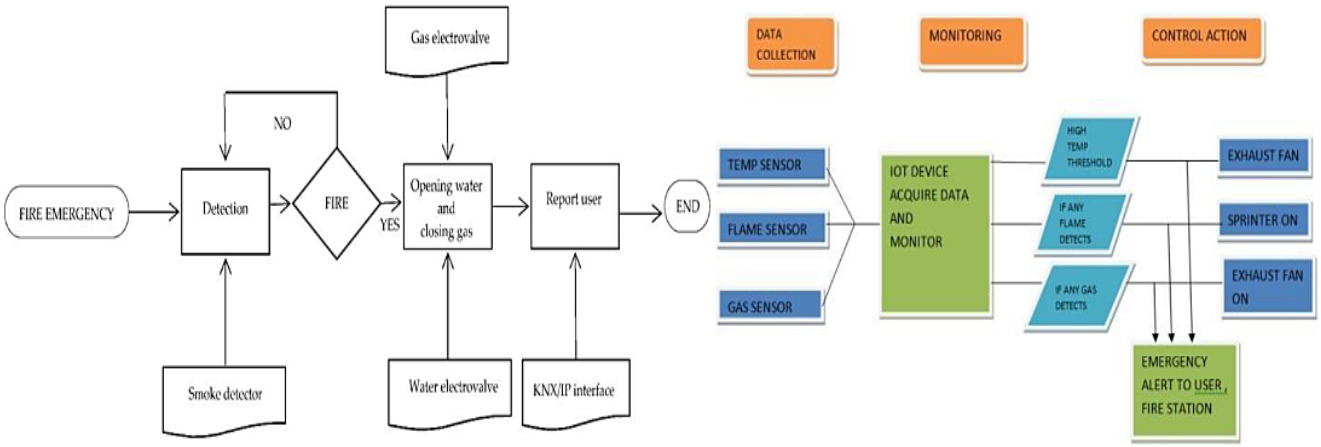
Non-functionalRequirements:

Following are the non-functional requirements of the proposed solution.

NFR No.	**Non-Functional Requirement**	**Description**
NFR-1	Usability	It ought to have the option to caution inhabitants of the structure the utilization of every perceptible and apparent alert.
NFR-2	Security	It ought to be utilized to guarantee the insurance of both important properties, as well as human existence
NFR-3	Reliability	It might have a capacity to recognize the smoke accurately and doesn't give a false caution or signal.
NFR-4	Performance	It ought to have Programmed fire sprinklers combined with identification which distinguishes the flames, yet in addition smother the flames in the underlying stage itself.
NFR-5	Availability	It could be accessible for day in and day out hours so it tends to be useful for individuals
NFR-6	Scalability	The sensors and boards utilized in this framework ought to have the option to effortlessly change overhaul concurring to change and need in requirements

5.3 **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 systemrequirement graphically. It shows how data enters and leaves the system, what changesthe information, and where data is stored.



User Stories

Use the below templateto list all the user stories for the product.

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 download the application	I can view the complete data sent by the hardware	High	Sprint-1

Customer (Mobile user)	Registration	USN-2	As a user, I can register for the application by entering my mobile number, email, password.	I can access my profile	High	Sprint-1
Customer (Mobile user)	Registration	USN-3	As a user. I will receive confirmation email or OTP to SMS once I have registered for the application	I can receive confirmation email or OTP click confirm	High	Sprint-1
Customer (Mobile user)	Login	USN-4	As a user, I can log into the application by entering email and password	I can access my profile and dashboard	High	Sprint-2

Customer (web user)	Actions	USN-5	As a user, I can View Temperature Readings	I can view the data by hardware	Medium	Sprint 2
Customer (web user)	Actions	USN-6	As a user. I can view any flame is detected in the place	I can view the data by hardware	High	Sprint-2

Customer (web user)	Actions	USN-7	As a user. I will have on and off button for operate sprinklers	The actions are taken by the user based on flame detected data	Medium	Sprint-3
Customer (web user)	Actions	USN-8	As a user, I will have on and off button for operate exhaust fan.	The actions are taken by the user based on temperature and level of gas content data	Medium	Sprint-3
Administrator	Storage	USN-9	As a Administrator I can store the data in cloud database.	The entire data are stored in cloud database	High	Sprint-4

5.4 Technology Stack:

Table-1: Components & Technologies:

S. No	Component	Description	Technology
1	User Interface	Web UI, Node-RED, MIT app Inventor	IBM IoT Platform, IBM Node RED, IBM Cloud
2	Application Logic-1	Create IBM Watson IoT Platform and create Node RED service	IBM Watson, IBM Node-RED, IBM Cloud ant service,
3	Application Logic-2	Describe logic for a process in the application and build a web application using node-red service	IBM Node-red
4	Application Logic-3	Develop python script to subscribe publish and to IBM IoT Platform	Python
5	Database	Data Type, Configurations etc.	MySQL, NoSQL

6	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloud
7	File Storage	Mobile application is developed for storing and receiving the sensor information	Web UI
8	External API-1	IBM sensors are used to detect the fire, temperature, smoke in the environment and provides the activation of water sprinklers in web UI	IBM Sensors
9	External API-2	IBM Fire management API is used to detect the fire in one place	IBM fire management system API
10	Machine Learning Model	Using this model, we can be able to recognize objects	Object Recognition Model
11	Infrastructure (Server / Cloud)	Cloud Server Configuration	IBM Cloud, IBM IoT Platform

Table-2: Application Characteristics:

S. NO	Characteristics	Description	Technology
1	Open-Source Frameworks	MIT App Inventor	MIT license
2	Security Implementations	IBM Services	Encryptions, IBM Controls
3	Scalable Architecture	Sensor-IoT Cloud based Architecture	AI and Cloud computing
4	Availability	Mobile phones, Desktop and Laptop	MIT App Inventor
5	Performance	Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN's) ETC	Sensor

6.PROJECT PLANNINGPHASE

6.1 Prepare Milestone and Activity List:

TITLE	DESCRIPTION	DATE
IDEATION PHASE		
Literature Survey & InformationGathering	Literature survey on the selected project & gathering information by referring the,technical papers, researchpublications etc.	01 OCTOBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture theuser Pains &Gains, Prepare list of problem statements.	10 OCTOBER 2022
Problem Statement	List of problem in the project.	10 OCTOBER 2022
Brainstorm and Idea Prioritization	List the by organizing the brainstorming session andprioritize the top 3 ideas based on the feasibility & importance.	10 OCTOBER 2022
Project Design Phase - I		
Proposed Solution	Prepare the proposed solution document, which includesthe novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	12 OCTOBER 2022
Problem Solution Fit	Prepare problem- solution fit document	18 OCTOBER 2022
Solution Architecture	Solution Architecture	18 OCTOBER 2022

