# HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANT POWERED BY IOT

**TEAM ID-PNT2022TMID14654**


**PROJECT SUBMITTED BY:**

**MANOJKUMAR M**

**KARTHICK S**

**KARTHIKEYAN M**

**MANOBHARATH M**



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# PROJECT REPORT

## 1. INTRODUCTION

### 1.1 Project Overview

Industrial hazard is the danger or chance of accidental injury to the worker while engaged at his accustomed work in the plant. In industrial areas fire accidents can prevent by fire detection using temperature, gas and flame sensors with automatic water sprinkler, harmful or toxic gas leakages can identify by monitoring harmful gases and intimate alert message to safety control board of industry, Machine overheating can reduce by cooling machine with compressor, control the humidity and temperature instantaneously in order to have stable, controllable atmospheric conditions. Identifying industrial hazards allows employers to protect their worker from accidents, injuries, and fatalities.

### 1.2 Purpose

Safety stands as the foremost priority in most of today's technology-aided industrial processes. By using continuous monitoring and detecting of hazardous signs, major problems will be prevented at the initial stages. Thus, minor problems can prevent easily in order to prevent major problems. For preventing

the kind of accidents resulting in the seizing of work and loss of the production. By controlling the hazard to the minimal level, accidents in the industry can be avoided.

# 2. LITERATURE SURVEY

## 2.1 Existing Problem

### 2.1.1 Problem-1

**A Smart Fire Detection System using IOT Technology With Automatic Water Sprinkler.**

**Hamood Alqourabah, Amgad Muneer, Suliman Mohammed Fati et al.(2020) proposed a "A Smart Fire Detection System using IOT Technology With Automatic Water Sprinkler". This paper has been developed to solve the slow response issue of fire accidents.**

**Temperature, gas, and flame sensors are inputs. Output like LED and Buzzer indicate a fire. Water system launched with 12V water pump powered by Arduino and control by a 5v relay. The sprinkler head is the outer of the water output. An ultrasonic sensor is used to measure the tank level and inform the need for refilling. By analyzing the result, we can easily identify the sense of fire accident.**

### 2.1.2 Problem-2

**Gas monitoring and power cut-off system for underground mines.**

**A. Kumar, H. Kumar, V. N. Pandey, D. K. P. Singh and S. K.Chaulya et al. (2012) proposed a "Gas monitoring and power cut-off system for underground mines".This mechanism detect several hazardous gases from burning smoke, fumes (soldering) in the field of mining domain. This work includes designing and implementation of a system that continuously monitors the concentration of methane (CH4) and carbon-monoxide (CO) gas in the underground mines, which automatically cuts off the power supply of the particular zone in an underground mine, when the concentration of CH4 exceeds more than the permissible limit decided by the user. By analyzing this paper, The proposed gas monitoring system place a vital role in detecting the gases in mines.**

### 2.1.3 Problem-3

**Monitoring temperature, humidity and Controling system in industrial fixed room storage based on IoT.**

**M.T.A.Seman, M.N.Abdulllah, M.K.Ishak et al.(2020) proposed a "MONITORING TEMPERATURE,**

**HUMIDITY AND CONTROLLING SYSTEM IN INDUSTRIAL FIXED ROOM STORAGE BASED ON**

**IOT". this paper was proposed new features that can detect, notify, record and control the humidity and temperature instantaneously in order to have stable, controllable atmospheric conditions. The temperature and humidity sensor is the input used to get the surrounding temperature and humidity inside the room. The NodeMCU works as the brain of the system that**

**receives data from DHT- 11 sensor and upload them to the database. The data and information from DHT-11 sensor will be analysed graphically on Blynk platform using NodeMCU. Humidifier triggered when the reading of temperature and humidity is less than 20% and more than 80%.**

**The system is capable of obtaining the temperature and humidity of a space, thus providing a real time temperature and humidity monitoring either using an application in a smartphone via WIFI over IoT, a LCD display embedded in the system or a computer interface.**

### 2.1.4 Problem-4

**Toxic gas detection and monitoring utilizing internet of things.**

**Dr. Chalasani Srinivas, Mohan Kumar.Ch et al. (2017) proposed a "Toxic gas detection and monitoring utilizing internet of things". This project intended to avoid industrial accidents and to monitor harmful gases and to intimate alert message to safety control board of industry using ArduinoUno R3 and internet of things. Ardunio Uno R3 board is used as central microcontroller which is connected with sensor which can continuously monitor respective environment parameters. An alarm is produced instantly if the level of the gases goes above the normal level means indication through the internet specific receiver section. Data received by sensor is stored in internet which can be used for further processing and it can be analyzed for improving safety regulations. This model can be future extended for providing better living environment for people in and around industries with a pollution controlled environment.**

## 2.2 References

### 2.2.1 Problem-1

**A Smart Fire Detection System using IOT Technology With Automatic Water Sprinkler.**

**Hamood Alqourabah, Amgad Muneer, Suliman Mohammed Fati et al, 2020.**

### 2.2.2 Problem-2

**Gas monitoring and power cut-off system for underground mines.**
**A. Kumar, H. Kumar, V. N. Pandey, D. K. P. Singh and S. K.Chaulya et al, 2012.**

### 2.2.3 Problem-3

**Monitoring temperature, humidity and Controling system in industrial fixed room storage based on IoT.**
**M.T.A.Seman, M.N.Abdulllah, M.K.Ishak et al, 2020.**

### 2.2.4 Problem-4

**Toxic gas detection and monitoring utilizing internet of things.**
**Dr. Chalasani Srinivas, Mohan Kumar.Ch et al, 2017.**

## 2.3 Problem Statement Definition

### 2.3.1 Person1 (Industrial Worker)

**I'm trying to manage to control catastrophic condition, but it causes disorders in human health and cause to death. Because of leakages in toxic gases which makes me feel that don't have safety while working in an industries.**

### 2.3.2 Person2 (Industrial Worker)

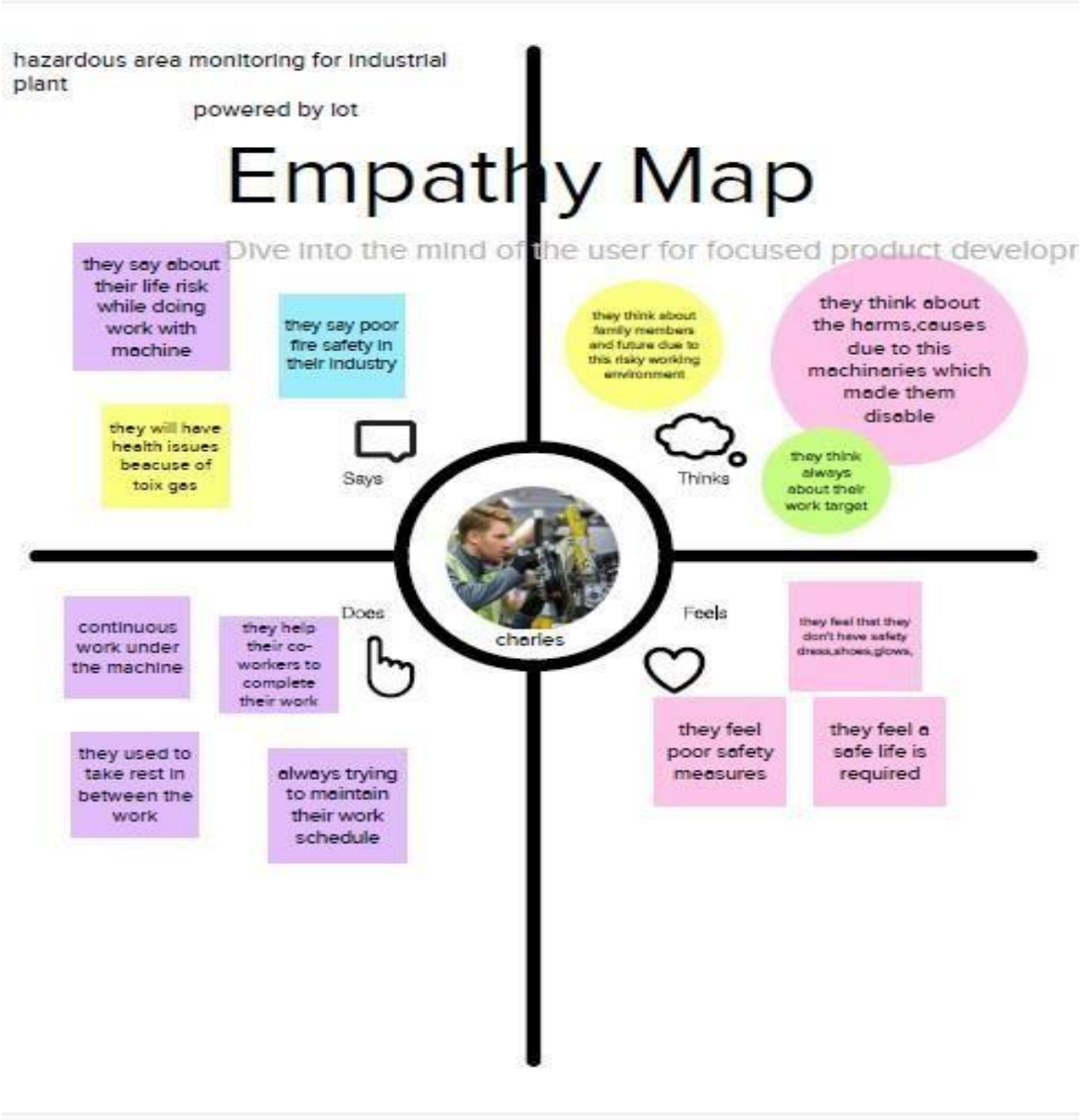
**I'm trying to control the initial stage of fire hazard, but it causes extreme danger for humans and machines in industries. Because of Defective in products, Flammable Liquids, Gas explotions.**

### 2.3.3 Person3 (Industrial Worker)

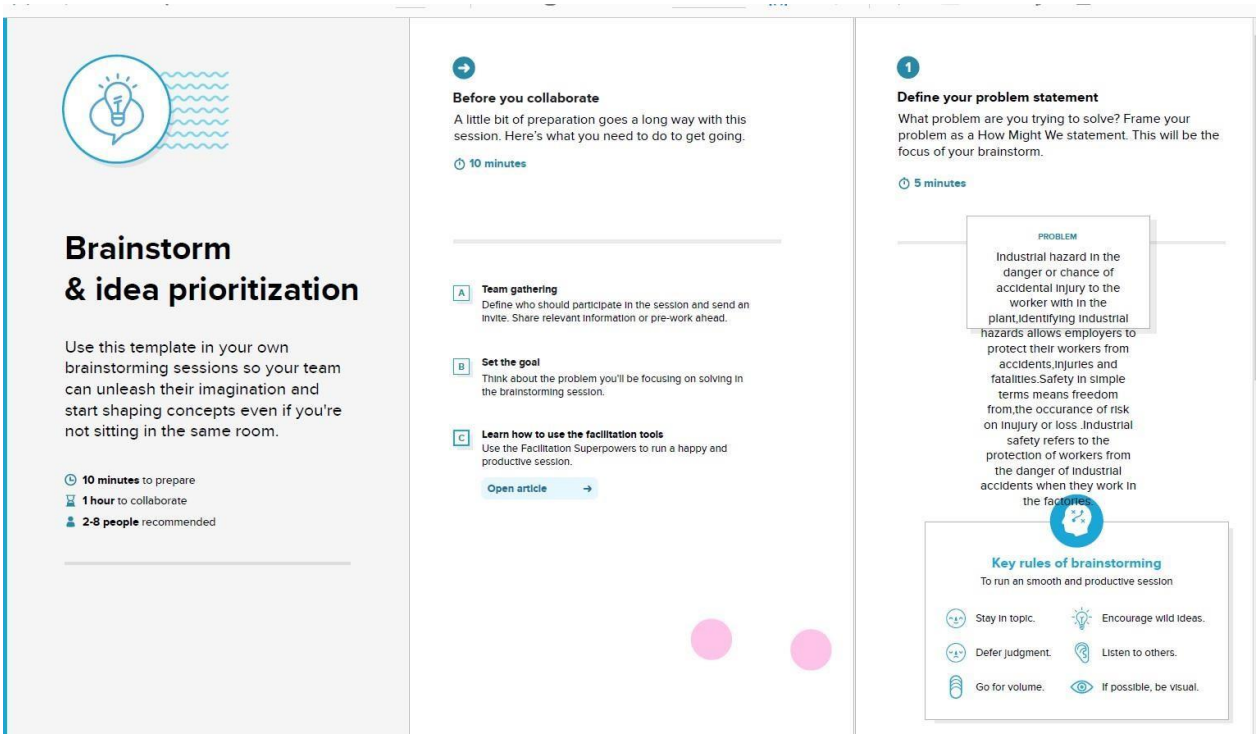
**I'm trying to reduce the heat by using smart compressor, but it creates more faults in machinaries. Because of improper maintainence which make me feel storage of production.**

