INDUSTRY-SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM

TEAM ID - PNT2022TMID20427

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ABSTRACT

The goal of an industry-specific intelligent fire control system is to stop industrial fires before they start and to take the necessary precautions. Preventing fire accidents brought on by flammable gas, smoke, and temperature increases is the primary goal of the industry-specific intelligent fire control system.The system includes sensors to track any environmental changes.Temperature sensor to gauge the ambient temperature. The flame sensor can also determine if there is a fire or not.

1.INTRODUCTION

1.1 PROJECT OVERVIEW

The smart fire management system includes a gas, flame, and temperature sensor to detect any environmental changes. Based on the temperature readings and if any gases 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 the Fire station

1.2 Purpose

- To give a detect the status of the room with IoT devices
- To turn on sprinkler and exhaust fan when there is accident
- To detect the flow of water
- To send and store the temperature status in a cloud storage
- To give a easy management system on dashboard
- To give a overview of what’s happening to the user
- To send a sms to the authorities when there is a fire accident

2.LITERATURE SURVEY

2.1 Existing Problem

A)Stuart Campbell, Jonathan O’Neill "AUTOMATIC FIRE ALARM & DETECTION SYSTEMS", 2018

New ‘multi-sensor’ devices are much more discerning with an anticipated performance of 80% believability however there is a general lack of understanding of the capabilities and reliability of this new technology by fire and rescue services and until this is addressed they are unlikely to alter their response. A new communications strategy and a ‘You Tube’ Digital Media Tool has been produced to begin to tackle this issue. The current product standard contains no reference to immunity testing, a simple and effective method of assessing a product’s capacity to false alarm. The documentation and recording of laboratory-based immunity tests demonstrates the capabilities of this technology and should provide the necessary stimulus for more urgent consideration by Standards making bodies.

B)Abhishek Patil, Ashutosh Singh, Akash Kumar,Ms. Sathya.V "SMART FIRE ALARM & DETECTION SYSTEM" , 2020

Safety is significant in this day and age and it is vital that acceptable wellbeing framework be executed in spots of Structural Health Monitoring of structures. This system is used in building and home dwellings for the fire detection and prevention purpose. And it should be implemented in all the establishments where the risk of fire accidents is very high .The sensor nodes are placed in important areas of the building, which we create a network and the monitored data is transmitted to control unit through wireless sensor network and if the temperature or pressure reach above the threshold value and building damage is detected automatically, alerts the surroundings and take necessary precautions to prevent the disaster. This, safet,y system that can be used in any Constructing and constructed environments. The sensor nodes detects the maximum level that it can withhold, in the mean time it calculates where the damage is occurring and remaining time that the building can offer further resistance to damage.

C)Majid Bahrepour, Nirvana Meratnia, Paul Havinga "AUTOMATIC FIRE DETECTION: A SURVEY FROM WIRELESS SENSOR NETWORK PERSPECTIVE", 2019

Automatic fire detection is important for early detection and promptly extinguishing fire. There are ample studies investigating the best sensor combinations and appropriate techniques for early fire detection. In the previous studies fire detection has either been considered as an application of a certain field (e.g., event detection for wireless sensor networks) or the main concern for which techniques have been specifically designed (e.g., fire detection using remote sensing techniques). These different approaches stem from different backgrounds of researchers dealing with fire, such as computer science, geography and earth observation, and fire safety. In this report we survey previous studies from three perspectives: (1) fire detection techniques for residential areas, (2) fire detection techniques for forests, and (3) contributions of sensor networks to early fire detection.

D)Hamood Alqourabah1 , Amgad Muneer2 , Suliman Mohamed Fati3 "A smart fire detection system using IoT technology with automatic water sprinkler", 2021

House combustion is one of the main concerns for builders, designers, and property residents. Singular sensors were used for a long time in the event of detection of a fire, but these sensors cannot measure the amount of fire to alert the emergency response units. To address this problem, this study aims to implement a smart fire detection system that would not only detect the fire using integrated sensors but also alert property owners, emergency services, and local police stations to protect lives and valuable assets simultaneously. The proposed model in this paper employs different integrated detectors, such as heat, smoke, and flame. The signals from those detectors go through the system algorithm to check the fire's potentiality and then broadcast the predicted result to various parties using GSM modem associated with the system. To get real-life data without putting human lives in danger, an IoT technology has been implemented to provide the fire department with the necessary data. Finally, the main feature of the proposed system is to minimize false alarms, which, in turn, makes this system more reliable. The experimental results showed the superiority of our model in terms of affordability, effectiveness, and responsiveness as the system uses the Ubidots platform, which makes the data exchange faster and reliable.

E)Saurabh Joshi,Divyanshu Sharma, Yashpal Sammal,Satyajit Das"Intelligent Fire Alert and Escaping System", 2017

The primary purpose of Intelligent Fire Alert and Escaping System is to provide an early warning of fire so that people can escape from a place of danger to a safer place & immediate action can be taken to stop or get rid of the fire effect as soon as possible. This type of system uses sensors, microcontrollers, cameras, robot, GSM module etc. In this proposed research paper RF wireless remote controls a robot which has a fire alert system with a wireless camera inbuilt in the robot. An Intelligent Fire Alert and Escaping System identify the fire at early stage and monitors the situation with the help of camera which results in finding a safe route or place for escape. It is also capable of extinguishing fire at early stage and sends an alert to the fire station. The sensor used in this is a smoke detector and flame sensor.

F)Guggilla Anusha,V.R. Seshagiri Rao"Fire Detection and Alarm Systems", 2018

For the protection and safety of the garment plant staff has becoming a biggest issue now a days. The garment plant employees face a lot of problems and broken out of fireplace one of them for sure. The depositors aren't showing any interest in this sector and importance of this sector is obtaining toneless. In this research a fireplace detection system is propounded and conjointly provides information of the region affected. Here we used ARM7which are embedded with different types of sensors .We provide associate authentication system to avoid warning. The system can instantly send a SMS to the admin. The admin will make sure or deny the information. If the admin make sure breaking out of fire then system can right away raise an alarm and a SMS will be sent to the nearby fire brigade.

2.2 Reference

https://pdfs.semanticscholar.org/f3e7/a7c0cf2d448be592421045033506e845e6c2.pdf

https://www.mdpi.com/2224-2708/7/1/11

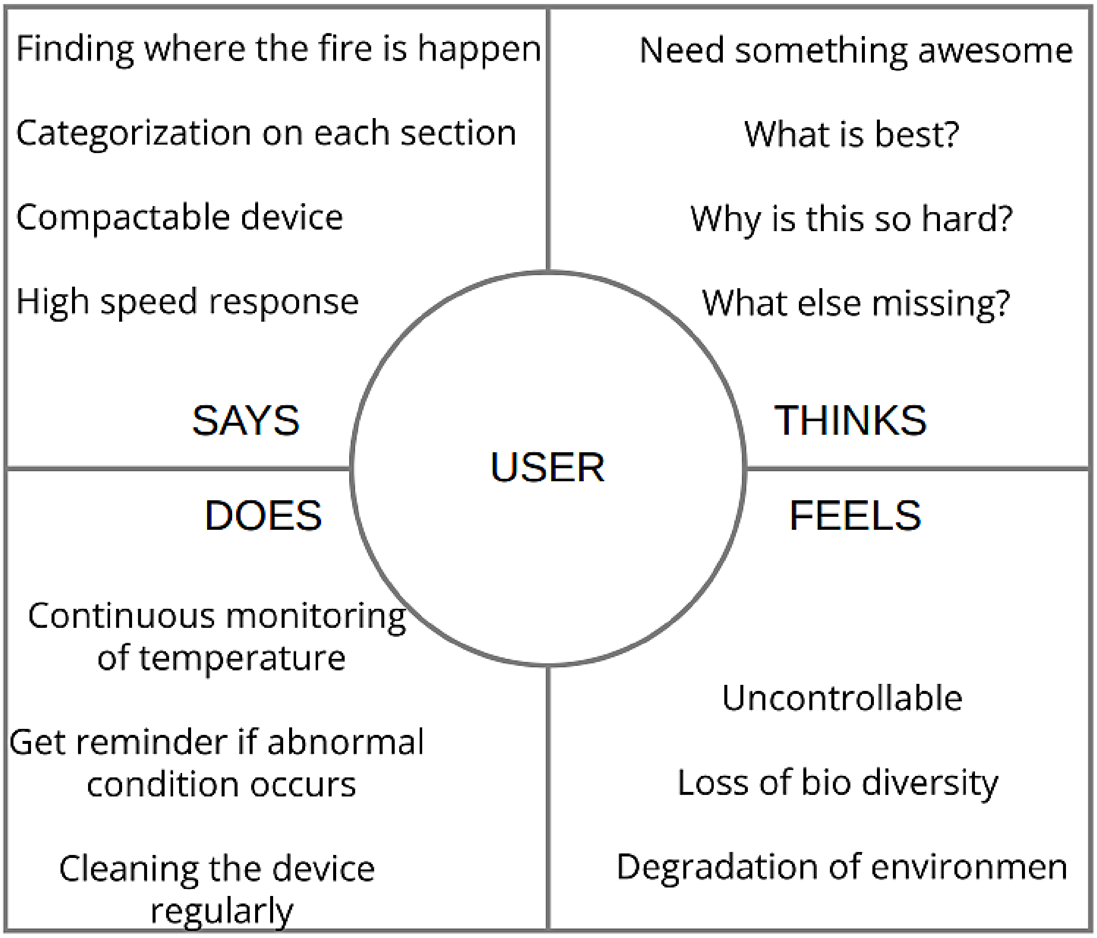
2.3 Problem Statement Definition

The most frequently used applications of the lot in the fire management system are for detecting fire and alerting fire departments over IOT. Fire management system includes application of multiple sensors with automatic water sprinkler which can help to detect fire and alert emergency services to protect lives and valuable assets.

3.IDEATION AND PROPOSED SOLUTION

3.1 Empathy map canvas

- An empathy map is a simple, easy-to-digest visual that captures knowledge about a user’s behaviours and attitudes
- It is a useful tool to helps teams better understand their users.Creating an effective solution requires understanding the true problem and the person who is experiencing it
- The exercise of creating the map helps participants consider things from the user’s perspective along with his or her goals and challenges.



SAYS

Finding where the fire is happen

Categorization on each section

Compactable device

High speed response

THINKS

Need something awesome

What is best?

Why is this so hard?

What else missing?

USER

DOES

Continuous monitoring of temperature

Get reminder if abnormal condition occurs

Cleaning the device regularly

FEELS

Uncontrollable

Loss of bio diversity

Degradation of environmen

3.2 Ideation

IDEATION-1:

Our project aim is to detect the fire accident in Industries. Industry fires generally occurs may result in human deaths. So that, it must be detected early and alert the information to the admins through cloud services. We use flame sensor to detect the fire and inform the fire station by using wifi module, buzzer alarms at the fire station. Finding exact location of where fire happens is very difficult to make it easier we have to add google map with cloud services to get exact location.