TITLE	DESCRIPTION	DATE
Project Design Phase-II		
Customer Journey	Prepare the customer journey maps tounderstand the user interactions & experiences with the application (entryto exit)	20 OCTOBER 2022
Functional Requirement	Prepare the functional requirementdocument.	30 OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams andsubmit for review	30 OCTOBER 2022
Technology Architecture	Prepare the technology architecturediagram.	30 OCTOBER 2022
Project Planning Phase		
Prepare Project Planning & SprintDelivery Plan	Prepare the Product Backlog, SprintPlanning, Stories, and Storypoints	05 NOVEMBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity listof the project	08 NOVEMBER 2022
Project Development Phase		
Project Development - Delivery ofSprint-1, 2, 3 & 4.	Develop & submit the developed code and testing it.	29 OCT – 19 NOV 2022

6.2 Sprint Delivery Plan:

Sprint	Functional Require -ment(Epic)	User Story Number	User Story/ Task	Story Point	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for theapplication by entering my email, password, and confirming mypassword.	2	High	T.Tamilselvan
Sprint-1	Simulation	USN-2	Connect sensorsand Arduino withpython.	1	High	Suba vigneshA, Tamil selvan.T
Sprint-2	Software	USN-3	Creating devicein the IBMWatsonoT platform, and workflow using Node-Red	2	Low	Nandha kumarS, Simma R
Sprint-1	MIT App Inverter	USN-4	Develop a mobile application for the Fire Management System Using MIT app Inventor	2	Medium	Tamil Selvan T Nandha kumar S
Sprint-1	Login	USN-5	AS a user, I can log into application by entering email & password	1	High	Simma R, Suba Vignesh A

Sprint	Functional Requirement (Epic)	User Story Number	User Story/Task	Story Point	Priority	Team Members
Sprint-1	Dashboard	USN-6	As a I can get notification alert	1	Medium	Tamil Selvan T, Suba Vignesh A
Sprint-2	Testing and Development Phase 1	USN-7	Testing the system performance, for an emergency caseand its deployed	2	High	Tamil Selvan T, Nandhakumar S
Sprint-3	Linking	USN-8	Link the app with the IBM cloud	2	High	Suba Vignesh A, Simma R
Sprint-4	Implementation	USN-9	Deployment of IOT based industrial specific fire management system I can see and use system for 24/7	2	High	Nandha Kumar S, Simma R

Sprint	Total Story Point	Duration	Sprint Start Date	Sprint End Date	Story points completed (as a plan end date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24Oct2022	29Oct2022	20	29Oct2022
Sprint-2	20	6 Days	31Oct2022	05Oct2022	20	05Oct2022
Sprint-3	20	6 Days	07Novt2022	12Oct2022	20	12Oct2022
Sprint-4	20	6 Days	14Nov2022	19Nov2022	20	19Nov2022

Velocity:

Imagine we have a 10-day sprintduration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's averagevelocity (AV) per iteration unit (story points per day)

$$AV = \frac{\text{SPRINT DURATION}}{\text{VELOCITY}} = \frac{20}{6} = 3.33$$

BURNDOWN CHART:

A burn down chart is a graphicalrepresentation of work left to do versus time. It is often used in agile softwaredevelopment methodologies such as Scrum. However, burn down charts can be appliedto any project containing measurable progressover time.

https://www.visual-paradigm.com/scrum/scrum-burndown-chart/

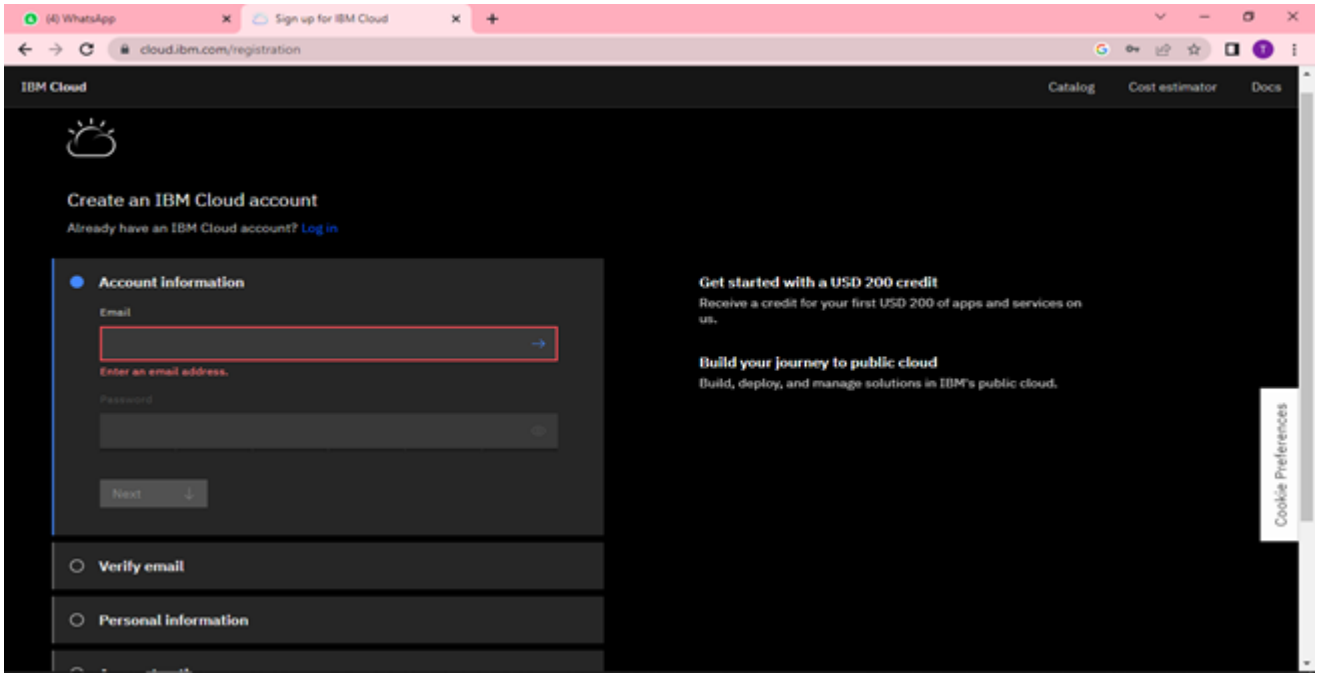
Reference:

https://www.atlassian.com/agile/project-management
https://www.atlassian.com/agile/tutorials/how-to-do-scrum-with-jira-software
https://www.atlassian.com/agile/tutorials/epics
https://www.atlassian.com/agile/tutorials/sprints
https://www.atlassian.com/agile/project-management/estimation
https://www.atlassian.com/agile/tutorials/burndown-charts