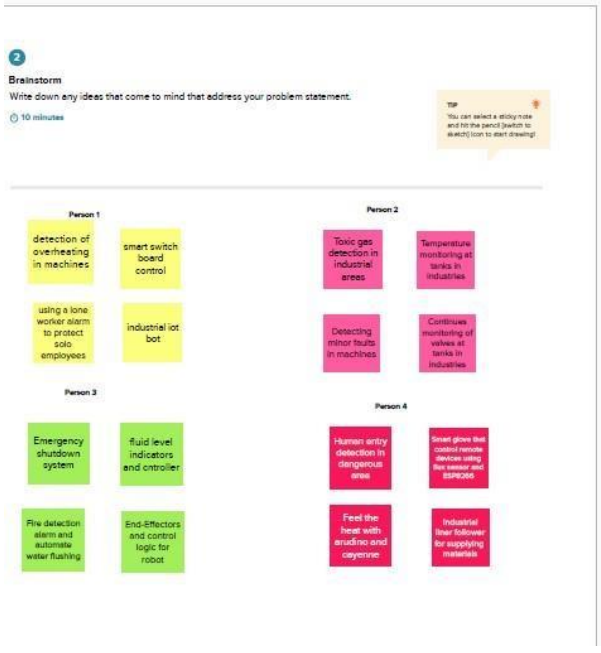
## 3. IDEATION & PROPOSED SOLUTION

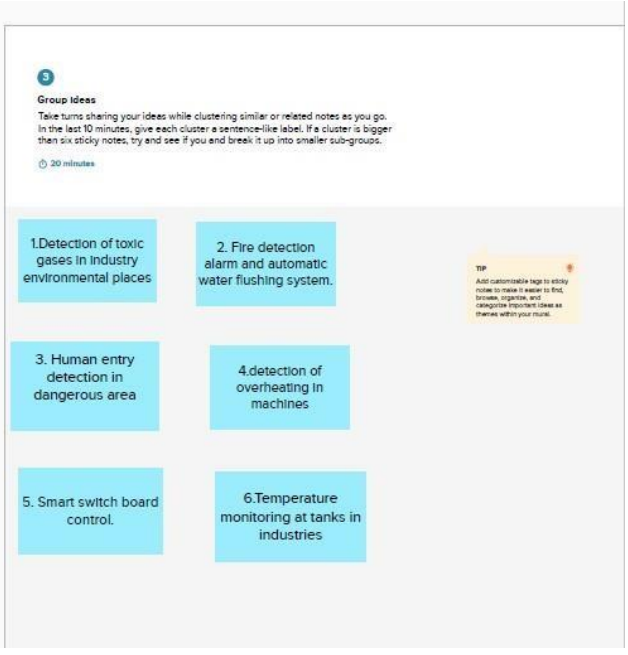
### 3.1 Empathy map canvas

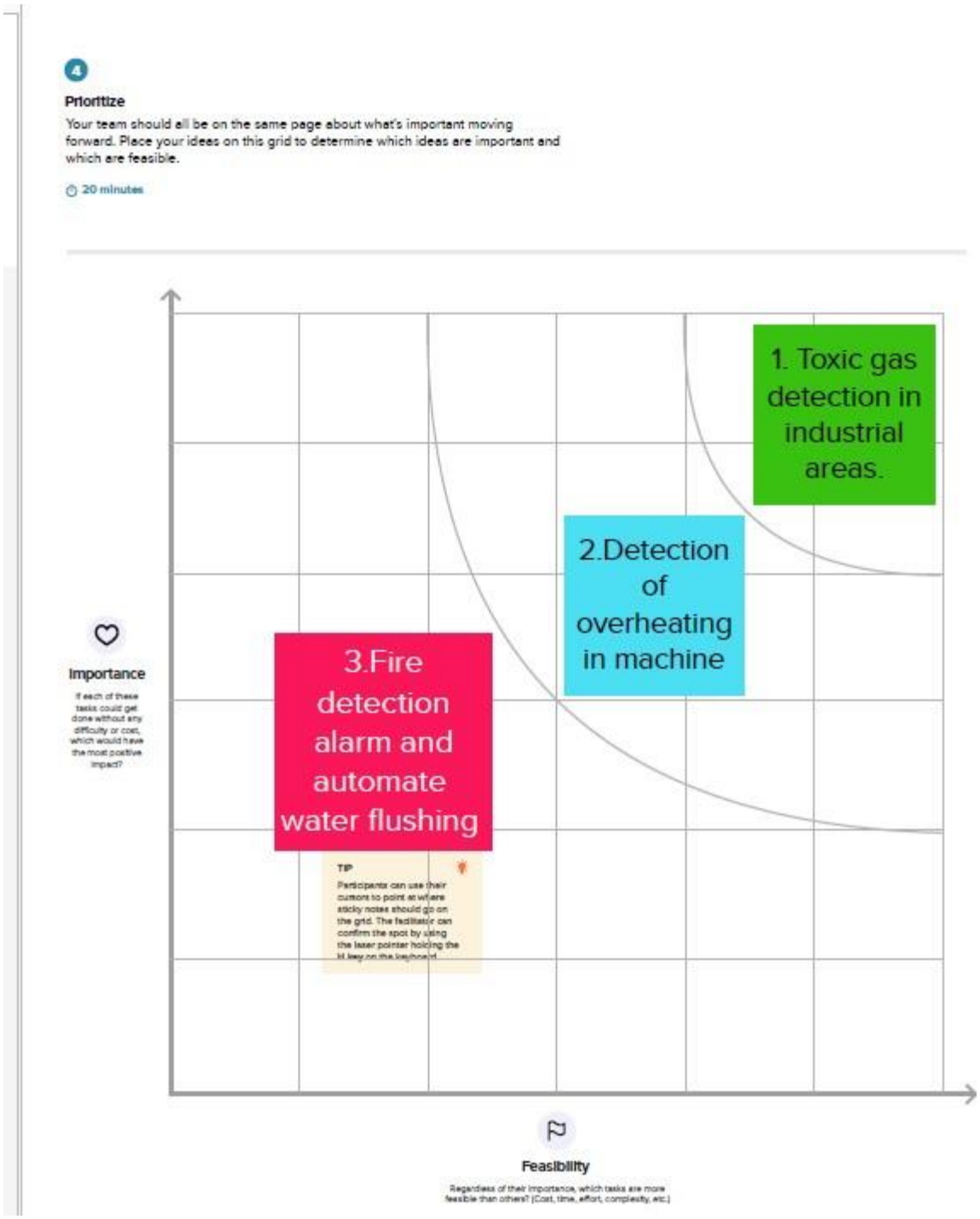


# 3.2 Ideation & Brainstorming



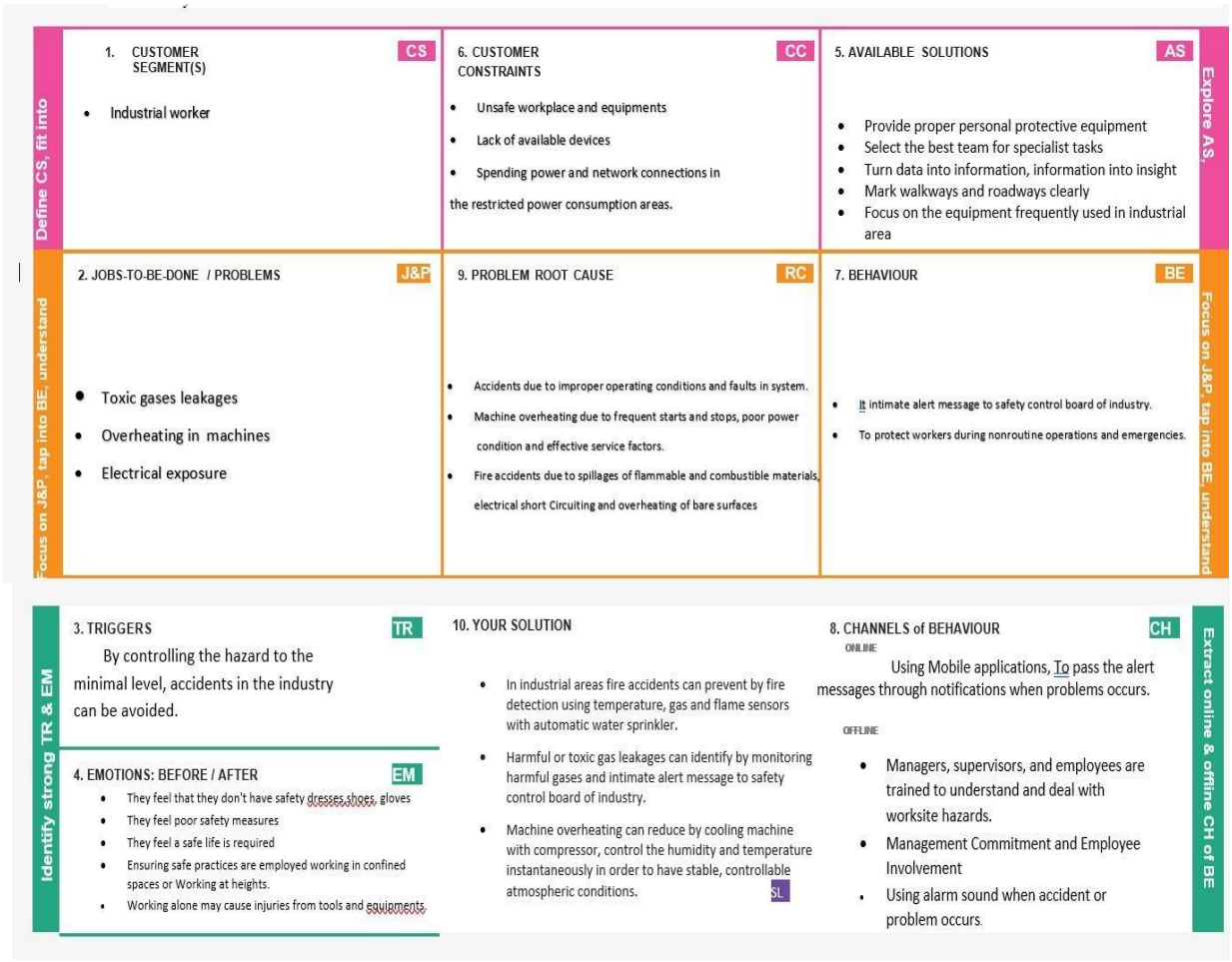



## 3.3 Proposed Solution

| S.No. | Parameter | Description |
|---|---|---|
| **1.** | Problem Statement (Problem to be solved) | Industrial hazard is the danger or chance of accidental injury to the worker while engaged at his accustomed work in the plant. The most occurring problems in industries are fir accidents, harmful gas leakages, overheating in machines, electrical explosions, accidents due to improper operating conditions and faults in systems. Identifying industrial hazards allows employers to protect their worker from accidents, injuries, and fatalities. |
| **2.** | Idea / Solution description | In industrial areas fire accidents can prevent by fire detection using temperature, gas and flame sensors with automatic water sprinkler,<br>Harmful or toxic gas leakages can identify by monitoring harmful gases and intimate alert message to safety control board of industry,<br>Machine overheating can reduce by cooling machine with compressor, control the humidity and temperature instantaneously in order to have stable, controllable atmospheric conditions. |
| **3.** | Novelty / Uniqueness | Safety stands as the foremost priority in most of today's technology-aided industrial processes. By using continuous monitoring and detecting of hazardous signs, major problems will be prevented at the initial stages. Thus, minor problems can prevent easily in order to prevent major problems. For preventing the kind of accidents resulting in the seizing of work and loss of the production. By controlling the hazard to the minimal level, accidents in the industry can be avoided. |
| **4.** | Social Impact / Customer Satisfaction | With the help of employee's safety, a working environment having greater motivation and satisfaction of the manpower can be created. Broadly, having a safer working environment for performing the operations is expected by a worker from their employer. There are some specific advantages that can be obtained from an accident-free plant. Huge cost savings, high legal and moral grounds, improved productivity are some of the important benefits. Greater job satisfaction and higher motivation can be obtained by the workers if their expectations of safety from hazards are fulfilled by the industrial working environment. |

| | | |
|---|---|---|
| **5.** | Business Model (Revenue Model) | To meet industrialists explaining about the problem-solving solutions for the hazards in industries by proposing the ideas that using IoT technology. For the further development of problem solutions into products collecting funds from the industries as per the need cost. There are some specific advantages that can be obtained from an accident-free plant. Huge cost savings, high legal and moral grounds, improved productivity are some of the important benefits. |
| **6.** | Scalability of the Solution | By taken the investigations based on the solutions found there will be more possibilities to make the ideas in to applicable.<br>The ideas proposed are possible by locating IoT sensors and sensing hazards by continuously monitoring the stability conditions in industrial environment. This mechanism is feasible because it is easy to setup, user friendly, wireless detector, predicts the risk, in beforehand, affordable etc., in today's technology application of these kind of sensor are very successful, trustworthy and easily accessed in many fields of work. |

# 3.4 Problem Solution fit




# 4. REQUIREMENT ANALYSIS

## 4.1 Functional Requirements

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story/ Sub-Task) |
|---|---|---|
| FR-1 | Detection of Hazard | Reporting the hazard to control node. Control the humidity and temperature instantaneously in order to have stable environment. |
| FR-2 | Air monitoring | Identifying harmful gas leakages by Air monitoring sensors and transmitting message to user (industrial workers). |
| FR-3 | Emergency Shutdown system | Shut downing the entire system in case of peak situations for example: Machine over heating with colling compressor. |
| FR-4 | Fire and smoke detection | Fire detection using temperature, gas and flame sensors with automatic water sprinkler. |
| FR-5 | End Users (Industrial workers) | Using cloud Service (Audio and visual notifications). |

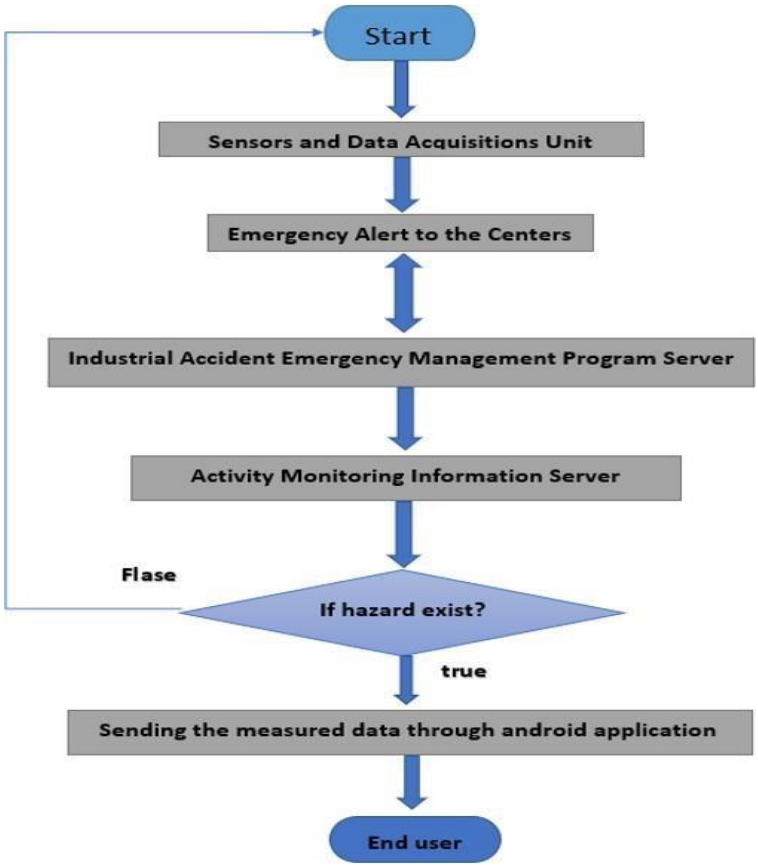
| | | |
|---|---|---|
| | | |

## 4.2 Non-Functional Requirements

| FR No. | Non-Functional Requirement | Description |
|---|---|---|
| NFR-1 | **Usability** | Huge cost savings, Greater job satisfaction and higher motivation can be obtained by the workers if their expectations of safety from hazards are fulfilled by the industrial working environment. |
| NFR-2 | **Security** | By using continuous monitoring and detecting of hazardous signs, major problems will be prevented at the initial stages. |
| NFR-3 | **Reliability** | High speed, not cost effective and controlling the hazard at minimal level. |
| NFR-4 | **Performance** | When problem occurs, the investigations based on the problems found there will be more possibilities to make the ideas in to applicable. |
| NFR-5 | **Availability** | This mechanism is feasible and it is easy to set up. Trust worthy and easy to access in many fields. |
| NFR-6 | **Scalability** | This mechanism is feasible because it is easy to set up, user friendly, wireless detector, predicts the<br>risk, in beforehand, affordable |