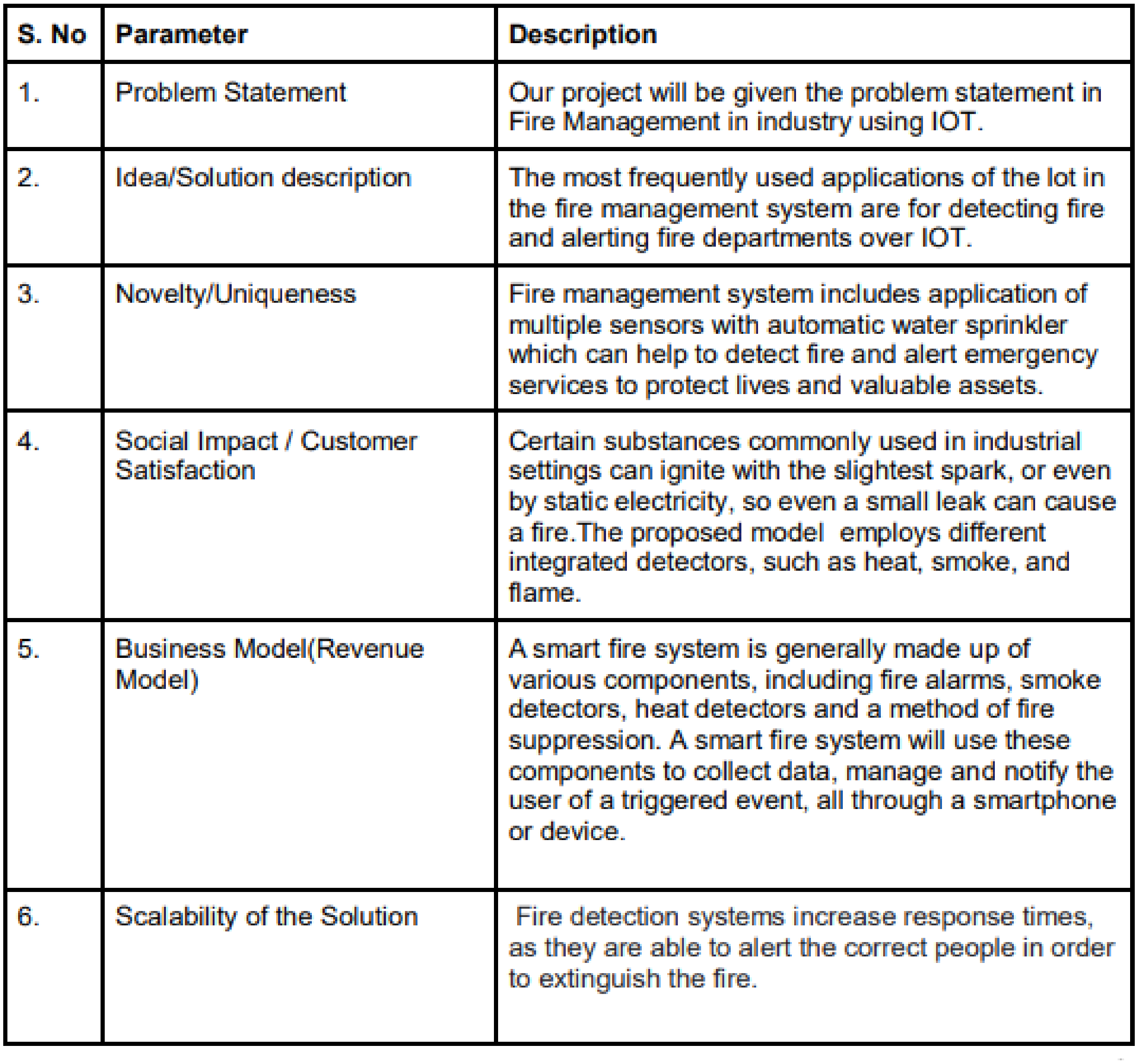
IDEATION-2:

Industry fire is the very dangerous that will harmful to Humanlife and Environment. It could be avoided if a robust system could be deployed in industries to detect the fire and alert to Fire station authority to take immediate action. Our project intention is to build a industry fire detection system using IOT which would detect the fire and send an emergency alert to Fire station through IOT.A GSM/GPRS module is used to communicate with IOT sever.

IDEATION-3:

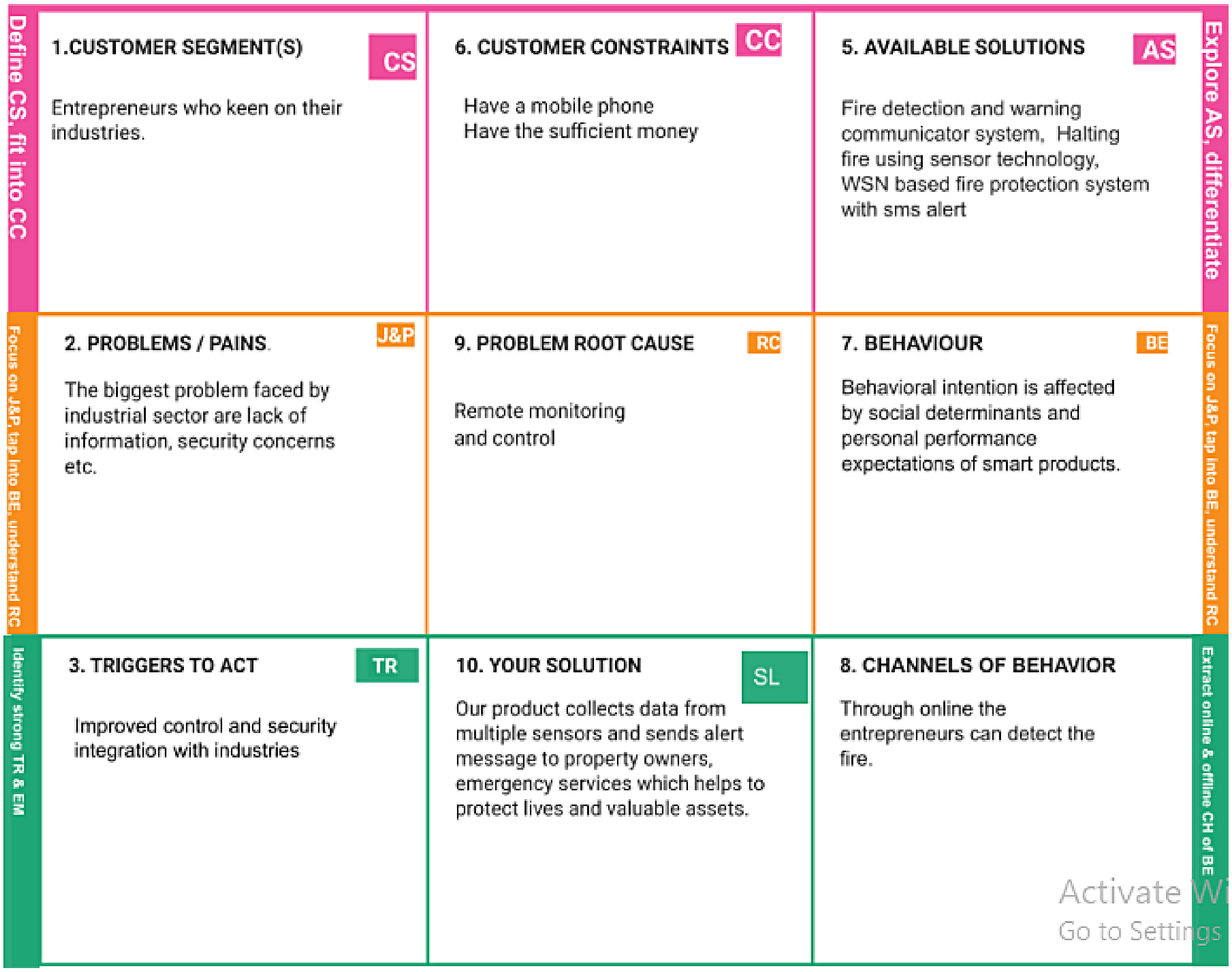
Our project deals with the detection and management of Industry fire. Industry fire are very common which is a massive disaster to the environment and Humanlife. In order to protect these, there need to be taken early caution measures to control the spreading fire. Usually it requires massive dependency of man power, transportation facility will leads to delay in taking actions.The DHT11 and flame sensors detects the fluctuation in the temperature and humidity continuously and using Node MCU microcontroller which is also a Wi-Fi module sends these values to the cloud as database, if these value exceeds the threshold value then a pop up alert message will be sent by the cloud to the respective department immediately. Where we can avoid major loss and spreading of fire to large area at its early stage

3.3 Proposed Solution



S. No	Parameter	Description
1.	Problem Statement	Our project will be given the problem statement in Fire Management in industry using IOT.
2.	Idea/Solution description	The most frequently used applications of the lot in the fire management system are for detecting fire and alerting fire departments over IOT.
3.	Novelty/Uniqueness	Fire management system includes application of multiple sensors with automatic water sprinkler which can help to detect fire and alert emergency services to protect lives and valuable assets.
4.	Social Impact / Customer Satisfaction	Certain substances commonly used in industrial settings can ignite with the slightest spark, or even by static electricity, so even a small leak can cause a fire.The proposed model employs different integrated detectors, such as heat, smoke, and flame.
5.	Business Model(Revenue Model)	A smart fire system is generally made up of various components, including fire alarms, smoke detectors, heat detectors and a method of fire suppression. A smart fire system will use these components to collect data, manage and notify the user of a triggered event, all through a smartphone or device.
6.	Scalability of the Solution	Fire detection systems increase response times, as they are able to alert the correct people in order to extinguish the fire.