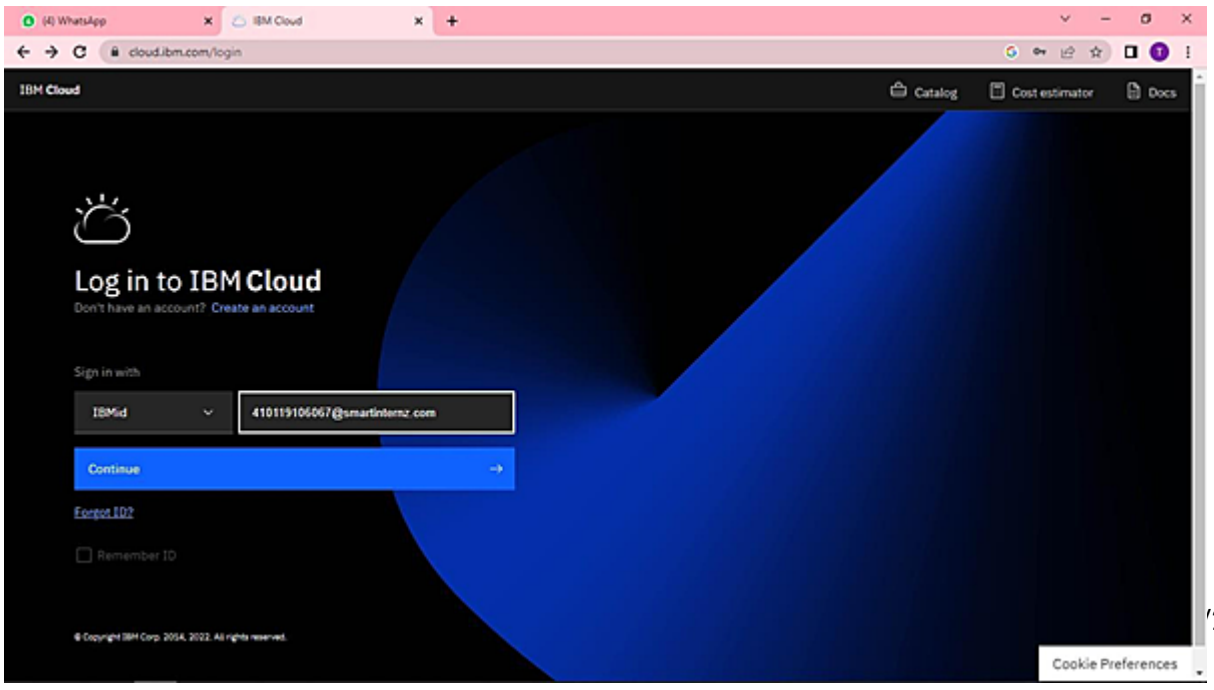
7.PROJECT DEVELOPMENT PHASE

7.1 Project Development SPRINT-1

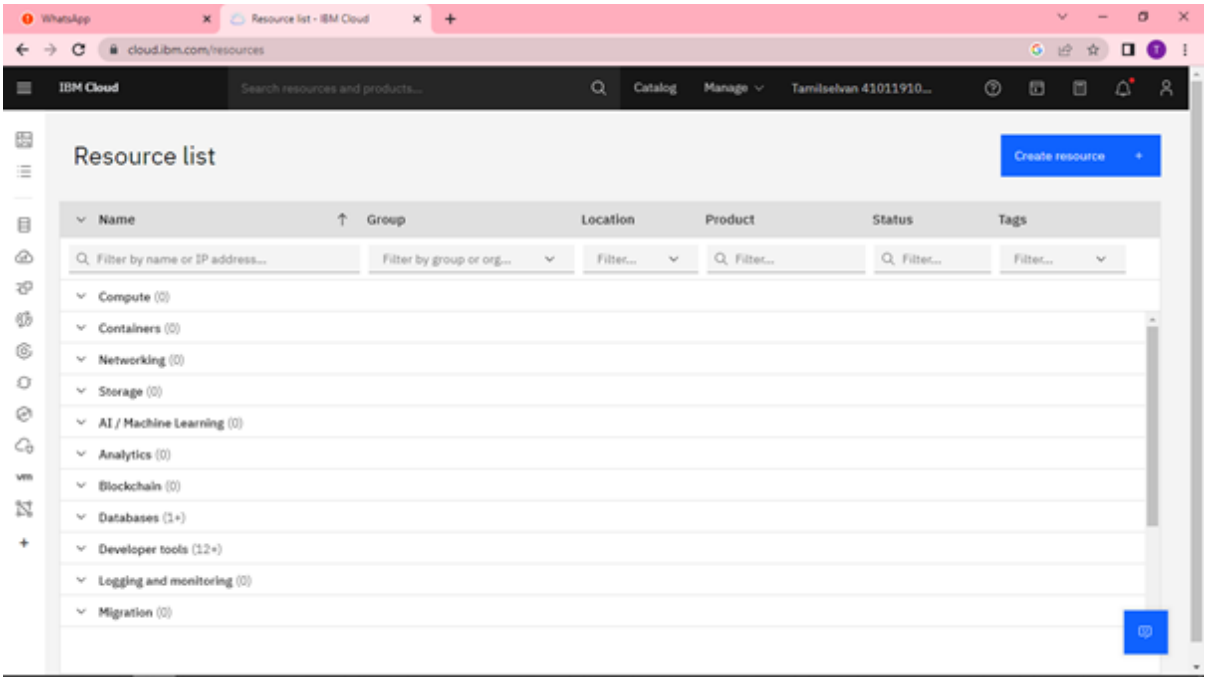
Step-1: To create IBM Cloud



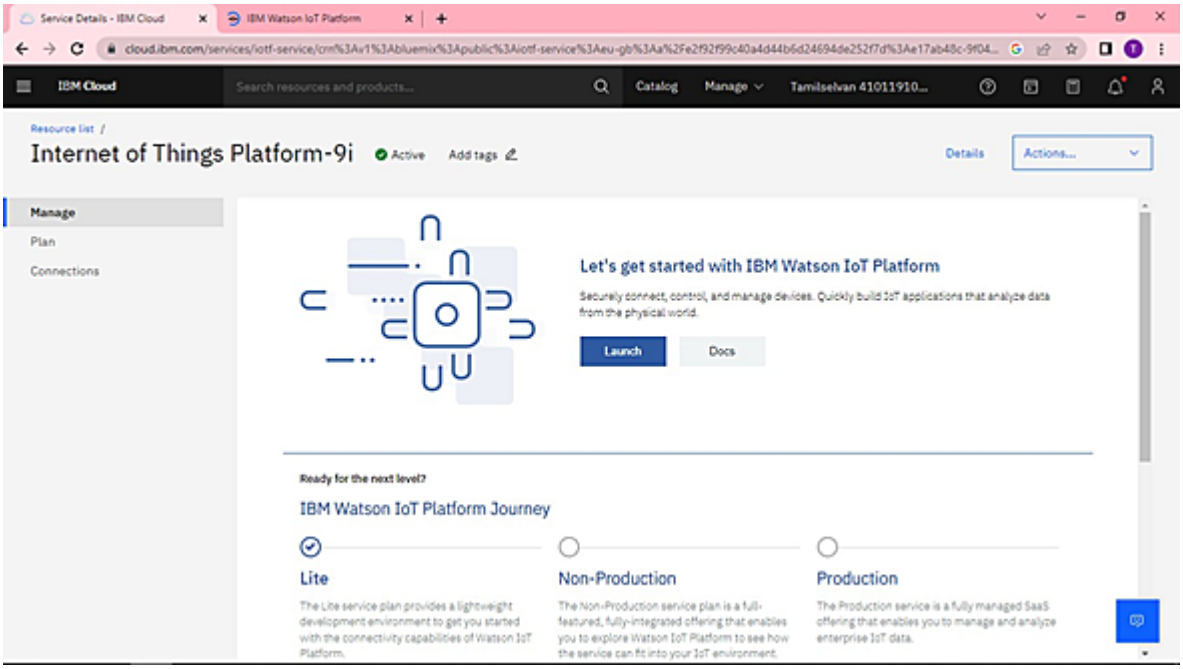