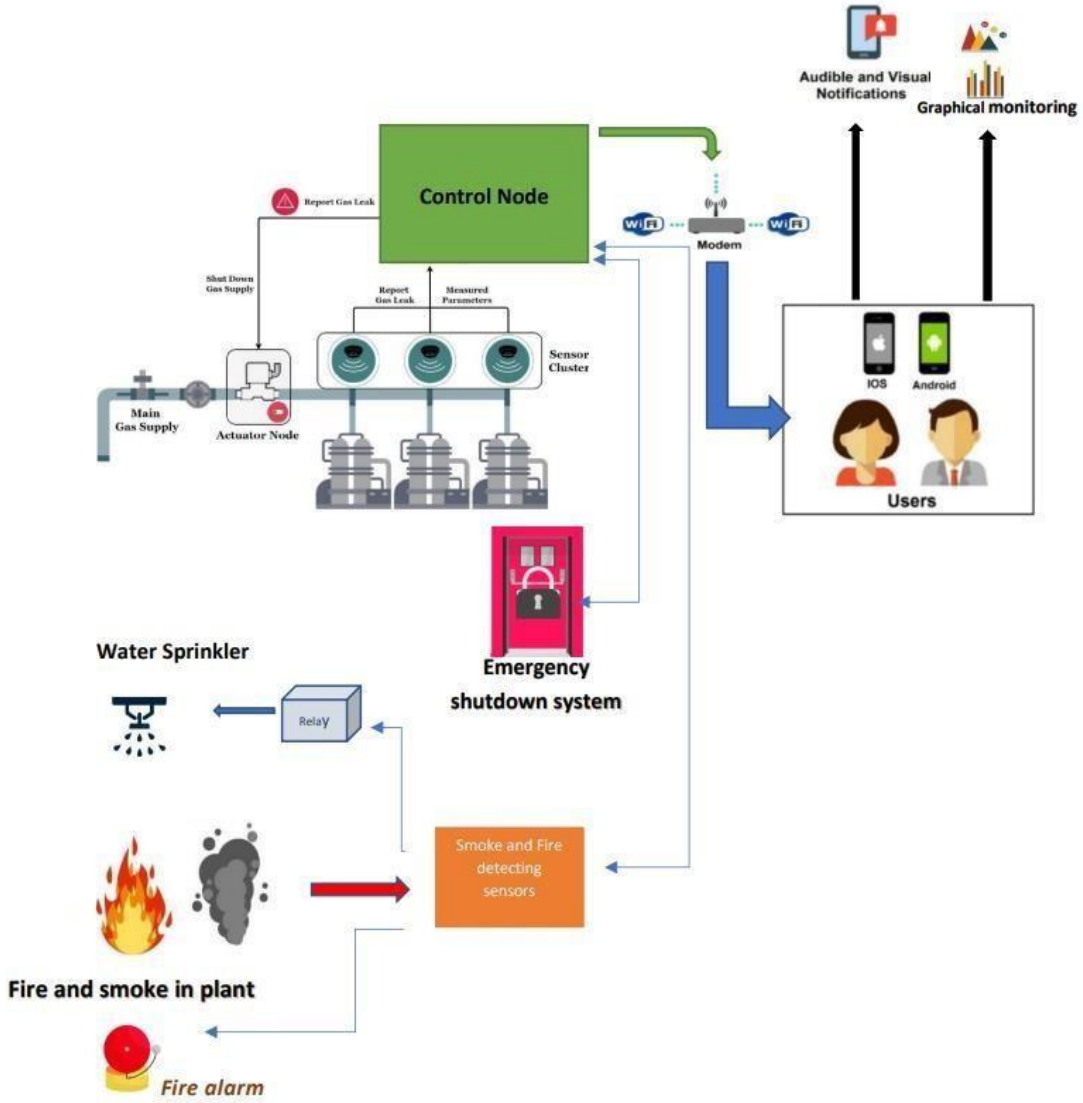
# 5. PROJECT DESIGN

## 5.1 Data Flow Diagrams

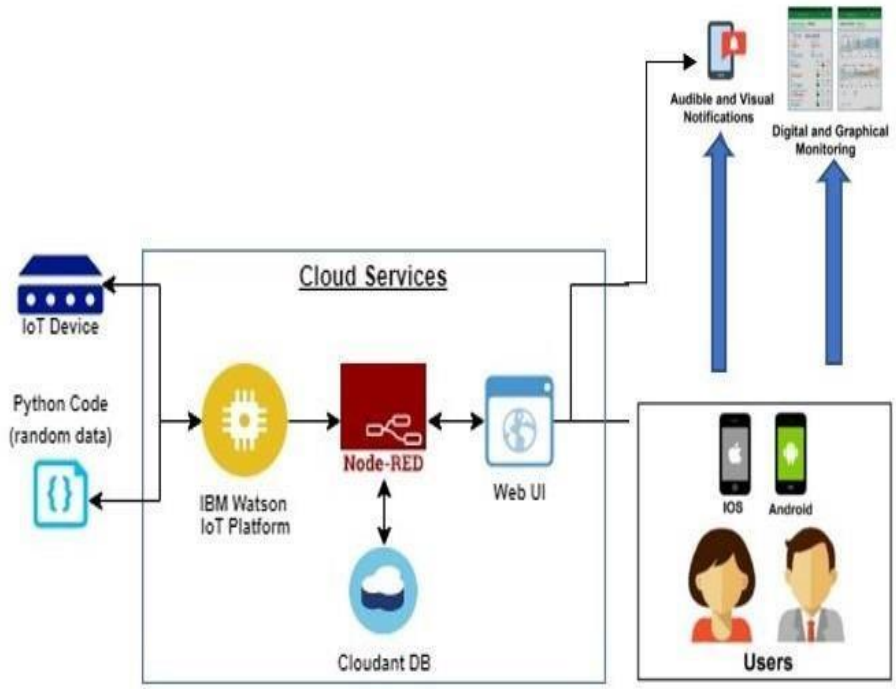



## 5.2 Solution & Technical Architecture

### 5.2.1 Solution Architecture




## 5.2.2 Technology Architecture




## 5.3 User Stories

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| Customer (Industrial worker) | Detection of hazard | USN-1 | As a worker, I will receive information from control node when hazard reported | I can aware myself by receiving information from control node | High | Sprint-1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | USN-2 | As a worker, I can monitor the humidity and temperature to have stable environment | I can notify the environmental changes via mobile application | Medium | Sprint-1 |
| | Air monitoring | USN-3 | As a worker, I can identify harmful gas leakages through mobile notifications | I can identify the harmful gas leakages in the field | High | Sprint-2 |
| | Emergency shutdown system | USN-4 | As a worker, I can measure the machine condition and shut down the entire system in the case of peak condition | I can shutdown the system in emergency situation | Medium | Sprint-3 |
| | Fire and smoke detection | USN-5 | As a worker, I can detect fire using temperature, smoke and flame sensors with automatic water sprinkler | I can detect fire by using sensors with water sprinkler | High | Sprint-4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| End user | Alerting through message | USN-6 | As a worker, I can receive the message in the form of audio, visual notification and graphical notification | I can detect the hazard and get notification | Low | Sprint-5 |

# 6. PROJECT PLANNING & SCHEDULING

## 6.1 Sprint Planning & Estimation

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint1 | Detection of hazard | USN-1 | As a worker, I will receive information from control node when hazard reported. | 4 | High | Manojkumar M<br>Karthick S<br>Karthikeyan M<br>Manobharath M |
| | | USN-2 | As a worker, I can monitor the humidity and temperature to have stable environment | 3 | Medium | Manojkumar M<br>Karthick S<br>Karthikeyan M<br>Manobharath M |
| Sprint2 | Air monitoring | USN-3 | As a worker, I can identify harmful gas leakages through mobile notifications | 4 | High | Manojkumar M<br>Karthick S<br>Karthikeyan M<br>Manobharath M |

| | | | | | | |
|---|---|---|---|---|---|---|
| Sprint3 | Emergency shutdown system | USN-4 | As a worker, I can measure the machine condition andshut down the entire systemin the caseof peak condition | 3 | Medium | Manojkumar M<br>Karthick S<br>Karthikeyan M<br>Manobharath M |

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-4 | Fire and smoke detection | USN-5 | As a worker, I can detect fire using temperature, smokeand flame sensors with automatic watersprinkler | 4 | High | Manojkumar M<br>Karthick S<br>Karthikeyan M<br>Manobharath M |
| | Alerting throughmessage | USN-6 | As a worker, I can receive the messageinthe formof audio, visualnotification and graphical notification. | 3 | Low | Manojkumar M<br>Karthick S<br>Karthikeyan M<br>Manobharath M |
| | | | | | | |
| | | | | | | |

## 6.2 Sprint Delivery Schedule

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-1 | 20 | 3 Days | 05 Nov 2022 | 07 Nov 2022 | 20 | 07 Nov 2022 |
| Sprint-2 | 20 | 3 Days | 08 Nov 2022 | 10 Nov 2022 | 20 | 10 Nov 2022 |
| Sprint-3 | 20 | 3 Days | 11 Nov 2022 | 13 Nov 2022 | 20 | 13 Nov 2022 |
| Sprint-4 | 20 | 3 Days | 14 Nov 2022 | 17 Nov 2022 | 20 | 17 Nov 2022 |