3.4 Proposed Solution Fit



Define CS, fit into CC	1.CUSTOMER SEGMENT(S) CS Entrepreneurs who keen on their industries.	6. CUSTOMER CONSTRAINTS CC Have a mobile phone Have the sufficient money	5. AVAILABLE SOLUTIONS AS Fire detection and warning communicator system, Halting fire using sensor technology, WSN based fire protection system with sms alert	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	2. PROBLEMS / PAINS J&P The biggest problem faced by industrial sector are lack of information, security concerns etc.	9. PROBLEM ROOT CAUSE RC Remote monitoring and control	7. BEHAVIOUR BE Behavioral intention is affected by social determinants and personal performance expectations of smart products.	Focus on J&P, tap into BE, understand RC
Identify strong TR & EM	3. TRIGGERS TO ACT TR Improved control and security integration with industries	10. YOUR SOLUTION SL Our product collects data from multiple sensors and sends alert message to property owners, emergency services which helps to protect lives and valuable assets.	8. CHANNELS OF BEHAVIOR Through online the entrepreneurs can detect the fire.	Extract online & offline CH of BE

4. REQUIREMENT ANALYSIS

4.1 Functional Requirements

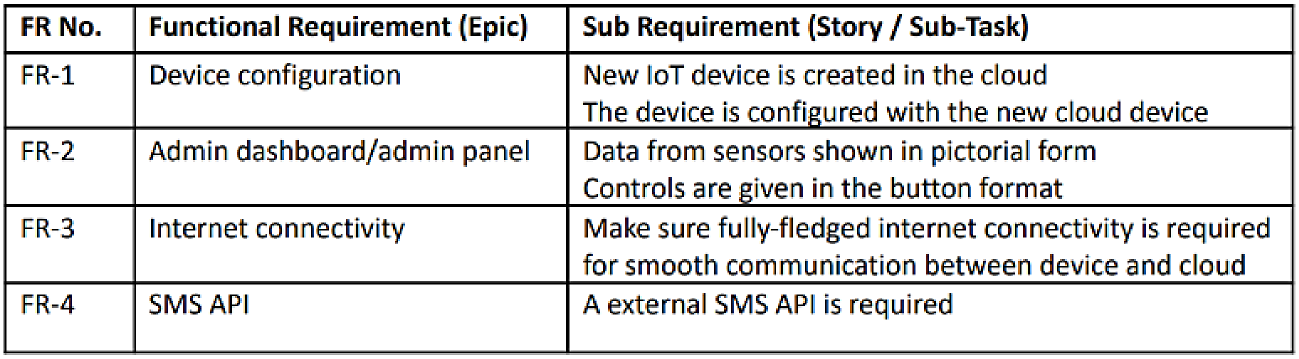
● A functional requirement defines a function of a system or its component, where a function is

● described as a specification of behaviour between inputs and outputs.

● It specifies "what should the software system do?"

● Defined at a component level

- Usually easy to define
- Helps you verify the functionality of the software



FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Device configuration	New IoT device is created in the cloud The device is configured with the new cloud device
FR-2	Admin dashboard/admin panel	Data from sensors shown in pictorial form Controls are given in the button format
FR-3	Internet connectivity	Make sure fully-fledged internet connectivity is required for smooth communication between device and cloud
FR-4	SMS API	A external SMS API is required

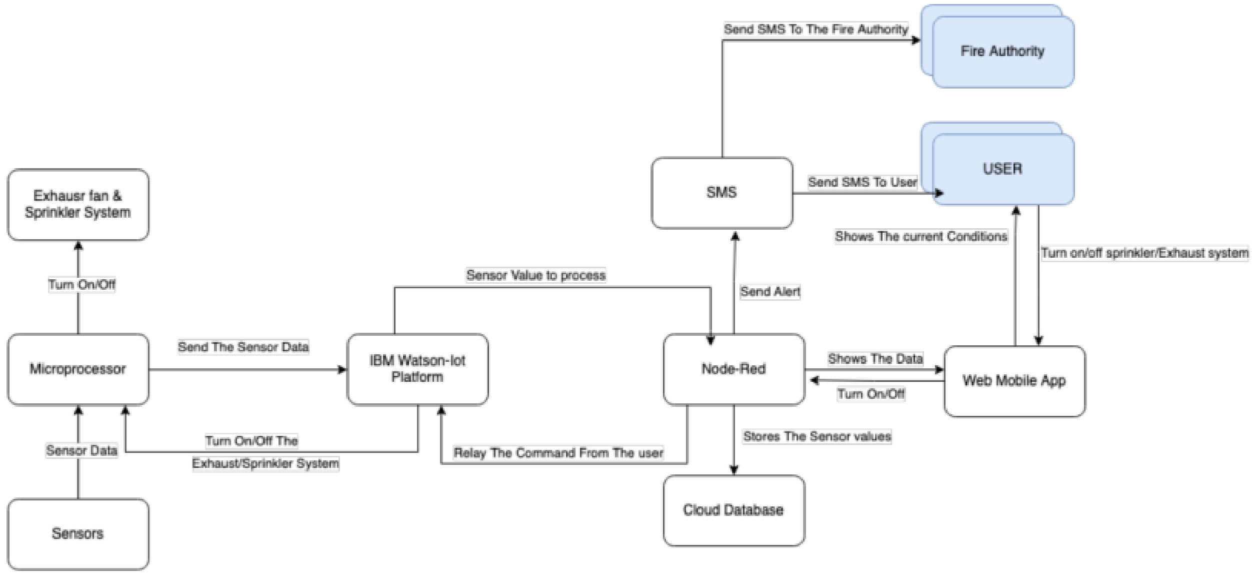
4.2 Non Functional Requirements

- A non-functional requirement defines the quality attribute of a software system
- It places constraint on "How should the software system fulfil the functional requirements?"
- It is not mandatory
- Applied to system as a whole
- Usually more difficult to define
- Helps you verify the performance of the software

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The dashboard can be used via a web browser It gives an abstract view in an easy-to-use form.
NFR-2	**Security**	As the data is sent through HTTPS the data is encrypted, so it is safe.
NFR-3	**Reliability**	The system is completely reliable as long as the internet and power is reliable
NFR-4	**Performance**	Only the data input and basic checking is done in smart device other heavy tasks are done in cloud.
NFR-5	**Availability**	The entire system is available for your service and for configuration .
NFR-6	**Scalability**	The smart system is scalable,we can add any number of devices as long as the IBM IoT platform supports it.