Step-2 : Login to IBM Cloud Account



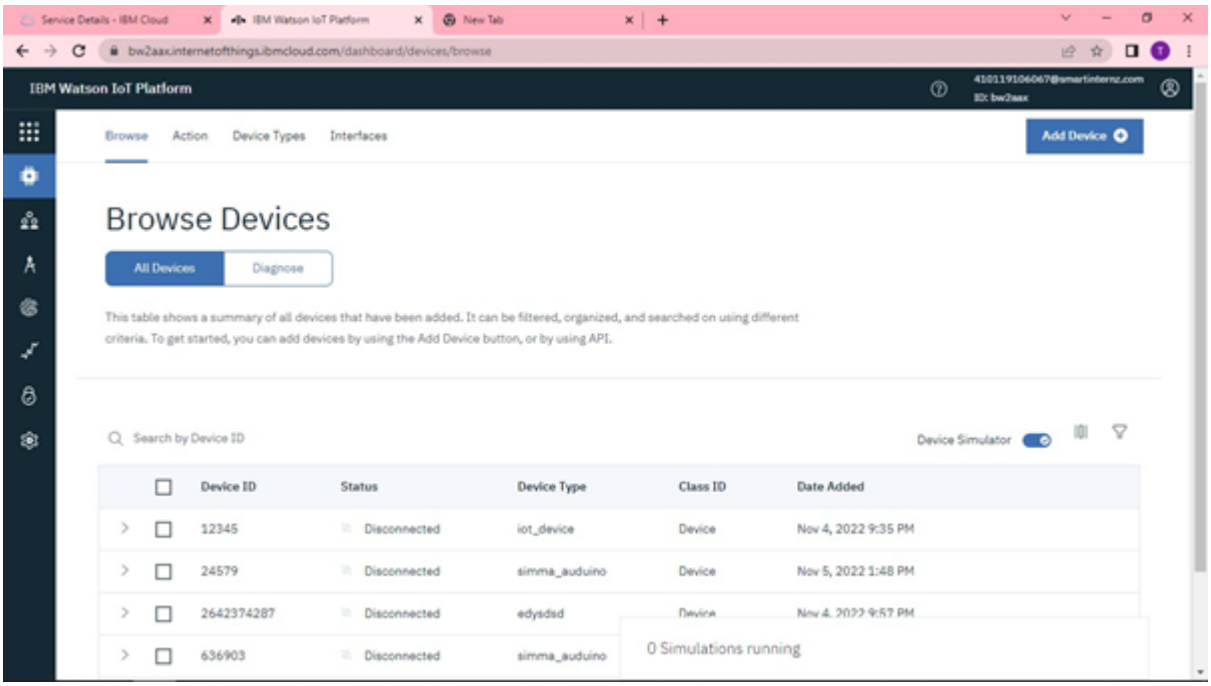
Step-3: Using IBM cloud services for the project



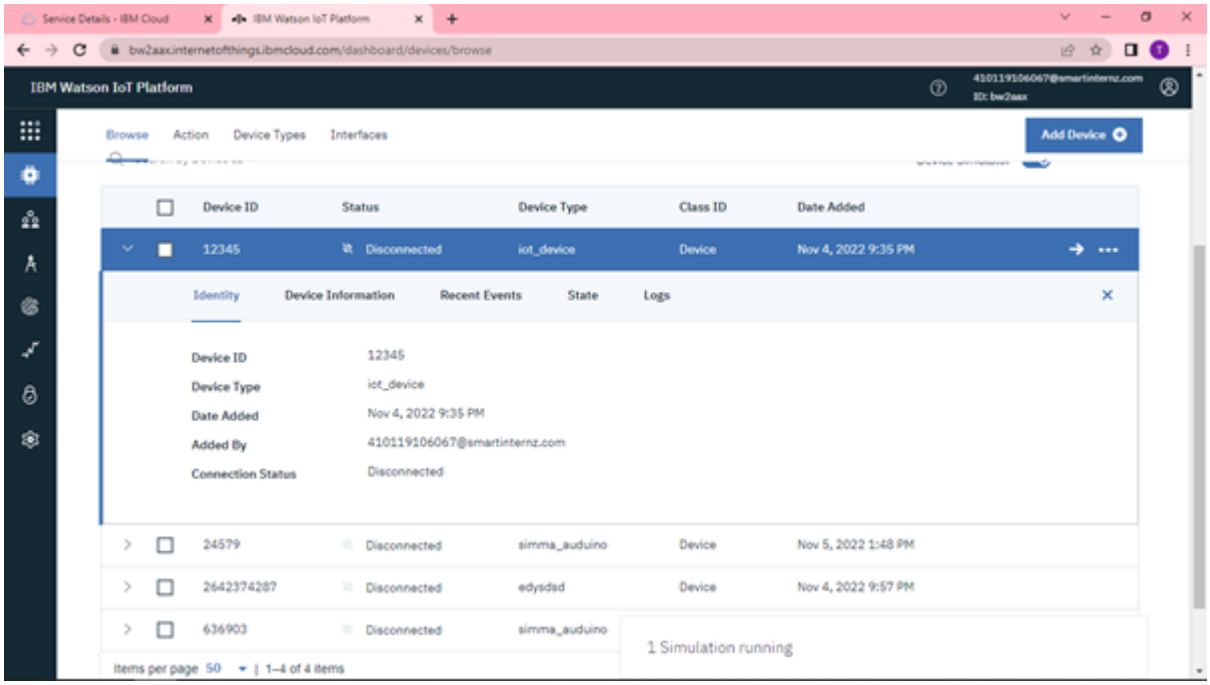
Step- 4: configure IBM Watson IOTplatform