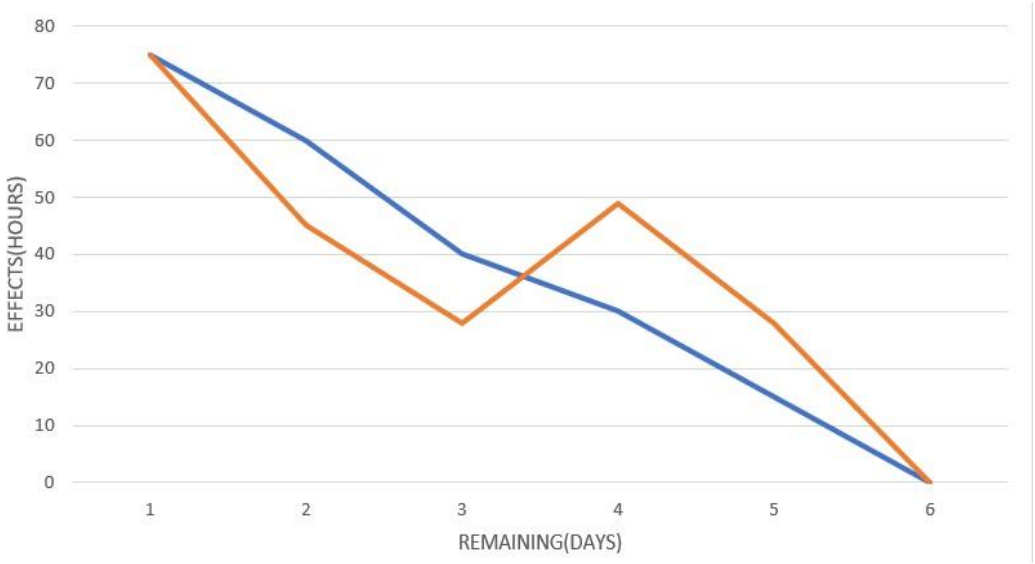
**Velocity:**

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

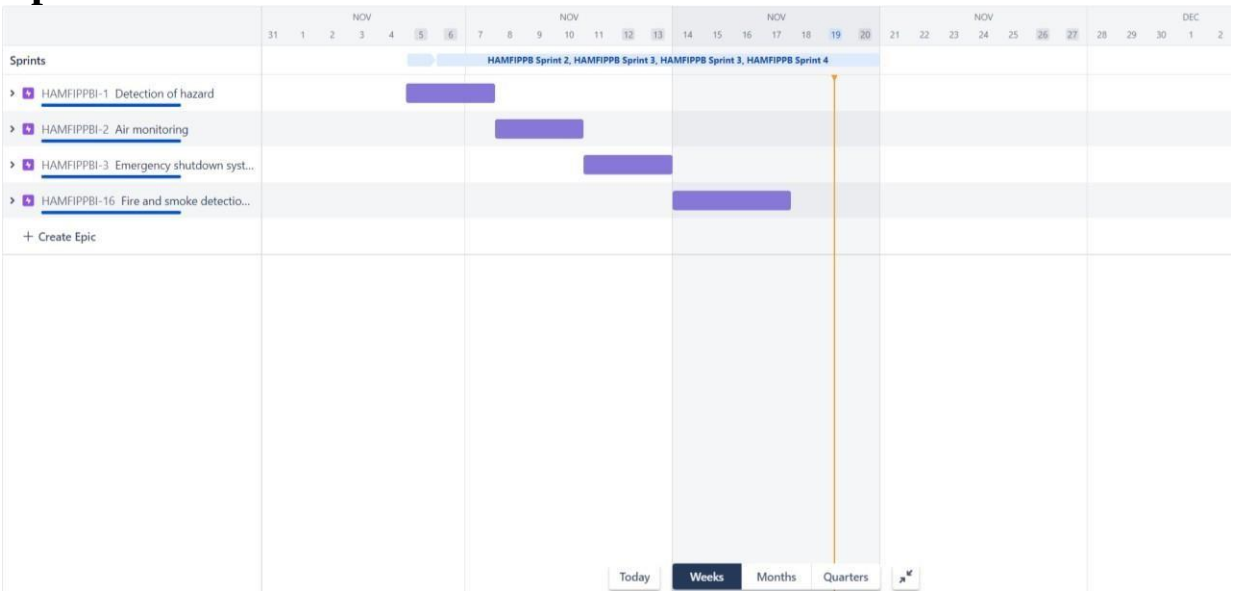
**AV=Sprint Duration/Velocity**

**=20/3= 6.66**

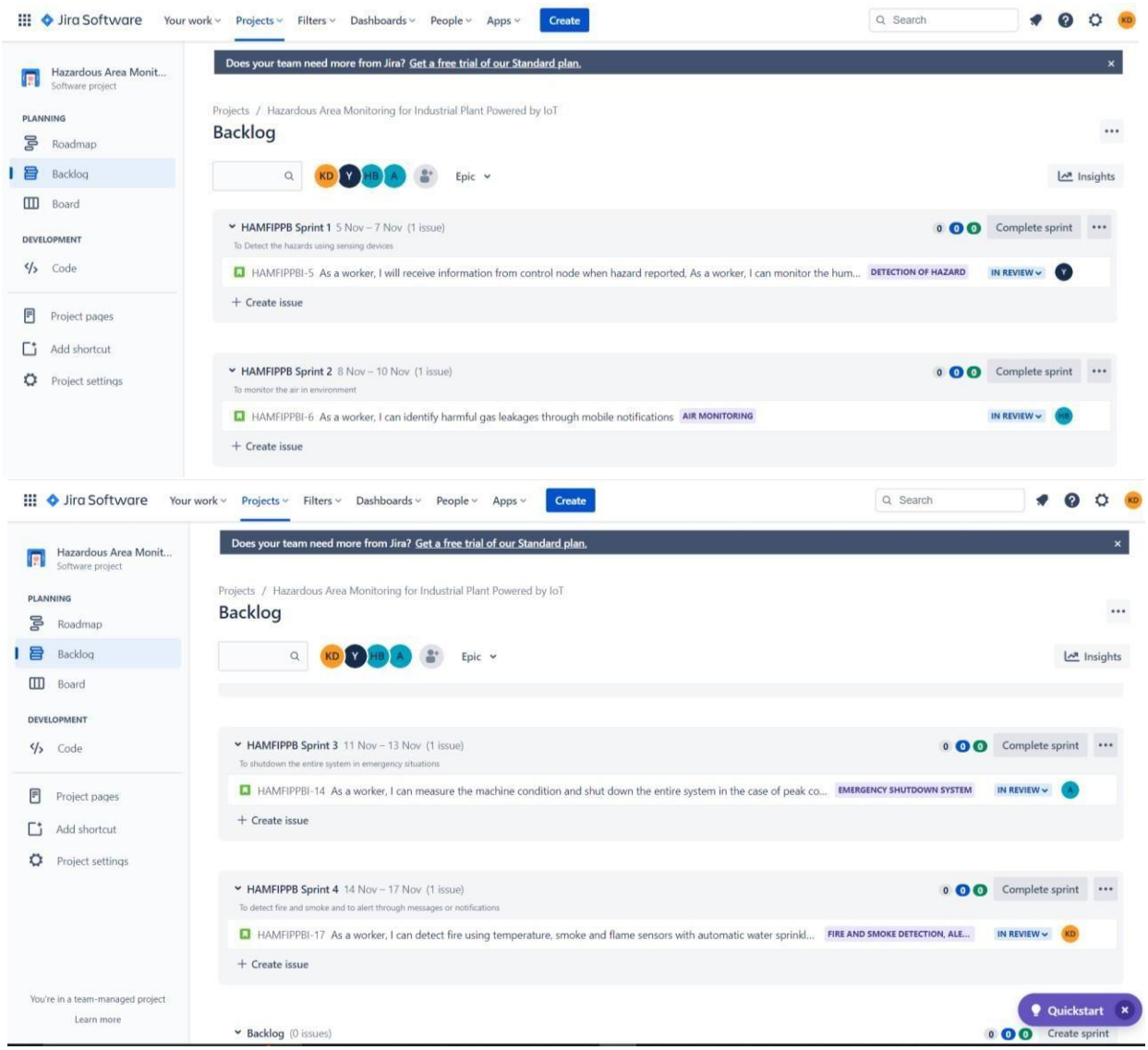
**Burndown chart:**



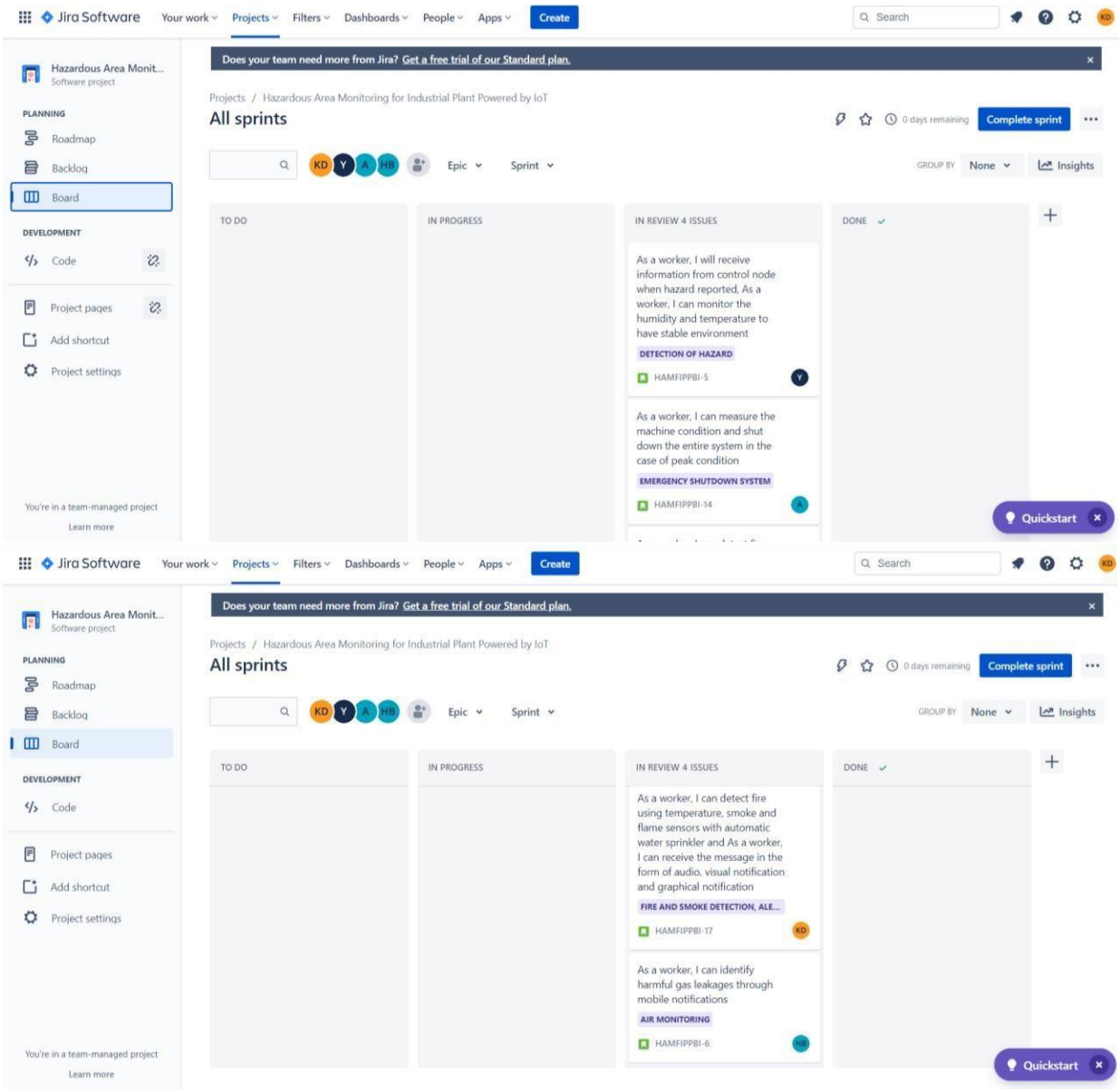

# 6.3 Reports from JIRA Road map:




# Backlog:


Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Hazardous Area Monit...
Software project
PLANNING
Roadmap
Backlog
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / Hazardous Area Monitoring for Industrial Plant Powered by IoT
Backlog
Epic
Insights
HAMFIPPB Sprint 1 5 Nov – 7 Nov (1 issue)
To Detect the hazards using sensing devices
Complete sprint
HAMFIPPBI-5 As a worker, I will receive information from control node when hazard reported. As a worker, I can monitor the hum...
DETECTION OF HAZARD
IN REVIEW
Create issue
HAMFIPPB Sprint 2 8 Nov – 10 Nov (1 issue)
To monitor the air in environment
Complete sprint
HAMFIPPBI-6 As a worker, I can identify harmful gas leakages through mobile notifications
AIR MONITORING
IN REVIEW
Create issue
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Hazardous Area Monit...
Software project
PLANNING
Roadmap
Backlog
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / Hazardous Area Monitoring for Industrial Plant Powered by IoT
Backlog
Epic
Insights
HAMFIPPB Sprint 3 11 Nov – 13 Nov (1 issue)
To shutdown the entire system in emergency situations
Complete sprint
HAMFIPPBI-14 As a worker, I can measure the machine condition and shut down the entire system in the case of peak co...
EMERGENCY SHUTDOWN SYSTEM
IN REVIEW
Create issue
HAMFIPPB Sprint 4 14 Nov – 17 Nov (1 issue)
To detect fire and smoke and to alert through messages or notifications
Complete sprint
HAMFIPPBI-17 As a worker, I can detect fire using temperature, smoke and flame sensors with automatic water sprinkl...
FIRE AND SMOKE DETECTION, ALE...
IN REVIEW
Create issue
Quickstart
Backlog (0 issues)
Create sprint

# Board:




# 7. CODING & SOLUTIONING

## 7.1 Feature-1

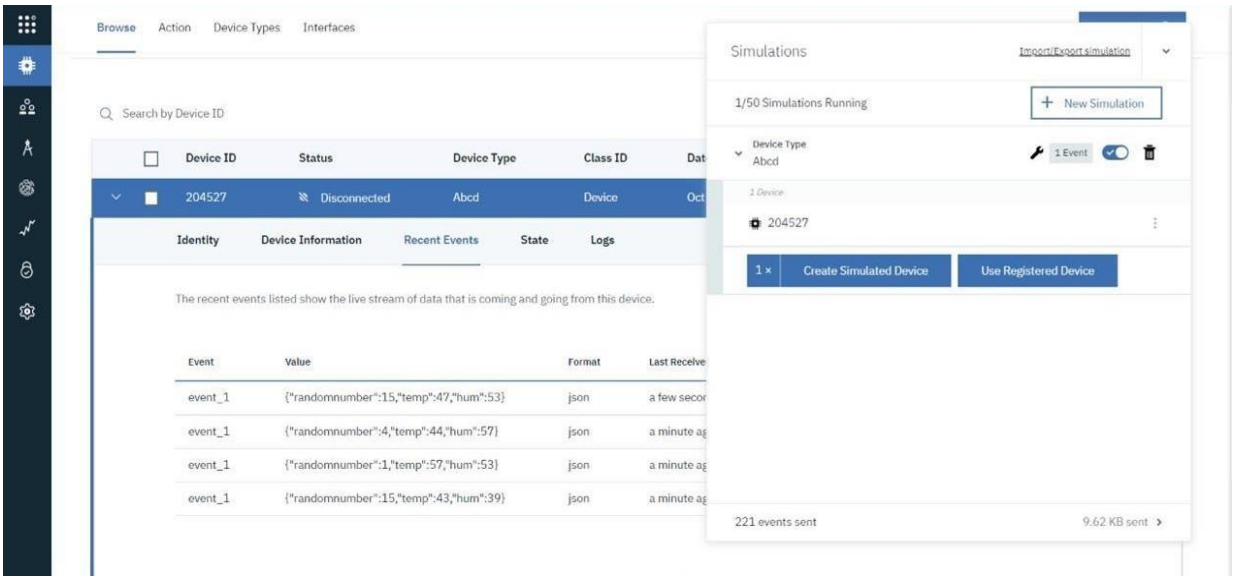
### 7.1.1 Python script to connect ibm watson IoT platform to get data from Cloud.

```
import time import sys
import ibmiotf.application
```

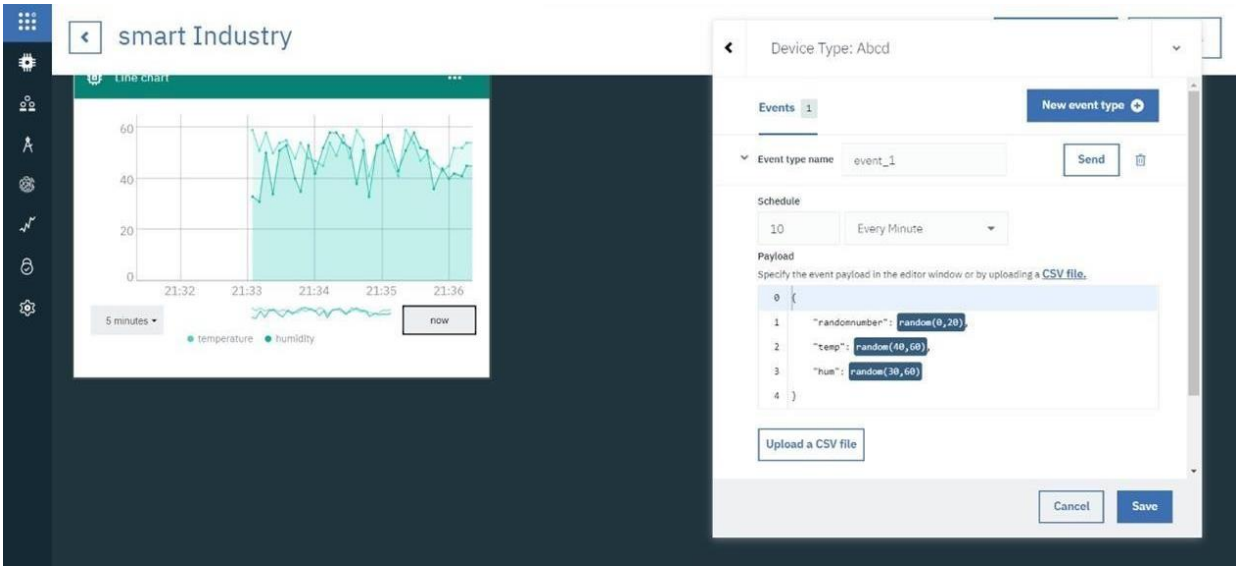
```
import ibmiotf.device import
random
#Provide your IBM Watson Device Credentials
organization = "f7gdph"
deviceType = "Abcd"
deviceId = "204527"
authMethod = "token"
authToken = "8778766443"
# Initialize GPIO
def myCommandCallback(cmd):
        print("Command received: %s" % cmd.data['command'])
status=cmd.data['command '] if status=="shutdown": print ("machine
                                    off") else :
    print ("machine
  on") #print(cmd)
try:
  deviceOptions = {"org": organization, "type": deviceType, "id":
deviceId, "auth-method": authMethod, "auth-token": authToken}
    deviceCli =
ibmiotf.device.Client(deviceOptions)
  #..... except Exception as e:
  print("Caught exception connecting device: %s" % str(e))
  sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud
as an event of type "greeting" 10 times deviceCli.connect()

while True:
    #Get Sensor Data from
    DHT11
    temp=random.randint(0,100)
    Humid=random.randint(0,100)
```

```
        data = { 'temp' : temp, 'Humid':
        Humid } #print data def
        myOnPublishCallback():
            print ("Published Temperature = %s C" % temp, "Humidity =
%s %%" % Humid, "to IBM Watson") success =
 deviceCli.publishEvent("IoTSensor", "json", data,
qos=0, on_publish=myOnPublishCallback) if not
        success: print("Not connected to
        IoTF") time.sleep(1)
        deviceCli.commandCallback =
myCommandCallback # Disconnect the device and application from the
cloud deviceCli.disconnect()
```