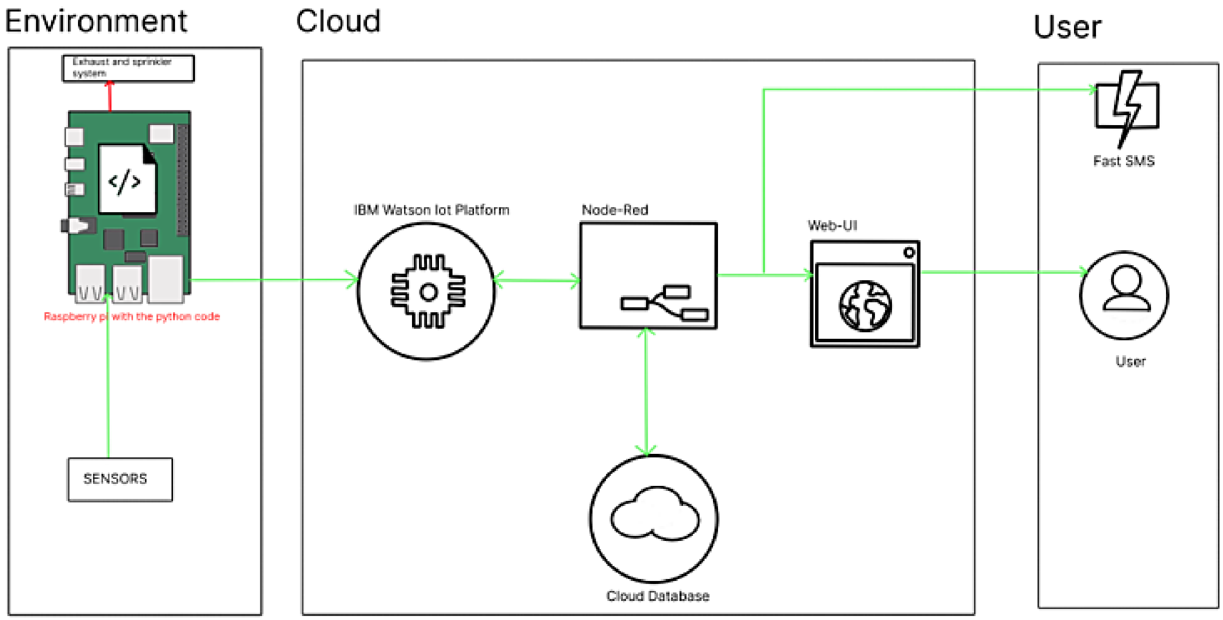
5. PROJECT DESIGN

5.1 Dataflow Diagram

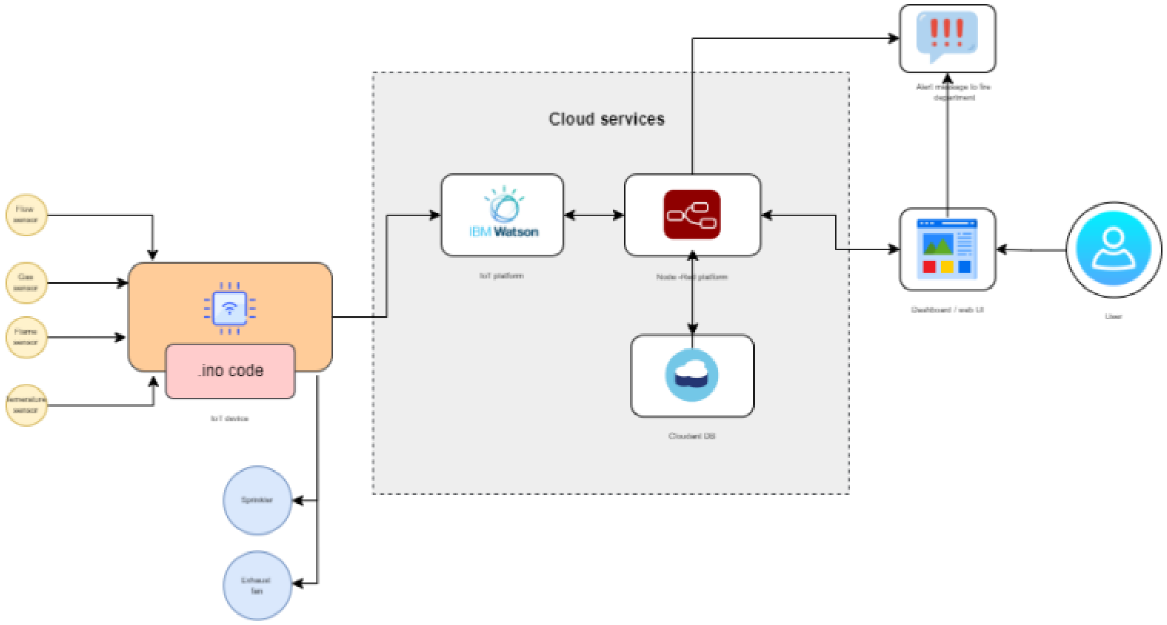


5.2 Solution and Technical architecture

Solution Architecture



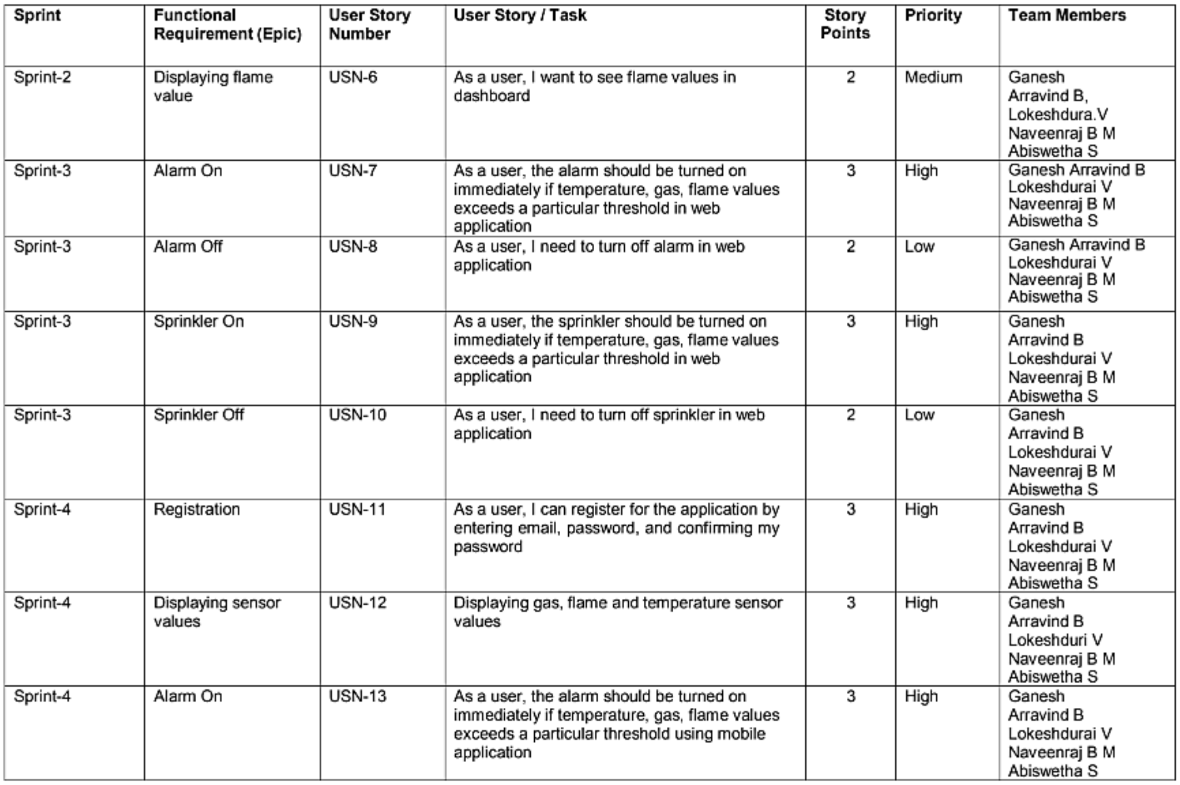
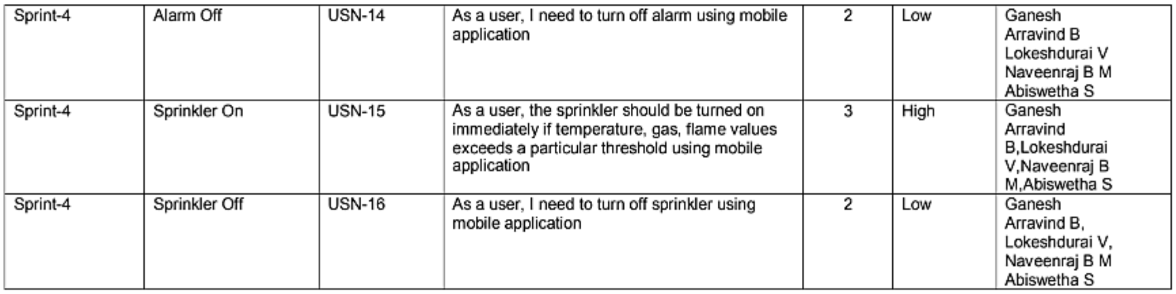
Technical Architecture



6. PROJECT DESIGN AND PLANNING

6.1 Sprint planning and estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Sensing the values	USN-1	As a user, I want to see the temperature values	3	High	Ganesh Arravind B,Lokeshdurai V,Naveenraj B M,Abiswetha S
Sprint-1	Sensing the values	USN-2	As a user, I want to see gas values	2	High	Ganesh Arravind B,Lokeshdurai V,Naveenraj B M,Abiswetha S
Sprint-1	Sensing the values	USN-3	As a user, I want to see if flame is present	2	High	Ganesh Arravind B,Lokeshdurai V,Naveenraj B M,Abiswetha S
Sprint-2	Displaying temperature value	USN-4	As a user, I want to see the temperature values in dashboard	2	Medium	Ganesh Arravind B,Lokeshdurai V,Naveenraj B M,Abiswetha S
Sprint-2	Displaying gas value	USN-5	As a user, I want to see the gas values in dashboard	2	Medium	Ganesh Arravind B,Lokeshdurai V,Naveenraj B M,Abiswetha S

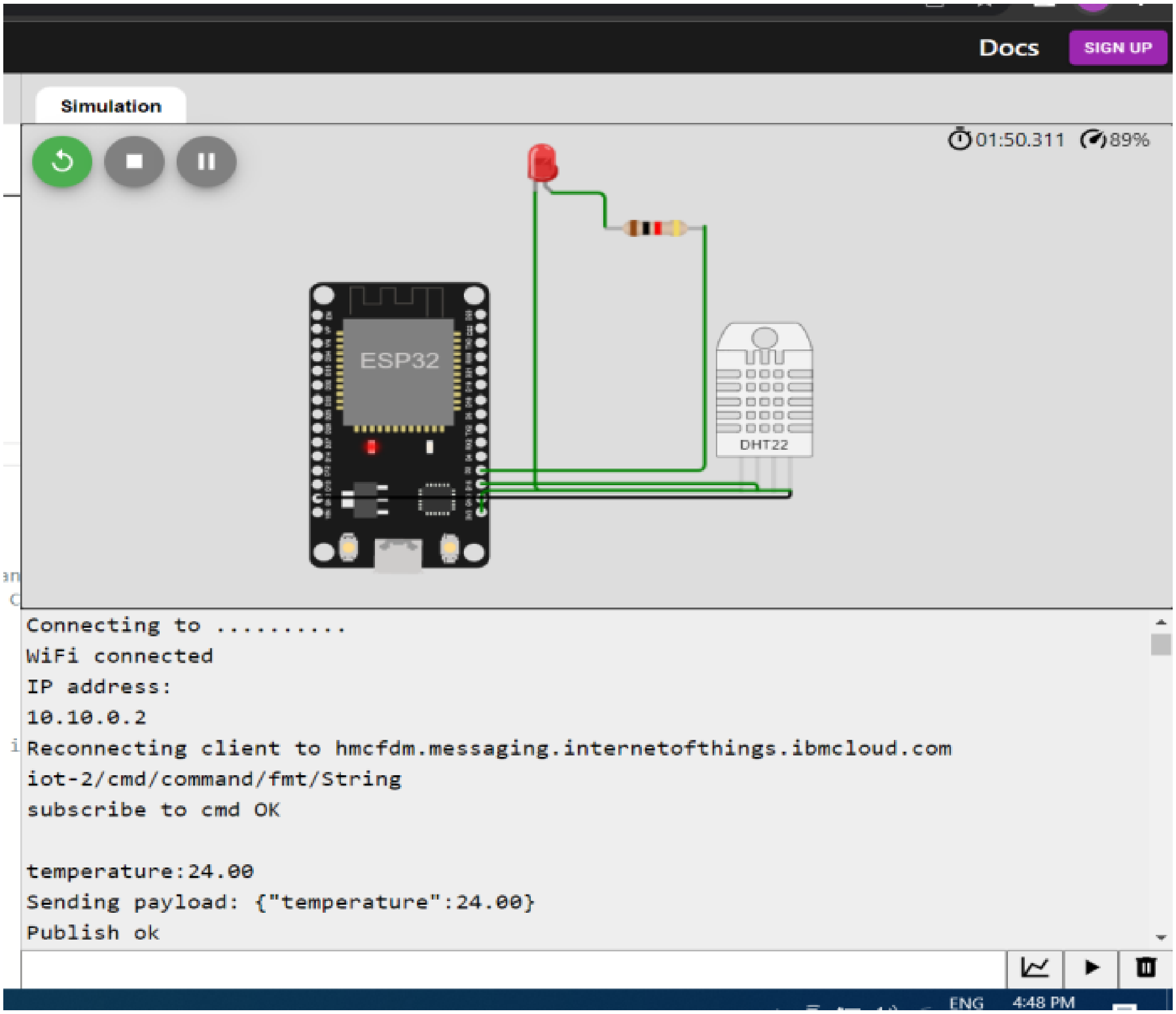
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	Displaying flame value	USN-6	As a user, I want to see flame values in dashboard	2	Medium	Ganesh Arravind B, Lokeshdura.V Naveenraj B M Abiswetha S
Sprint-3	Alarm On	USN-7	As a user, the alarm should be turned on immediately if temperature, gas, flame values exceeds a particular threshold in web application	3	High	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-3	Alarm Off	USN-8	As a user, I need to turn off alarm in web application	2	Low	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-3	Sprinkler On	USN-9	As a user, the sprinkler should be turned on immediately if temperature, gas, flame values exceeds a particular threshold in web application	3	High	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-3	Sprinkler Off	USN-10	As a user, I need to turn off sprinkler in web application	2	Low	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-4	Registration	USN-11	As a user, I can register for the application by entering email, password, and confirming my password	3	High	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-4	Displaying sensor values	USN-12	Displaying gas, flame and temperature sensor values	3	High	Ganesh Arravind B Lokeshduri V Naveenraj B M Abiswetha S
Sprint-4	Alarm On	USN-13	As a user, the alarm should be turned on immediately if temperature, gas, flame values exceeds a particular threshold using mobile application	3	High	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-4	Alarm Off	USN-14	As a user, I need to turn off alarm using mobile application	2	Low	Ganesh Arravind B Lokeshdurai V Naveenraj B M Abiswetha S
Sprint-4	Sprinkler On	USN-15	As a user, the sprinkler should be turned on immediately if temperature, gas, flame values exceeds a particular threshold using mobile application	3	High	Ganesh Arravind B,Lokeshdurai V,Naveenraj B M,Abiswetha S
Sprint-4	Sprinkler Off	USN-16	As a user, I need to turn off sprinkler using mobile application	2	Low	Ganesh Arravind B, Lokeshdurai V, Naveenraj B M Abiswetha S