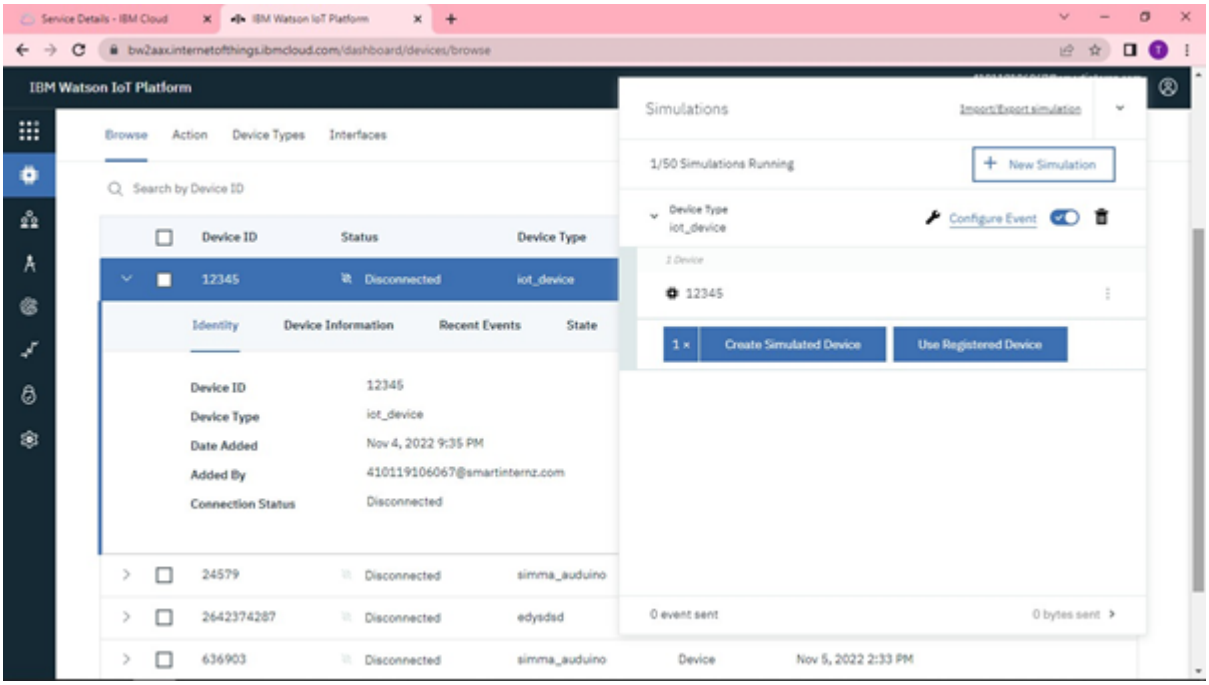
Step-5:IBM Watson IOT Platform is created



Step-6: To connect the IOT devices to the IBM cloud, create device in the IBM Watson IOT platform and get the device credentials



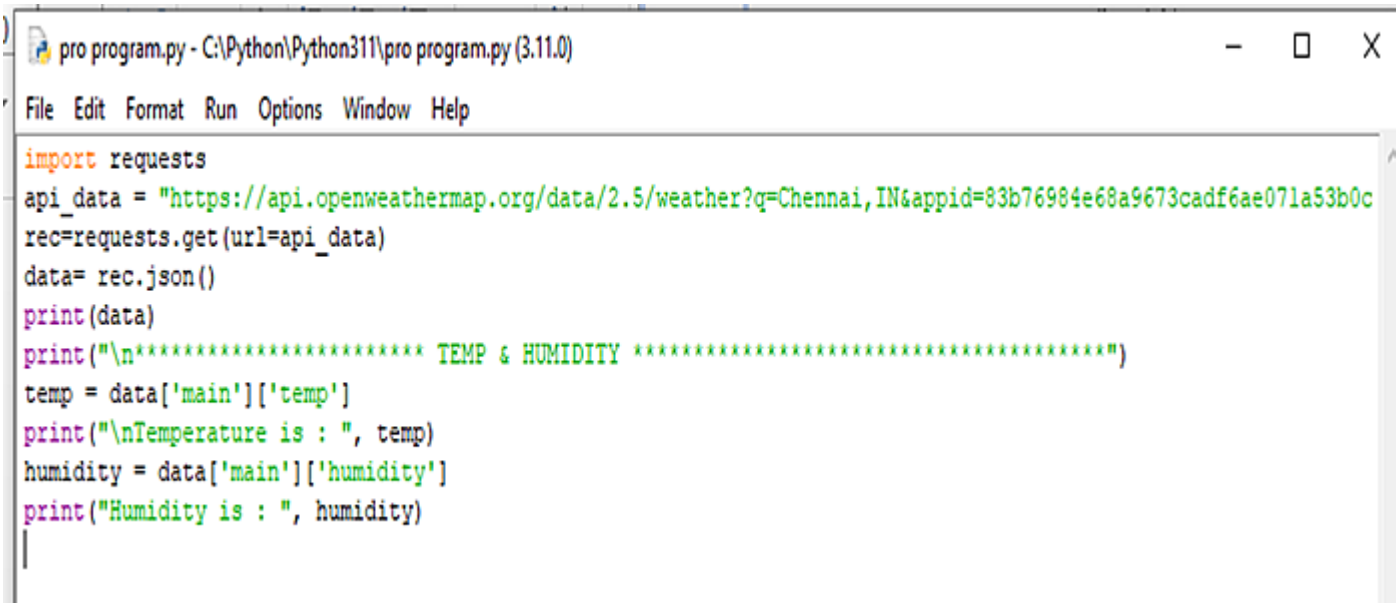
Step 7:Connect the device with iot device and start simulation



7.2 Project Development Sprint-2

Sprint goal:

Push the code from Sprint 1 to cloud so it can be accessed from anywhere



OUTPUT :

```
================== RESTART: C:\Python\Python311\pro program.py =================
{'coord': {'lon': 80.2785, 'lat': 13.0878}, 'weather': [{'id': 701, 'main': 'Mist', 'description': '
mist', 'icon': '50n'}], 'base': 'stations', 'main': {'temp': 300.14, 'feels_like': 302.33, 'temp_min
': 300.14, 'temp_max': 300.14, 'pressure': 1011, 'humidity': 74}, 'visibility': 4000, 'wind': {'spee
d': 2.06, 'deg': 30}, 'clouds': {'all': 20}, 'dt': 1668781698, 'sys': {'type': 1, 'id': 9218, 'count
ry': 'IN', 'sunrise': 1668731942, 'sunset': 1668773353}, 'timezone': 19800, 'id': 1264527, 'name': '
Chennai', 'cod': 200}

************************ TEMP & HUMIDITY **************************************

Temperature is :  300.14
Humidity is :  74
```