### 7.1.2 IBM Simulation



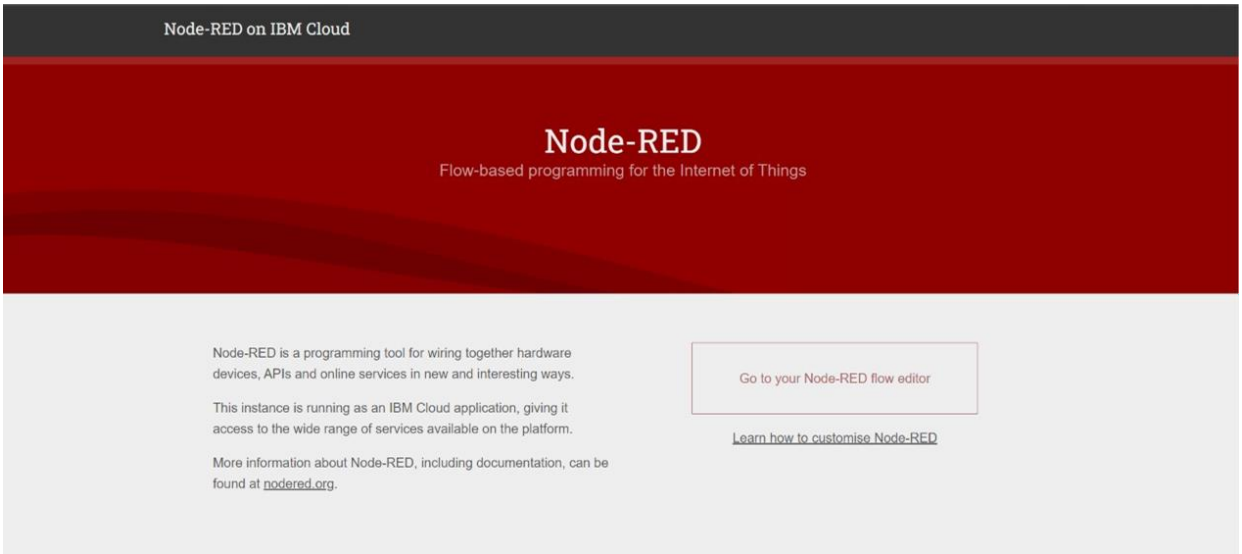

### 7.1.3 Line chart IBM watson IoT platform board



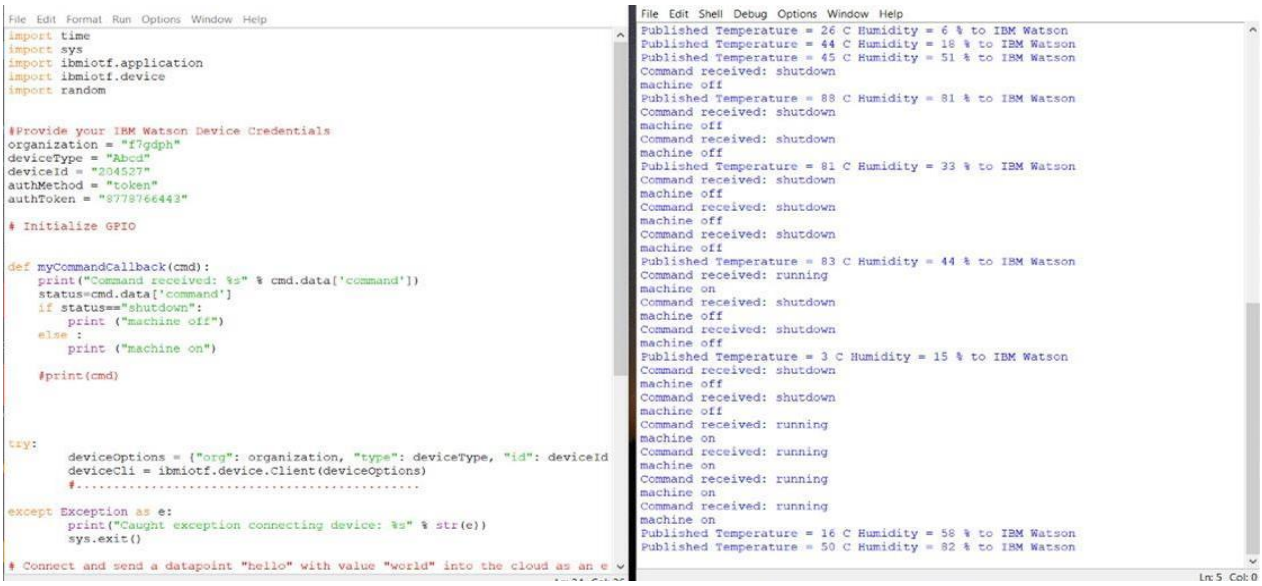

## 7.1.4 Installing IBM IoT using Command prompt window

IBM IOT is installed using command prompt window in this phase.