6.2 Sprint delivery schedule

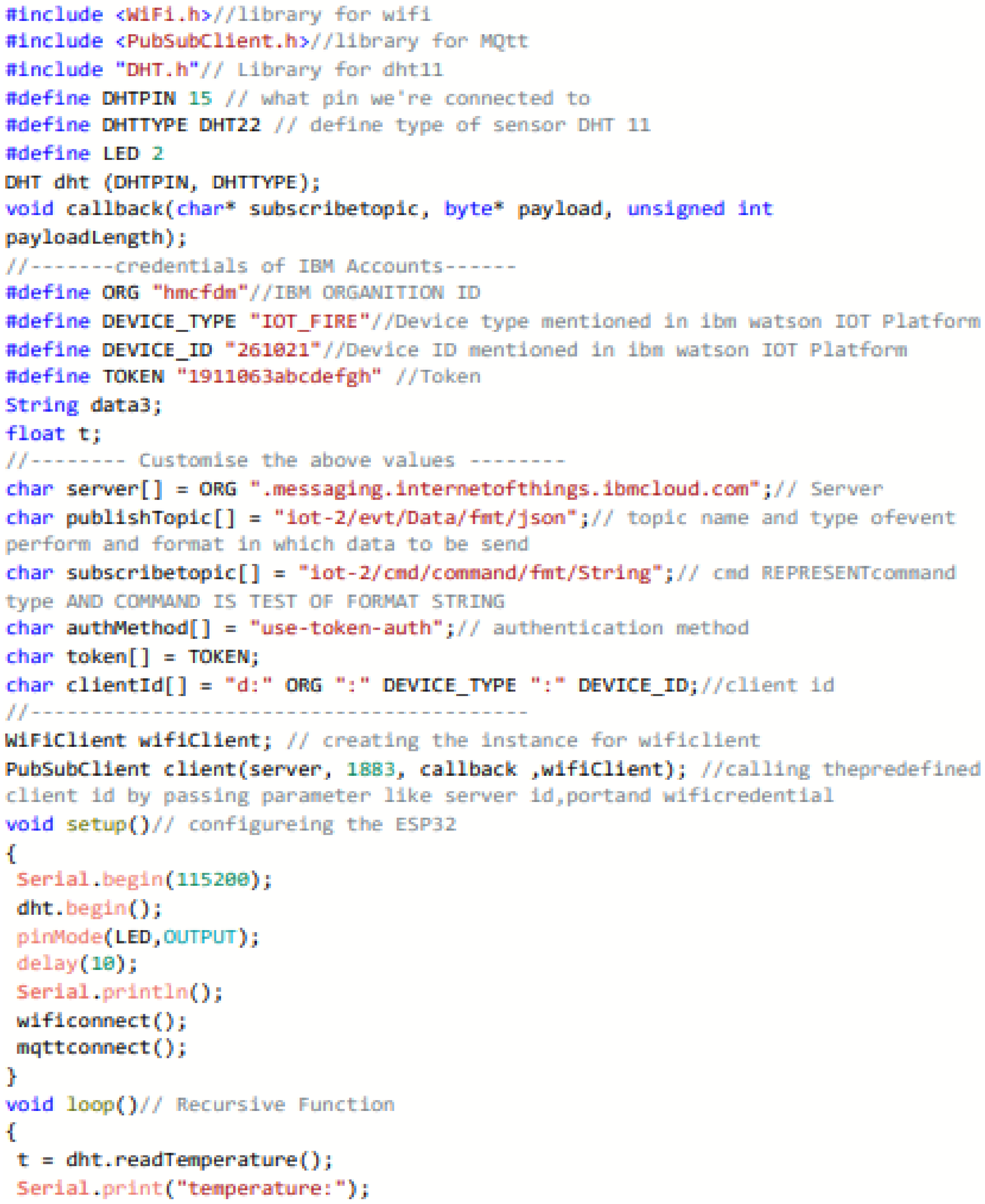
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1		6 Days	24 Oct 2022	29 Oct 2022	7	
Sprint-2		6 Days	31 Oct 2022	05 Nov 2022	6	
Sprint-3		6 Days	07 Nov 2022	12 Nov 2022	10	
Sprint-4		6 Days	14 Nov 2022	19 Nov 2022	16	

SPRINT 1

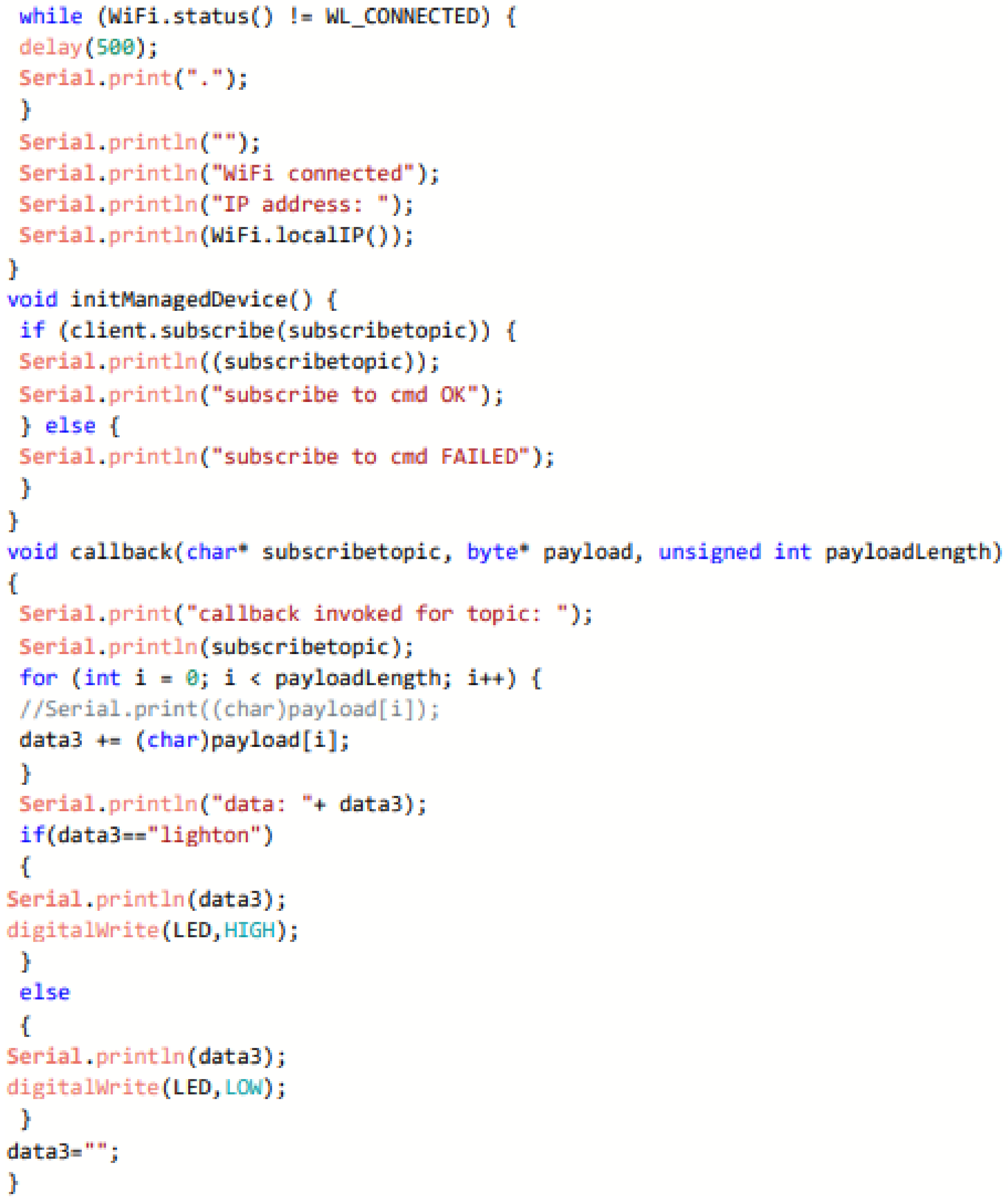
Display the temperature values:
https://wokwi.com/projects/348683544624628306