PYTHON CODE

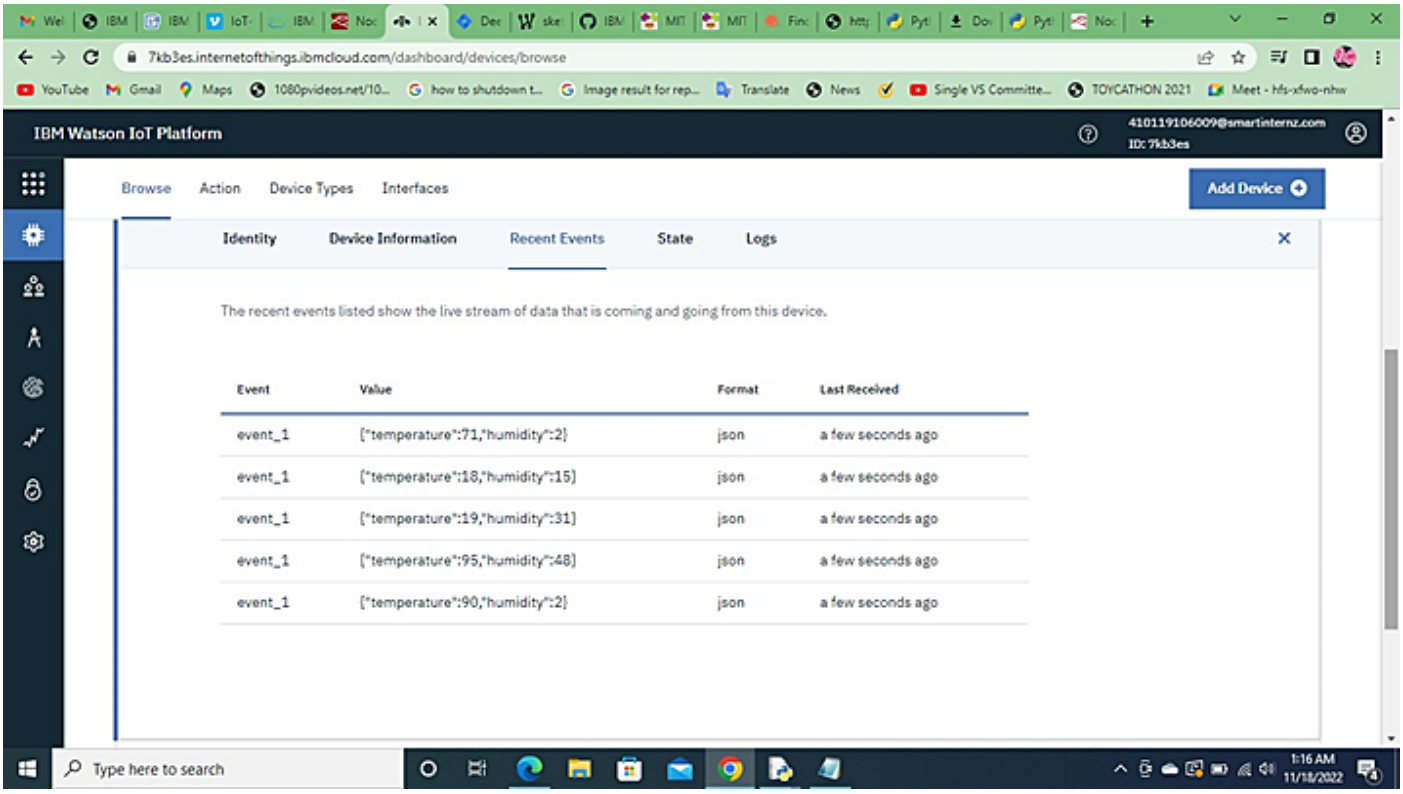
```
import
requests
api_data
=
"https://api.openweathermap.org/data/2.5/weather?q=Chennai,IN&appid=83b76984e68a9673cadf6ae071a53b0 c"
re=requests.get(url=api_da
ta) data= rec.json()
print(data)
temp = data['main']['tem']
print("\nTemperature is : ",
tem) humidity =
data['main']['hum']
print("Humidity is : ", hum)
```

PYTHON CODE:

```
#IBM Watson IOT
Platform #pip install
wiotp-sdk import
wiotp.sdk.device import
time
import
random
myConf
ig = {
    "identity": {
        "orgId": "60ys35",
        "typeId":
        "iot",
        "deviceId":"4
        321"
    },
    "auth": {
        "token": "921"
    }
}


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(-
    20,125)
    hum=random.randint(0,100)
    myData={'temperature':temp, 'humidity':hum}
    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()
```

OUTPUT:



7.3 Project Development Sprint-3

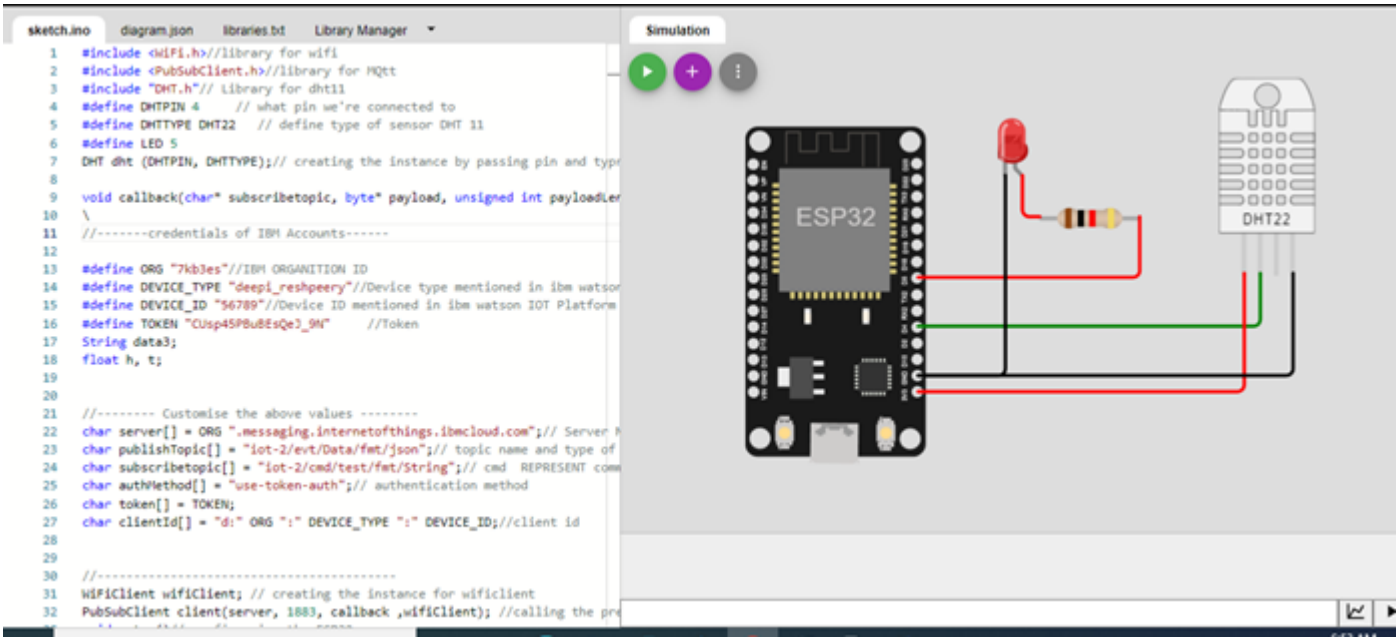
SPRINT GOAL:

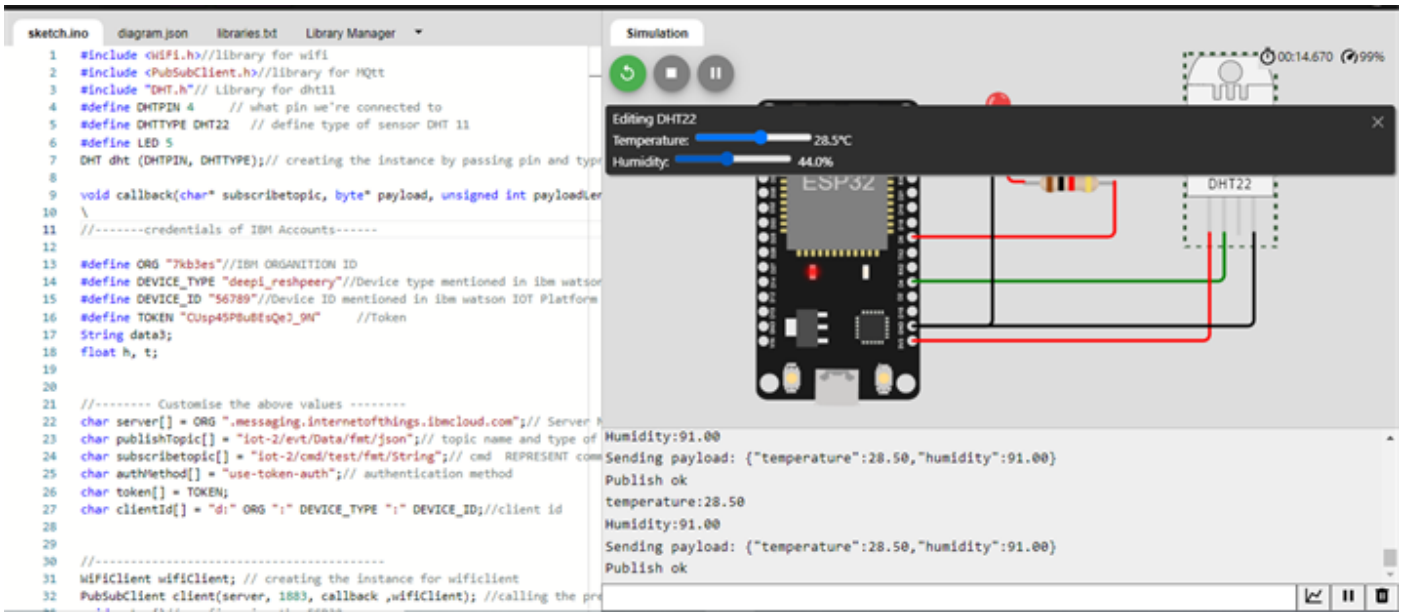
Integrate the hardware to be able to accessthecloud functions and provide inputs to the same.

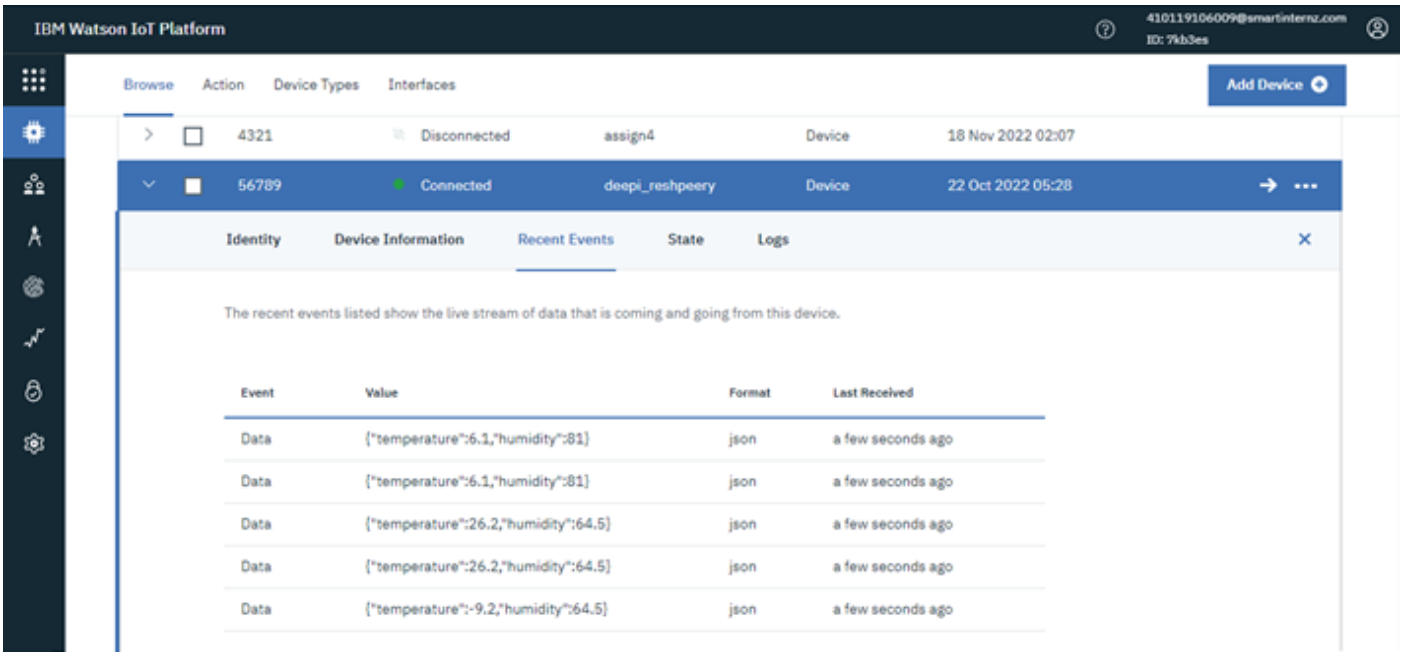
POGRAM 01:

AIM: To find the Temperature and Humidity DHT22 and ESP32

PLATFORM: WOKWI




sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
Editing DHT22
Temperature: 28.5°C
Humidity: 44.0%
ESP32
DHT22
Humidity:91.00
Sending payload: {"temperature":28.50,"humidity":91.00}
Publish ok
temperature:28.50
Humidity:91.00
Sending payload: {"temperature":28.50,"humidity":91.00}
Publish ok


IBM Watson IoT Platform
Browse
Action
Device Types
Interfaces
Add Device
4321 Disconnected assign4 Device 18 Nov 2022 02:07
56789 Connected deepi_reshpeery Device 22 Oct 2022 05:28
Identity
Device Information
Recent Events
State
Logs
The recent events listed show the live stream of data that is coming and going from this device.
Event Value Format Last Received
Data {"temperature":6.1,"humidity":81} json a few seconds ago
Data {"temperature":6.1,"humidity":81} json a few seconds ago
Data {"temperature":26.2,"humidity":64.5} json a few seconds ago
Data {"temperature":26.2,"humidity":64.5} json a few seconds ago
Data {"temperature":-9.2,"humidity":64.5} json a few seconds ago

Python Code:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#include "DHT.h"// Library for dht11
#define DHTPIN 4    // what pin we're connected to
#define DHTTYPE DHT22   // define type of sensor DHT 11
#define LED 5
DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of dht connected

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
\
//-------credentials of IBM Accounts------

#define ORG "60ys35"//IBM ORGANITION ID
#define DEVICE_TYPE "iot"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "4321"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN " 987654321"     //Token
String data3;
float h, t;
//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type AND COMMAND IS TEST OF
FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
//-------------------------------------
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by passing parameter like server
id,portand wificredential
void setup()// configureing the ESP32
{
  Serial.begin(115200);
  dht.begin();
  pinMode(LED,OUTPUT);
  delay(10);
```

```
  Serial.println();
  wificonnect();
  mqttconnect();
}
void loop()// Recursive Function
{

  h = dht.readHumidity();
  t = dht.readTemperature();
  Serial.print("temperature:");
  Serial.println(t);
  Serial.print("Humidity:");
  Serial.println(h);

  PublishData(t, h);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}




/*.....retrieving to Cloud.....*/

void PublishData(float temp, float humid) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"temperature\":";
  payload += temp;
  payload += "," "\"humidity\":";
  payload += humid;
  payload += "}";
  Serial.print("Sending payload: ");
  Serial.println(payload);