## 7.1.5 Node-RED on IBM Cloud



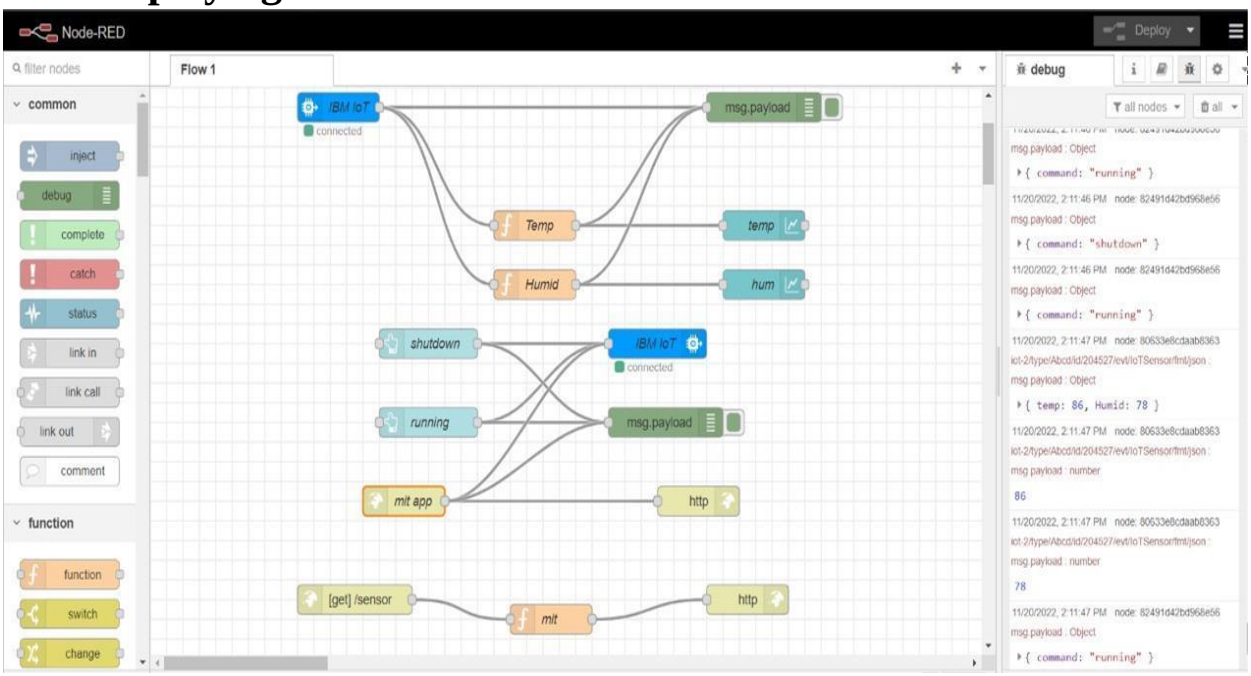

## 7.1.6 Run Python code with connection of IBM Cloud and Node-RED.



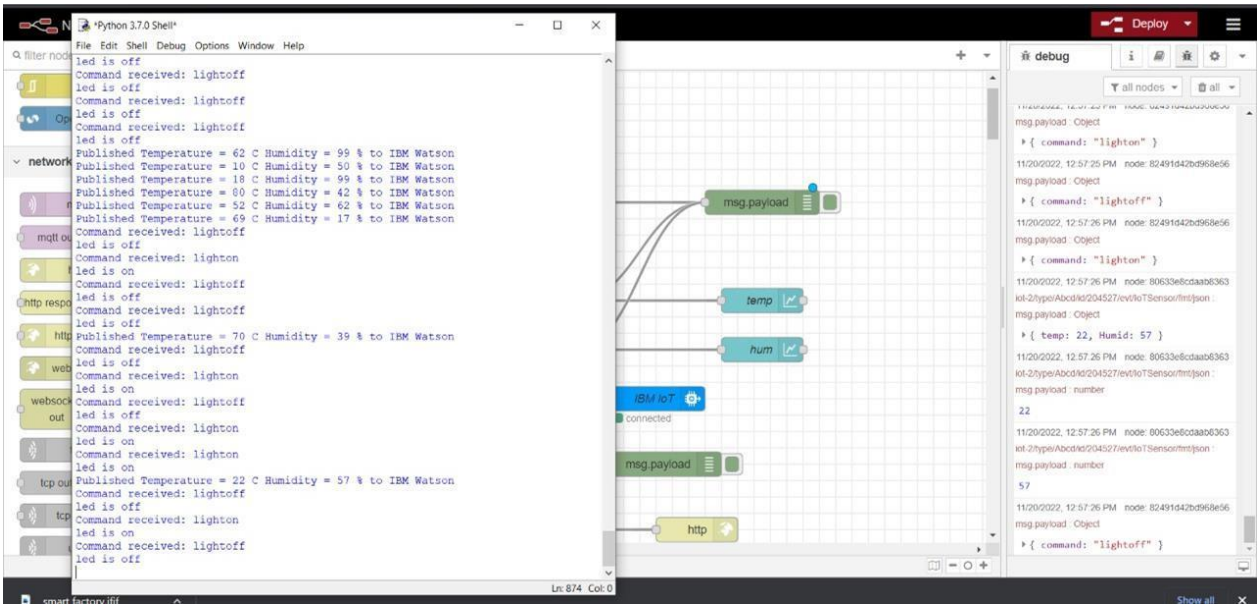
```
File  Edit  Format  Run  Options  Window  Help
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random


#Provide your IBM Watson Device Credentials
organization = "f7gdph"
deviceType = "Abcd"
deviceId = "204527"
authMethod = "token"
authToken = "8778766443"

# Initialize GPIO


def myCommandCallback(cmd):
    print("Command received: %s" % cmd.data['command'])
    status=cmd.data['command']
    if status=="shutdown":
        print ("machine off")
    else :
        print ("machine on")

    #print(cmd)



try:
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #.....................................................

except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an e
```

```
File  Edit  Shell  Debug  Options  Window  Help
Published Temperature = 26 C Humidity = 6 % to IBM Watson
Published Temperature = 44 C Humidity = 18 % to IBM Watson
Published Temperature = 45 C Humidity = 51 % to IBM Watson
Command received: shutdown
machine off
Published Temperature = 88 C Humidity = 81 % to IBM Watson
Command received: shutdown
machine off
Command received: shutdown
machine off
Published Temperature = 81 C Humidity = 33 % to IBM Watson
Command received: shutdown
machine off
Command received: shutdown
machine off
Command received: shutdown
machine off
Published Temperature = 83 C Humidity = 44 % to IBM Watson
Command received: running
machine on
Command received: shutdown
machine off
Command received: shutdown
machine off
Published Temperature = 3 C Humidity = 15 % to IBM Watson
Command received: shutdown
machine off
Command received: shutdown
machine off
Command received: running
machine on
Command received: running
machine on
Command received: running
machine on
Command received: running
machine on
Published Temperature = 16 C Humidity = 58 % to IBM Watson
Published Temperature = 50 C Humidity = 82 % to IBM Watson
```