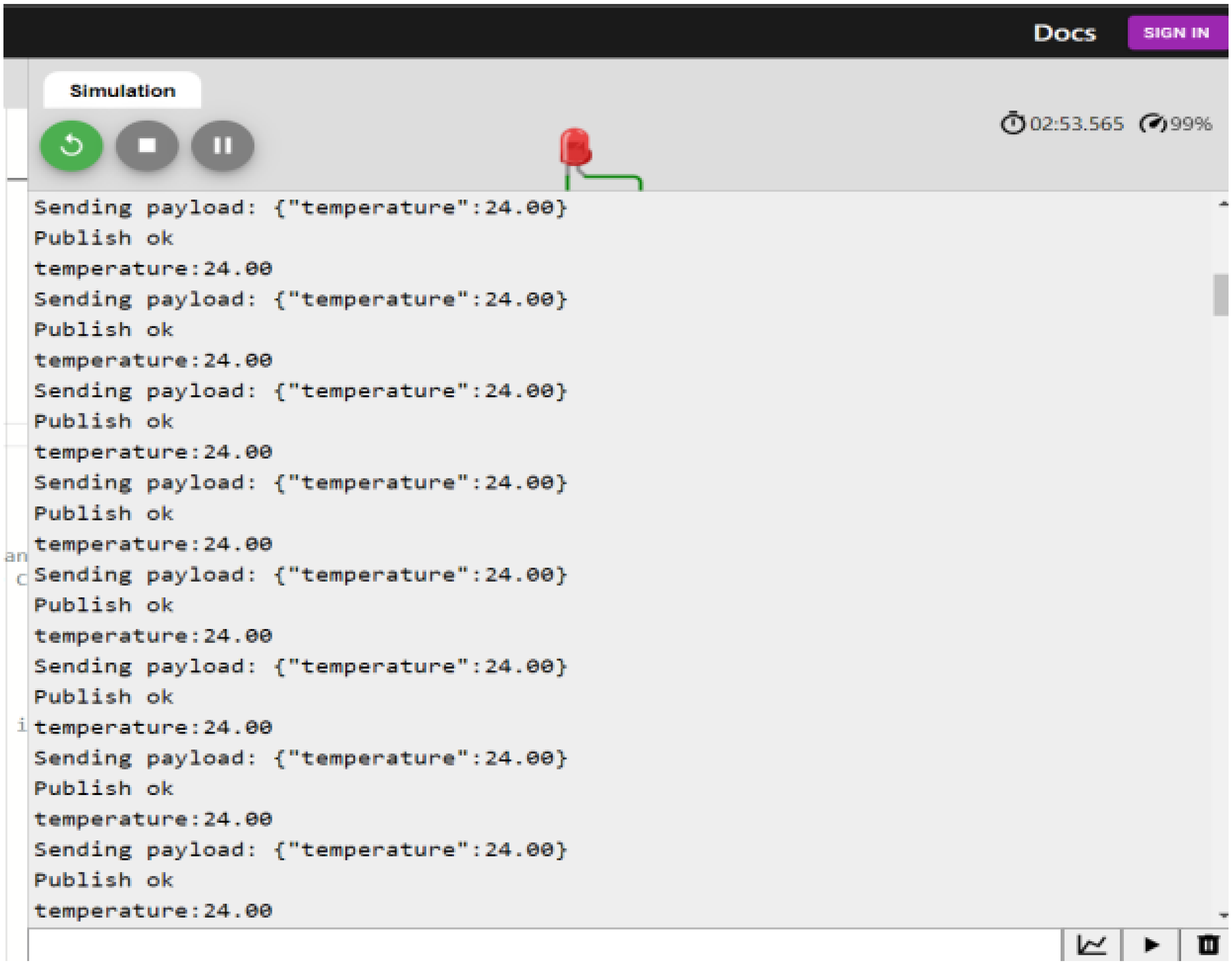
```
Connecting to ..........
WiFi connected
IP address:
10.10.0.2
Reconnecting client to hmcfdm.messaging.internetofthings.ibmcloud.com
iot-2/cmd/command/fmt/String
subscribe to cmd OK

temperature:24.00
Sending payload: {"temperature":24.00}
Publish ok
```



```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#include "DHT.h"// Library for dht11
#define DHTPIN 15 // what pin we're connected to
#define DHTTYPE DHT22 // define type of sensor DHT 11
#define LED 2
DHT dht (DHTPIN, DHTTYPE);
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-------credentials of IBM Accounts------
#define ORG "hmcfdm"//IBM ORGANITION ID
#define DEVICE_TYPE "IOT_FIRE"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "261021"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "1911063abcdefgh" //Token
String data3;
float t;
//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type ofevent
perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENTcommand
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 thepredefined
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
{
 t = dht.readTemperature();
 Serial.print("temperature:");
```



```
 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="";
}
```



```
Sending payload: {"temperature":24.00}
Publish ok
temperature:24.00
Sending payload: {"temperature":24.00}
Publish ok
temperature:24.00
Sending payload: {"temperature":24.00}
Publish ok
temperature:24.00
Sending payload: {"temperature":24.00}
Publish ok
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Sending payload: {"temperature":24.00}
Publish ok
temperature:24.00
```
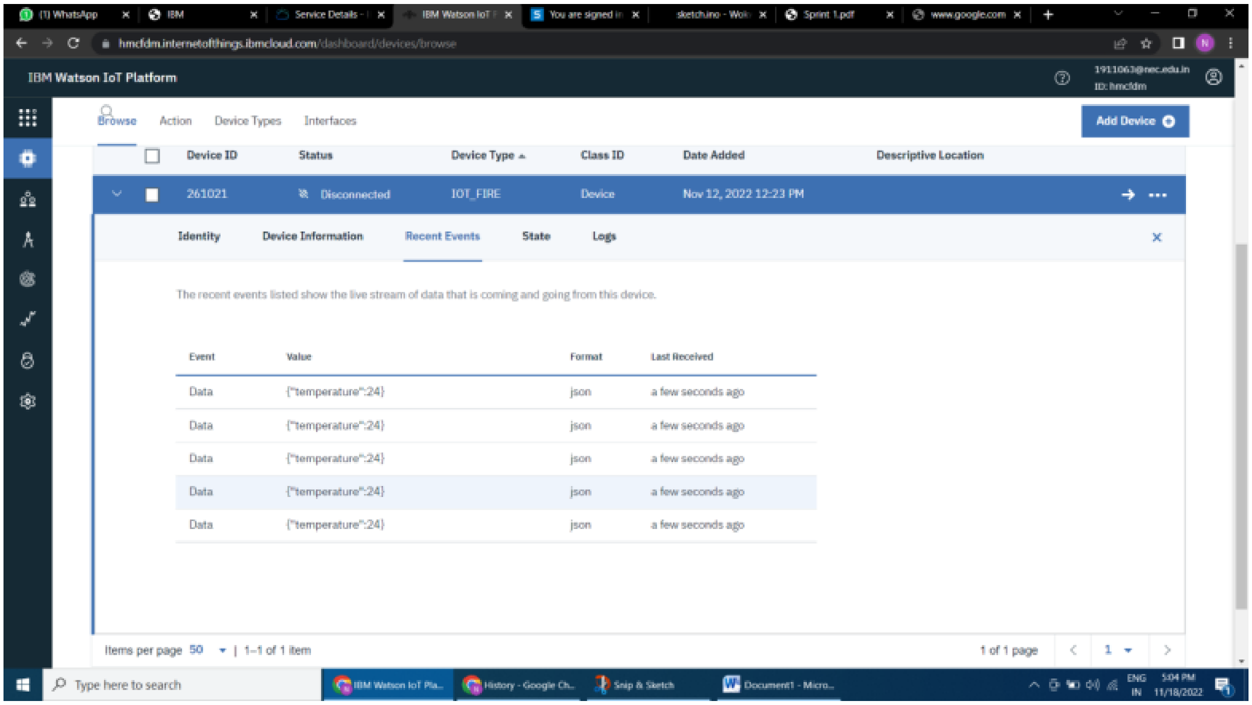
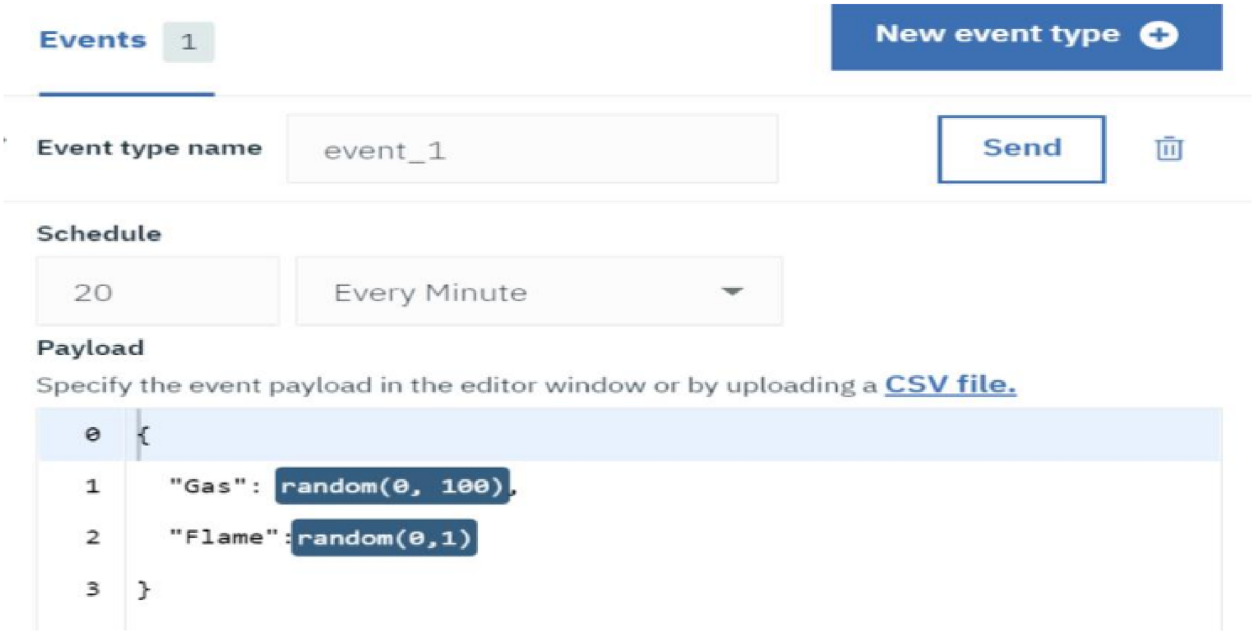



Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
261021	Disconnected	IOT_FIRE	Device	Nov 12, 2022 12:23 PM	

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":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago

Items per page 50 | 1–1 of 1 item   1 of 1 page



Event type name: event_1

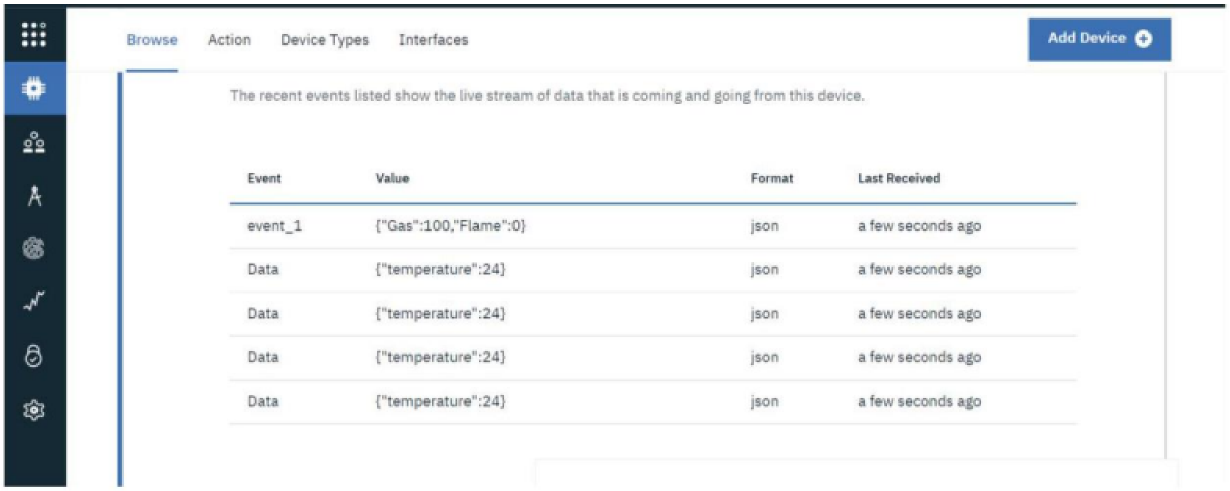
Schedule: 20 Every Minute

Payload

Specify the event payload in the editor window or by uploading a CSV file.

```
{
   "Gas": random(0, 100),
   "Flame":random(0,1)
}
```

Displaying gas sensor & flame sensor values:



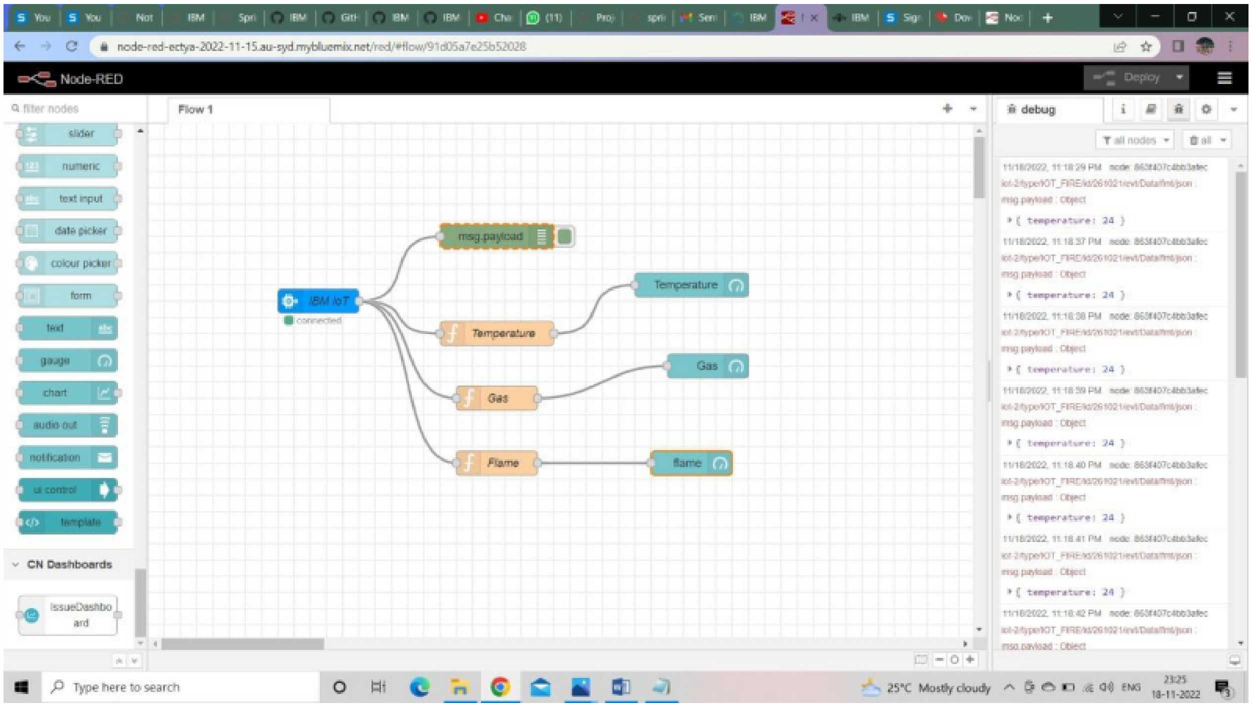
The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event_1	{"Gas":100,"Flame":0}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago
Data	{"temperature":24}	json	a few seconds ago

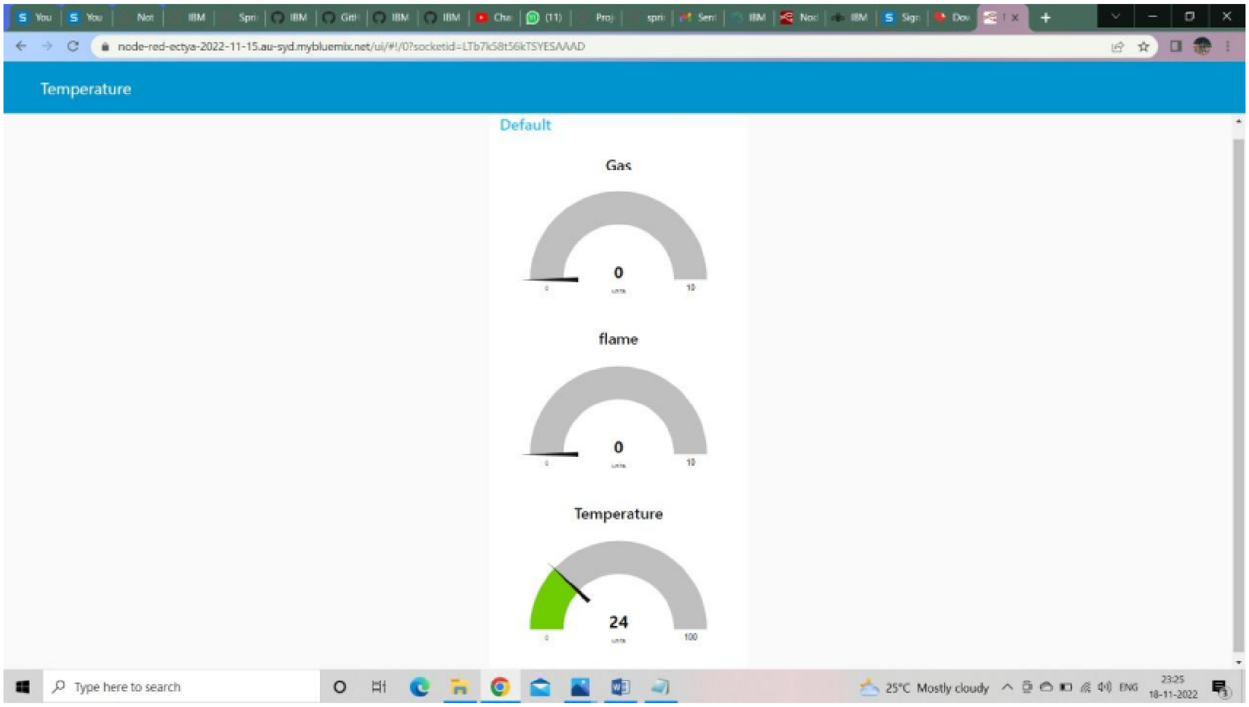
SPRINT 2:

MONITORING SENSOR VALUES

Display the temperature values,flame sensor,gas sensor in the dashboard:

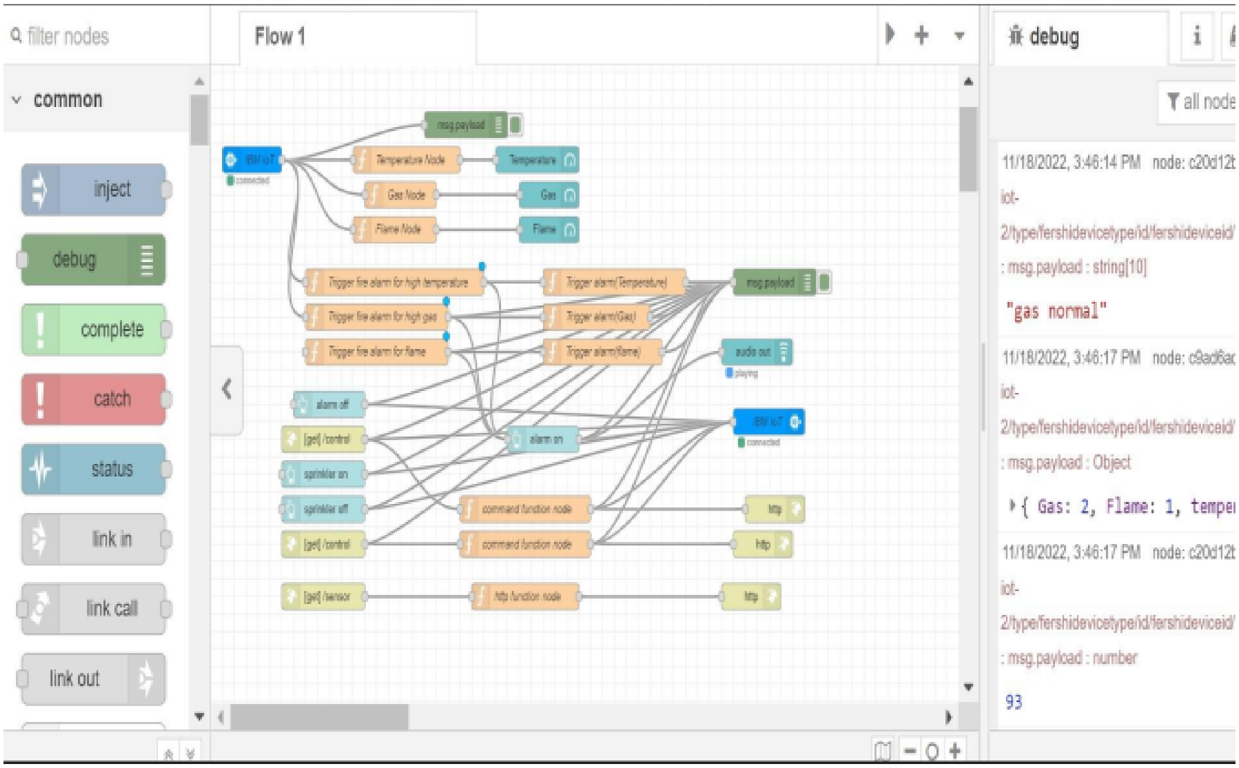


```
11/18/2022, 11:18:29 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
▸{ temperature: 24 }
11/18/2022, 11:18:37 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
▸{ temperature: 24 }
11/18/2022, 11:18:38 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
▸{ temperature: 24 }
11/18/2022, 11:18:39 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
▸{ temperature: 24 }
11/18/2022, 11:18:40 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
▸{ temperature: 24 }
11/18/2022, 11:18:41 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
▸{ temperature: 24 }
11/18/2022, 11:18:42 PM  node: 863f407c4bb3afec
iot-2/type/IOT_FIRE/id/261021/evt/Data/fmt/json :
msg.payload : Object
```



SPRINT 3:

Turning the alarm ON whenever temperature, gas, flame exceeds a particular value, Turning the alarm OFF:



11/18/2022, 3:46:14 PM node: c20d12b
iot-2/type/fershidevicetype/id/fershideviceid/
: msg.payload : string[10]

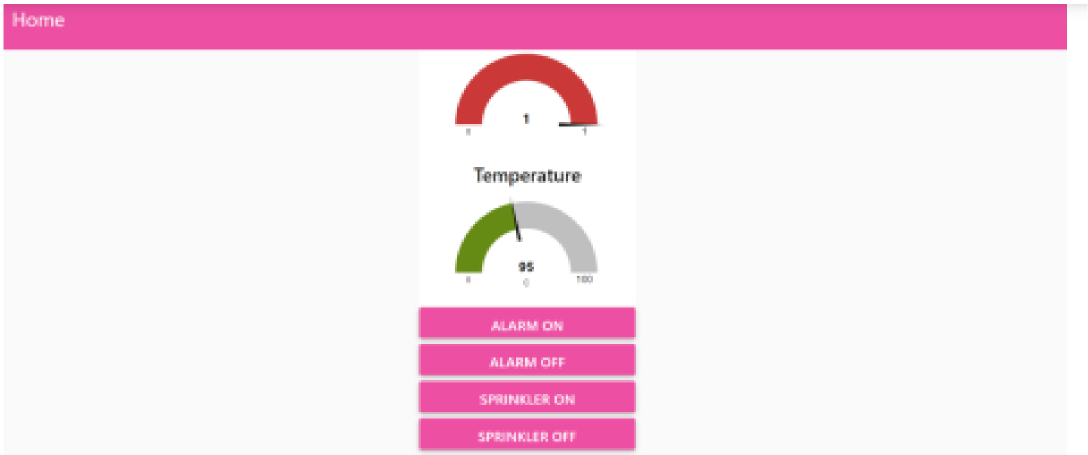
"gas normal"