  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in Serial monitor or else it
```

```
will print publish failed
  } else {
    Serial.println("Publish failed");
  }
}
void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }
     initManagedDevice();
     Serial.println();
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}
```

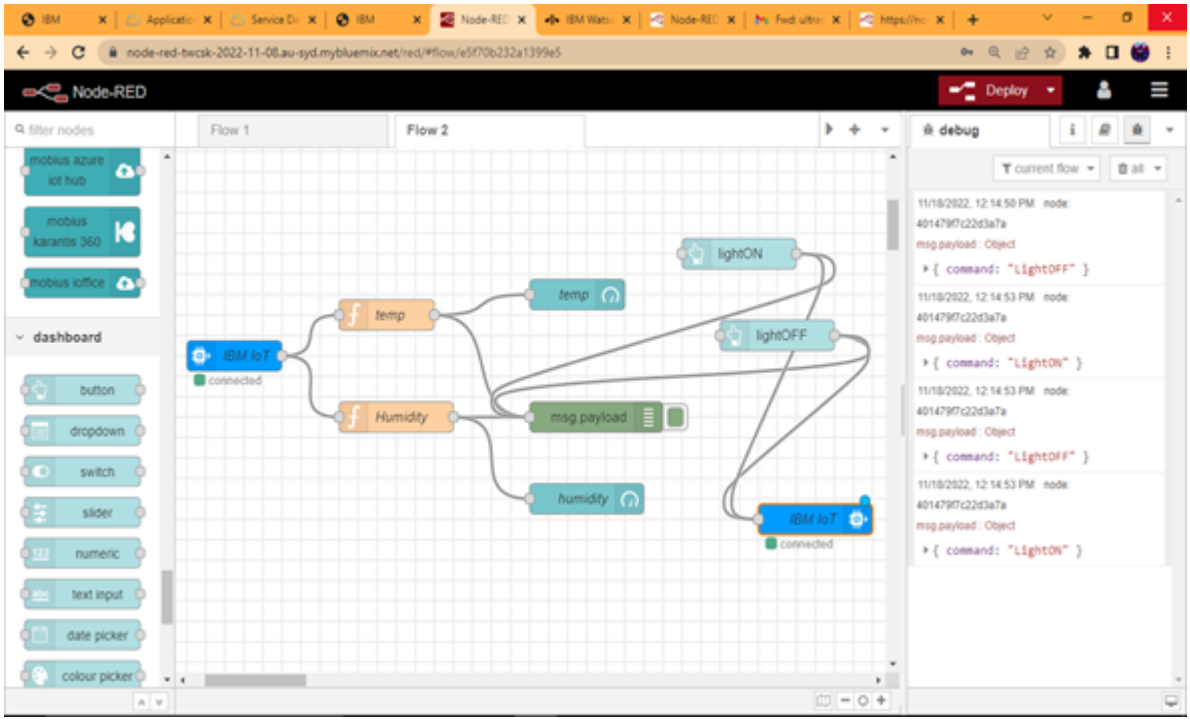
```
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{

  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
  for (int i = 0; i < payloadLength; i++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }
  Serial.println("data: "+ data3);
  if(data3=="lighton")
  {
Serial.println(data3);
digitalWrite(LED,HIGH);
  }
  else
  {
Serial.println(data3);
digitalWrite(LED,LOW);

  }
data3="";
}
```

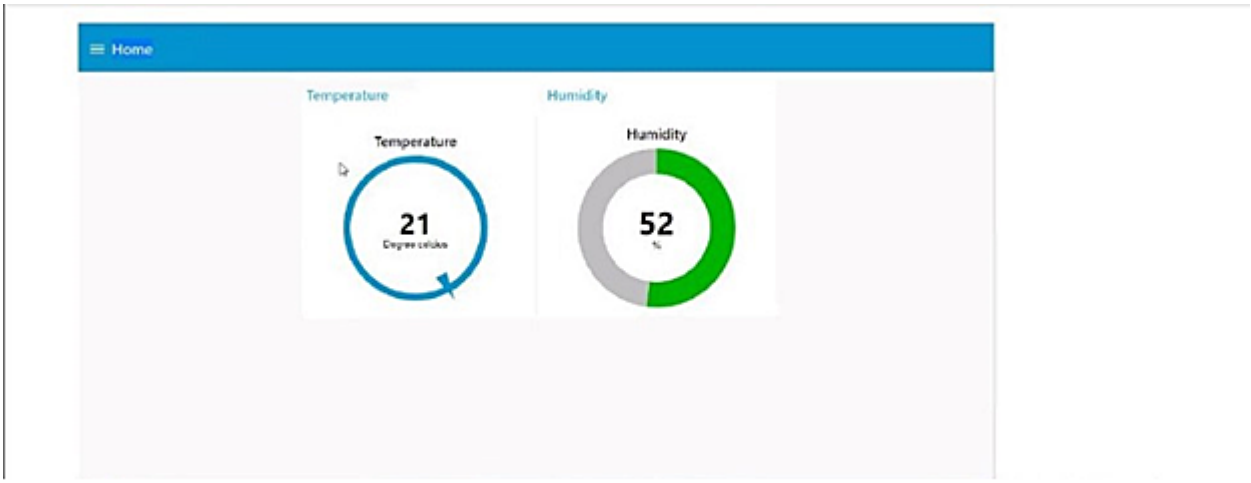
Output link :

https://wokwi.com/projects/348728594810274388

By using this Wokwi we determined the Temperature and Humidity for better road safety.

7.4 Project Development Sprint-4





CONCLUSION

We hope to gain hands-onexperience with the trending technologies of "Embedded System" and "Internet of Things" through this project. IoT-enabled industrial monitoring systems have become increasingly popular in a variety of industries because they improve safety standards by providing real-timemonitoring of critical parameters such as temperature, humidity, and smoke, as well as alerting officials and workers regularly. The implementation is not only for safety reasons, but it also has the potential to increase industry yields. In our project, the Internet of Things (IoT) is used to collect data and communicate through the internet. We hope that our project will be beneficial enough to be implemented in industries across India, saving lives and property from accidentsand risks that are often overlooked by industry personnel and users

9.REFERENCE

Integrating IoT technologies for an “intelligent” safety management in the processindustry Maria Grazia Gnoni , Paolo Angelo Bragatto, Maria Francesca Milazzo, Roberto Setola Procediamanufacturing 42, 511-515,2020.

IoT sensor-based BIM system for smart safety barriers of hazardous energy in petrochemical construction Lieyun Ding, Weiguang Jiang, Cheng Zhou Frontiers ofEngineering Management 9 (1), 1-15,2022.

Production Plant and Warehouse Automation with IoT and Industry 5.0 Zainab Fatima, Muhammad Hassan Tanveer,Shehnila Zardari, Laviza Falak Naz, Hina Khadim,Noorah Ahmed, Midha Tahir Applied Sciences 12 (4), 2053, 2022.

Explosion protection for industrial wirelessnetworks: Wireless Ethernetin hazardousareas works with explosion-proof enclosures. Kerstin Wolf Control Engineering 67 (10), 24-26, 2020.