## 7.1.7 Deploying in Node-RED

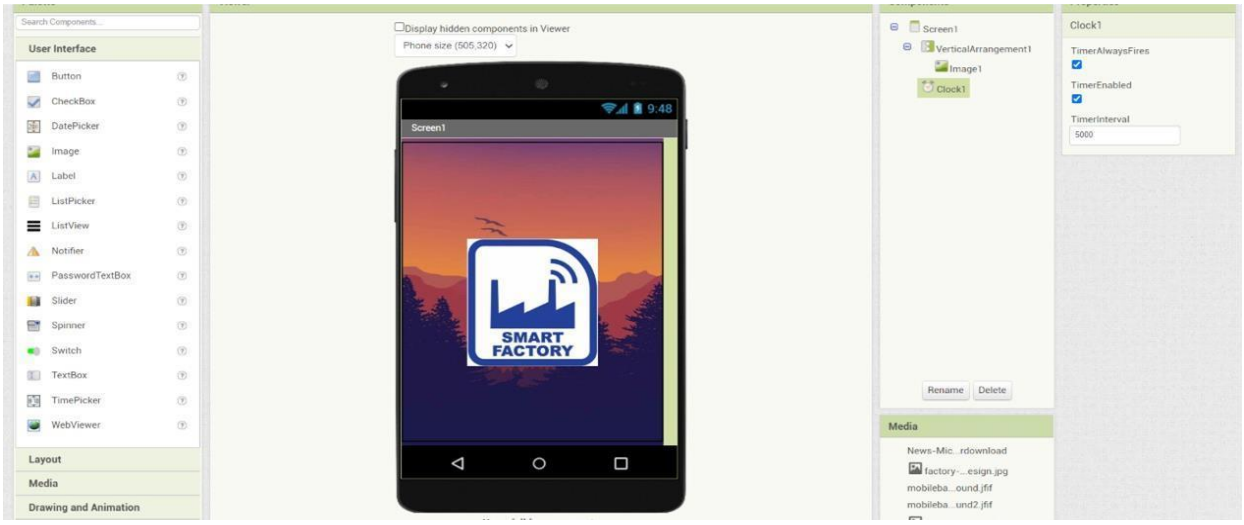



## 7.1.8 Simulation of Deploying Node-RED on IBM Cloud.

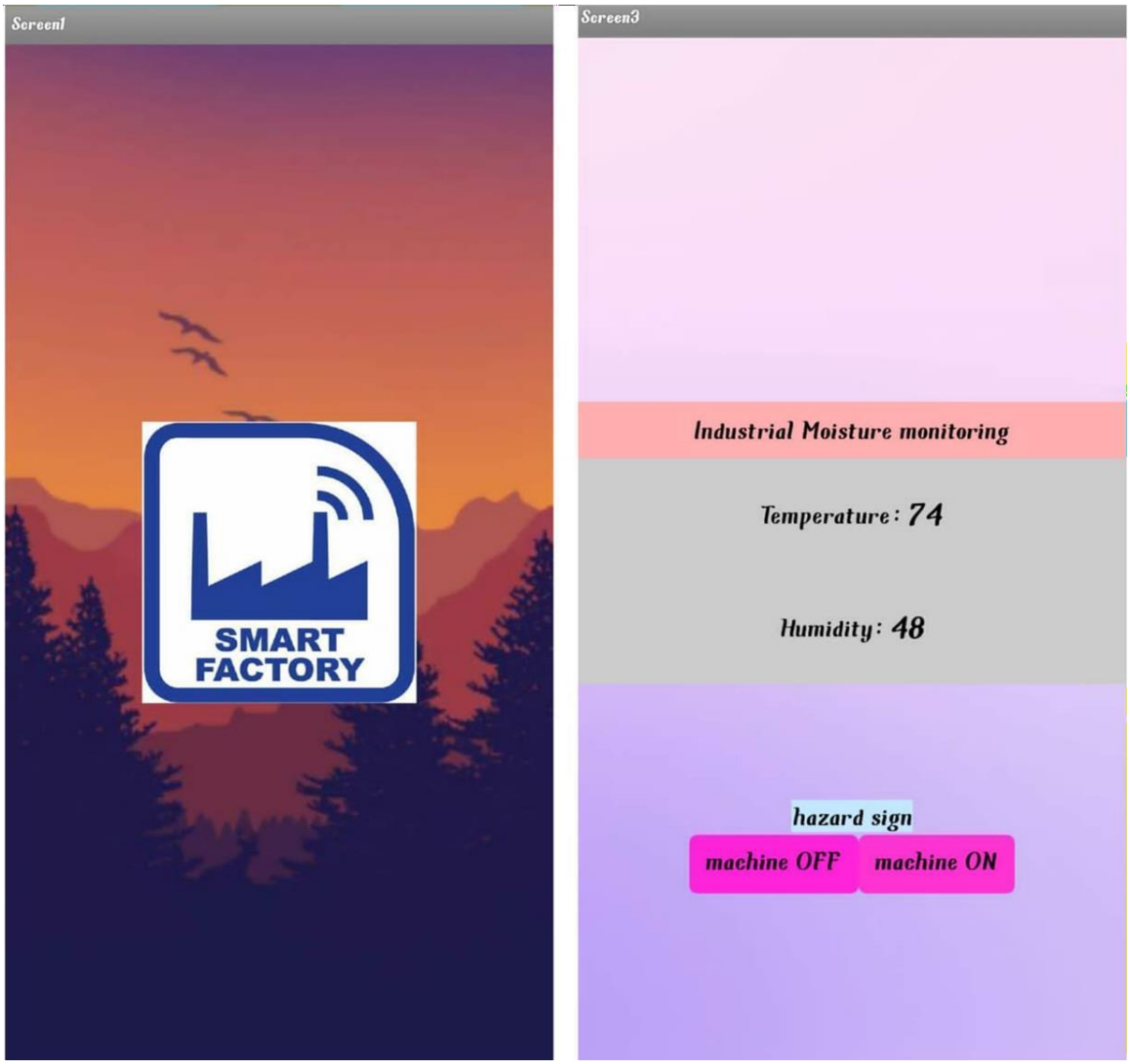



## 7.2 Feature-2

### 7.2.1 Displaying Temperature and Humidity values in Mobile Application.

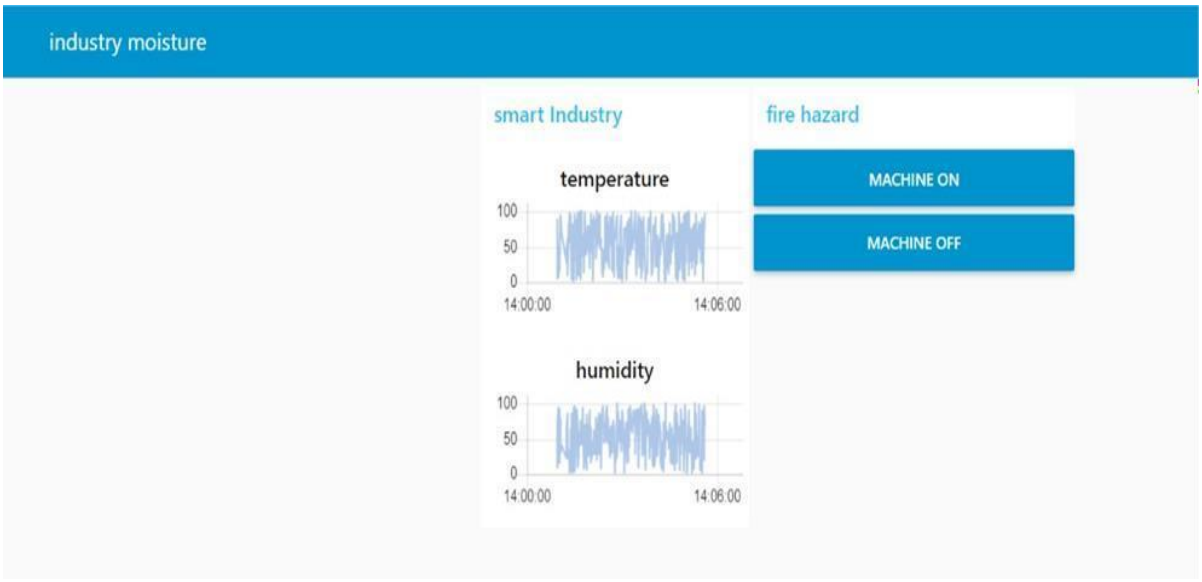



### 7.2.2 Detecting Temperature and Humidity through Mobile Application.

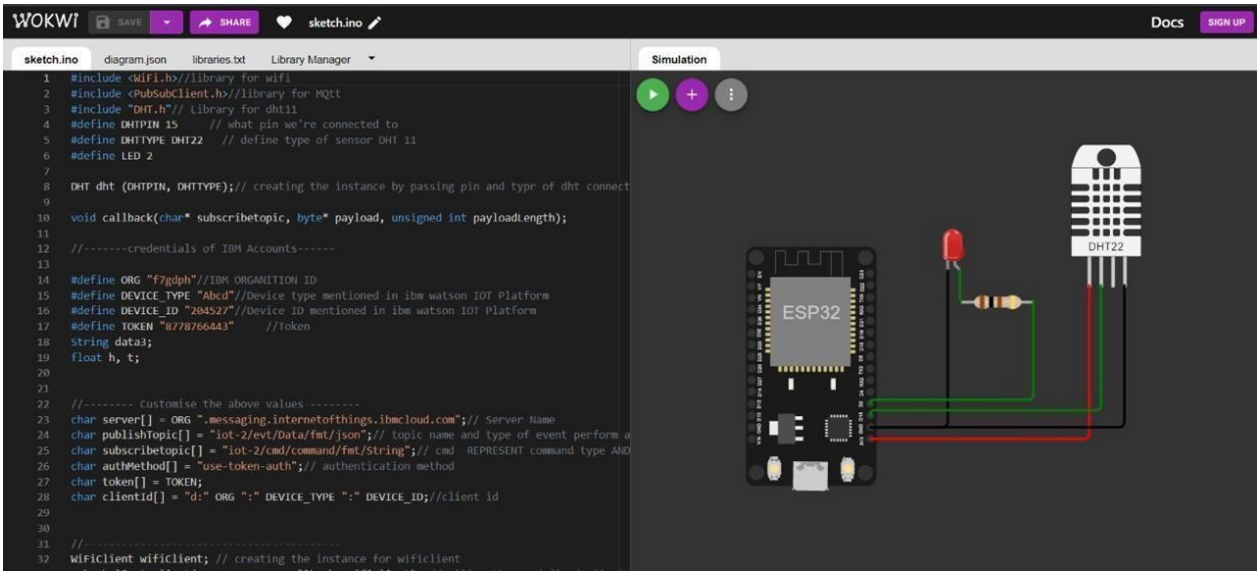



## 7.3 Database Schema

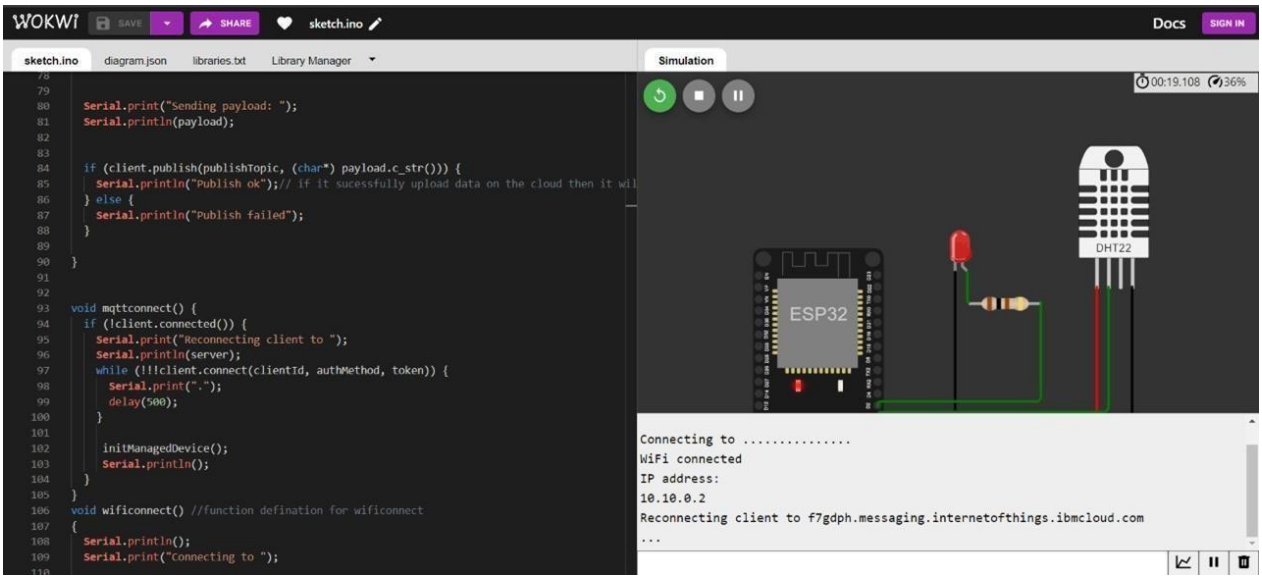
## 7.3.1 Node-RED dashboard




## 7.3.2 Wokwi Connection using DHT22 Sensor



## 7.3.3 Wokwi Simulation




# 8. TESTING

## 8.1 Test Cases-1

| NFT Test approach | load test |
|---|---|
| step 1 | Python script to connect IBM watson IoTplatform to get data from cloud |
| step 2 | IBM simulation |
| step 3 | line chart IBM watson IoT platform board |
| step 4 | Installing ibm iot using command prompt window and node-red on ibm cloud |
| step 5 | Run python code with connection of ibm cloud and deploying in node -red |
| step 6 | Simulation of deploying node-red on ibm cloud and then displaying temperature and humidity values in mobile application |
| step 7 | Detecting temperature and humidity through mobile application |
| step 8 | database schema node -red dashboard |

## 8.1.1 Test Cases-2

TEAM ID - PNT2022TMID39426

| NFT - Risk Assessment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| S.No | Project Name | Scope/feature | Functional Changes | Hardware Changes | Software Changes | Impact of Downtime | Load/Volume Changes | Risk Score | Justification |
| 1 | Hazardous Area Monitoring for Industrial Plant Powered By IoT | Unfamiliar order | Low | No Changes | Moderate | NIL | >5 to 10% | YELLOW | Reporting the hazard to control node or by Using cloud Service |

| NFT - Detailed Test Plan | | | | |
|---|---|---|---|---|
| S.No | Project Overview | NFT Test approach | sumptions/Dependencies/Ri | Approvals/SignOff |
| 1 | If their expectations of safety from hazards unfulfilled by the industrial working environment. | High speed, not cost effective and controlling the hazard at minimal level. | By using continuous monitoring and detecting of hazardous signs, major problems will be prevented at the initial stages. | D.KEERTHANA,M YOGASRI ,K.HEMAMANJAN, L.ANANTHI |

| End Of Test Report | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | Project Overview | NFT Test approach | NFR - Met | Test Outcome | GO/NO-GO decision | Recommendations | Identified Defects (Detected/Closed/Open) | Approvals/SignOff |
| | If their expectations of safety from hazards unfulfilled by the industrial working environment. | controlling the hazard at minimal level. | This mechanism is feasible because it is easy to setup, user friendly, wireless detector, predicts the risk, is beforehand, affordable. | This mechanism is feasible and it is easy to set up. Trust worthy and easy to access in many fields. | Industrial hazard is the danger or chance of accidental injury to the worker while engaged at his accustomed work in the plant. The most occurring problems in industries are fir accidents,harmful gas leakages, overheating in machines,electrical explosions, accidents due to improper operating conditions and faults in systems. Identifying industrial hazards allows employers to protect their worker from accidents,injuries, and fatalities. | Huge cost savings. Greater job satisfaction and higher motivation can be obtained by the workers if their expectations of safety from hazards are fulfilled by the industrial working environment. | When problem occurs, the investigation based on the problems found there will be more possibilities to make the ideas in to applicable. | D.KEERTHANA,M YOGASRI , K.HEMAMANJAN, L.ANANTHI |

## 8.2.2 Test Cases-3

This report shows the number of test cases that have passed, failed, and untested

| Section | Total Cases | Not Tested | Fail | Pass |
|---|---|---|---|---|
| Print Engine | 5 | 0 | 0 | 5 |
| Client Application | 35 | 0 | 0 | 35 |
| Security | 2 | 0 | 0 | 2 |
| Outsource Shipping | 4 | 0 | 0 | 4 |
| Exception Reporting | 7 | 0 | 0 | 7 |
| Final Report Output | 8 | 0 | 0 | 8 |
| Version Control | 1 | 0 | 0 | 1 |

## 8.2 User Acceptance Testing

| Resolution | Severity 1 | Severity 2 | Severity 3 | Severity 4 | Subtotal |
|---|---|---|---|---|---|
| By Design | 8 | 5 | 4 | 1 | 18 |
| Duplicate | 0 | 2 | 1 | 0 | 3 |
| External | 1 | 2 | 3 | 0 | 6 |
| Fixed | 12 | 4 | 2 | 18 | 36 |
| Not Reproduced | 1 | 0 | 0 | 0 | 1 |
| Skipped | 1 | 0 | 1 | 0 | 2 |
| Won't Fix | 3 | 5 | 0 | 1 | 9 |
| Totals | 20 | 12 | 14 | 25 | 71 |

# 9. RESULTS

## 9.1 Performance Metrics

| S.NO | PARAMETERS | PERFORMANCE |
|---|---|---|
| 1. | Response Time | 0.2s (Average of 10 trials) |
| 2. | Workload | 500 users (Calculated based on Cloud Space) |
| 3. | Revenue | Individual users while hazards occurs in an Industrial plant or Industry |
| 4. | Efficiency | User friendly, low cost, Simple and straightforward workflow, which makes the process efficient |
| 5. | Down Time | Almost no down time due to IBM Cloud enabled solution. |

# 10. ADVANTAGES

- **Immediate response of fire accident by detecting temperature and humidity in the work station.**
- **Implementation is simpler. Maintain the controlable atmospheric condition.**
- **Electronic Sensors have got enormous contribution towards the research in the field of mining domain.**
- **Prevent the workers and hazardous occuring in industries earlier by using this method.**

# DISADVANTAGES

- **Periodic adjustment.**
- **Complexity in designing process.**
- **Continuous monitoring is required.**

# 11. CONCLUSION

**Hence, The project offers that by using continuous monitoring and detecting of hazardous signs, major problems will be prevented at the initial stage itself. Huge cost savings, Greater job satisfaction and higher motivation can be obtained by the workers if their expectations of safety from hazards are fufilled by the industria working environment. This mechanism is feasible because it is easy to setup, user friendly, wireless detector, predicts the risk, in beforehand, affordable.**

## 12. FUTURE SCOPE

**Fire accidents can be controlled to a great extent in a places such as forests, homes, colleges, industries, trains and some other public places. Fire accidents leads to death of excess of people, by using this technique we can solve those lifes easily.**

**The emergency shutdown systems market is anticipated to grow at 7.2% CAGR during the forecast period. The emergency shutdown system is largely deployed in the oil & gas industry, power generating sector, manufacturing industry, and various other industries.**

## 13. APPENDIX

### Source Code

```
import time
import sys
import ibmiotf.application import
ibmiotf.device
import random


#Provide your IBM Watson Device Credentials
organization = "f7gdph"
deviceType = "Abcd"
deviceId = "204527"
authMethod = "token"
authToken =
"8778766443"

# Initialize GPIO


def myCommandCallback(cmd): print("Command received: %s" %
   cmd.data['command']) status=cmd.data['command'] if
      status=="shutdown ":
      print ("machine
      off")
   else :
      print ("machine
   on") #print(cmd)
```

```
try:
    deviceOptions = {"org": organization, "type": deviceType, "id":
deviceId, "auth-method": authMethod, "auth-token": authToken} deviceCli =
    ibmiotf.device.Client(deviceOptions)
    #.....

except Exception as e: print("Caught exception connecting device:
    %s" % str(e)) sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as
an event of type "greeting" 10 times deviceCli.connect()

while True:
        #Get Sensor Data from
        DHT11
        temp=random.randint(0,100)
        Humid=random.randint(0,100)
        data = { 'temp' : temp, 'Humid':
        Humid } #print data def
        myOnPublishCallback():
            print ("Published Temperature = %s C" % temp, "Humidity = %s
%%" % Humid, "to IBM Watson")

        success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0,
on_publish=myOnPublishCallback)  if  not
        success:
            print("Not connected to IoTF")
        time.sleep(1)
        deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud deviceCli.disconnect()
```

**GitHub Link-** **https://github.com/IBM-EPBL/IBM-Project-15506-1659599467**

**Project Demo Link-**