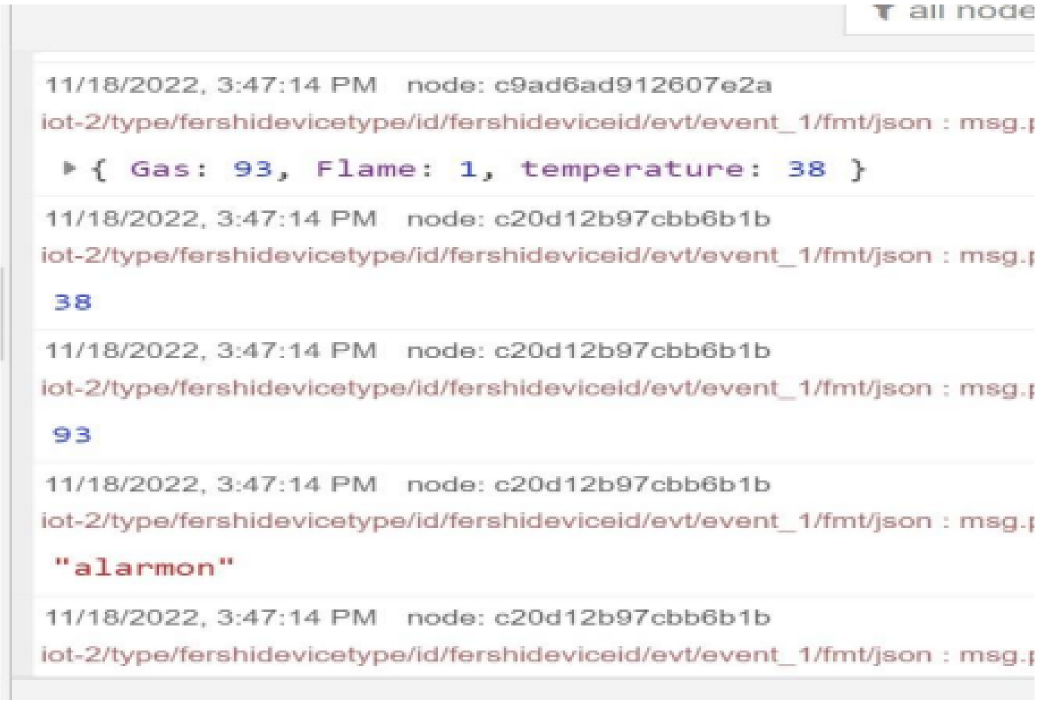
11/18/2022, 3:46:17 PM node: c9ad6ac
iot-2/type/fershidevicetype/id/fershideviceid/
: msg.payload : Object

▸{ Gas: 2, Flame: 1, temper

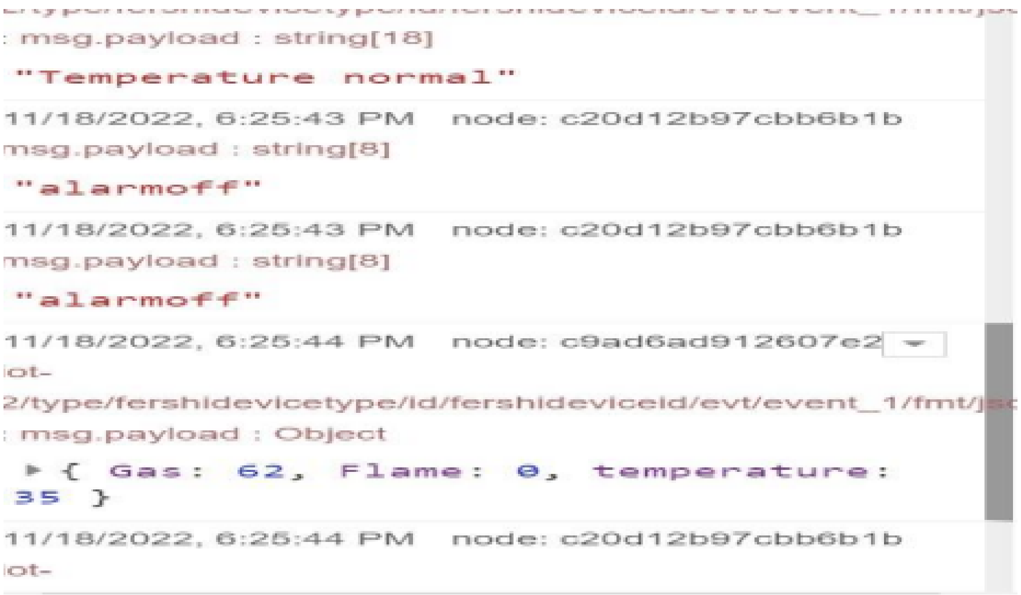
11/18/2022, 3:46:17 PM node: c20d12b
iot-2/type/fershidevicetype/id/fershideviceid/
: msg.payload : number

93



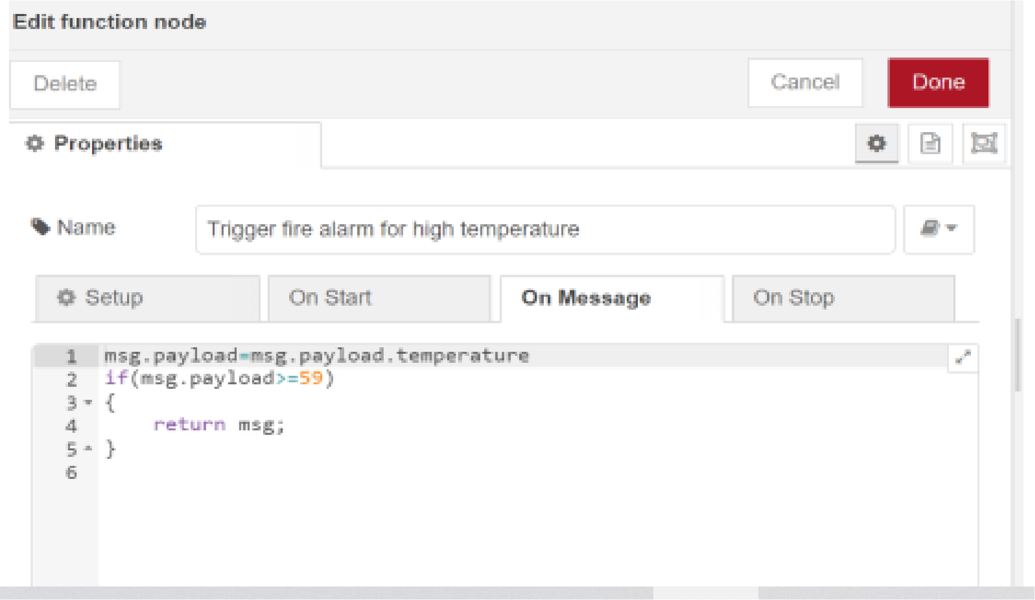


```
11/18/2022, 3:47:14 PM   node: c9ad6ad912607e2a
iot-2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/json : msg.p
 ▸ { Gas: 93, Flame: 1, temperature: 38 }
11/18/2022, 3:47:14 PM   node: c20d12b97cbb6b1b
iot-2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/json : msg.p
 38
11/18/2022, 3:47:14 PM   node: c20d12b97cbb6b1b
iot-2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/json : msg.p
 93
11/18/2022, 3:47:14 PM   node: c20d12b97cbb6b1b
iot-2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/json : msg.p
 "alarmon"
11/18/2022, 3:47:14 PM   node: c20d12b97cbb6b1b
iot-2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/json : msg.p
```



```
: msg.payload : string[18]
 "Temperature normal"
11/18/2022, 6:25:43 PM   node: c20d12b97cbb6b1b
msg.payload : string[8]
 "alarmoff"
11/18/2022, 6:25:43 PM   node: c20d12b97cbb6b1b
msg.payload : string[8]
 "alarmoff"
11/18/2022, 6:25:44 PM   node: c9ad6ad912607e2
iot-
2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/js
: msg.payload : Object
 ▶ { Gas: 62, Flame: 0, temperature:
 35 }
11/18/2022, 6:25:44 PM   node: c20d12b97cbb6b1b
iot-
```

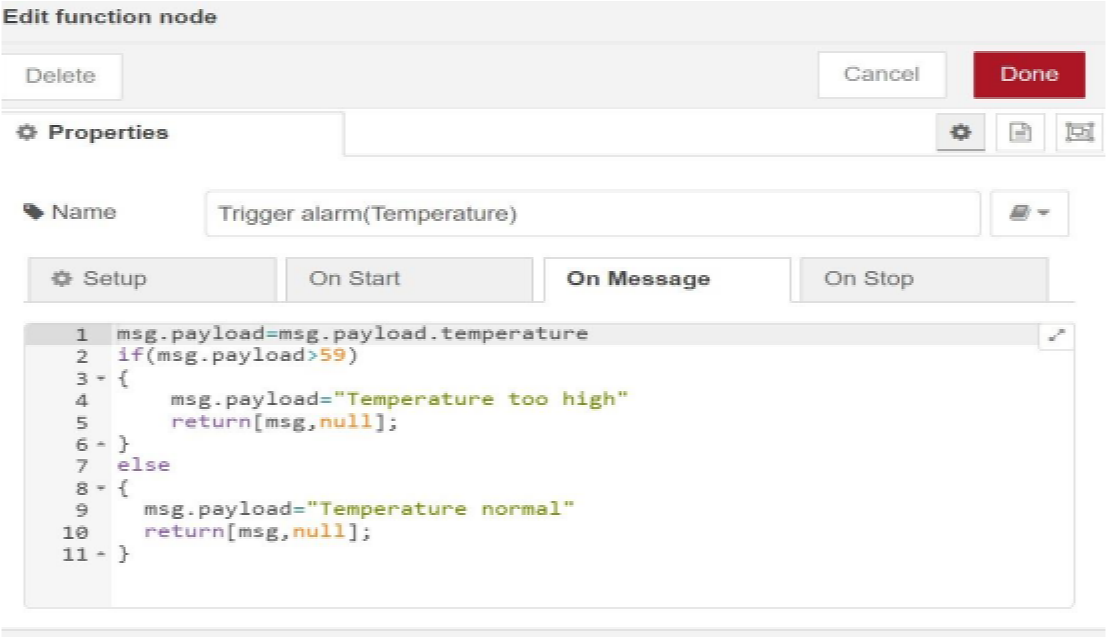
Code:



Edit function node

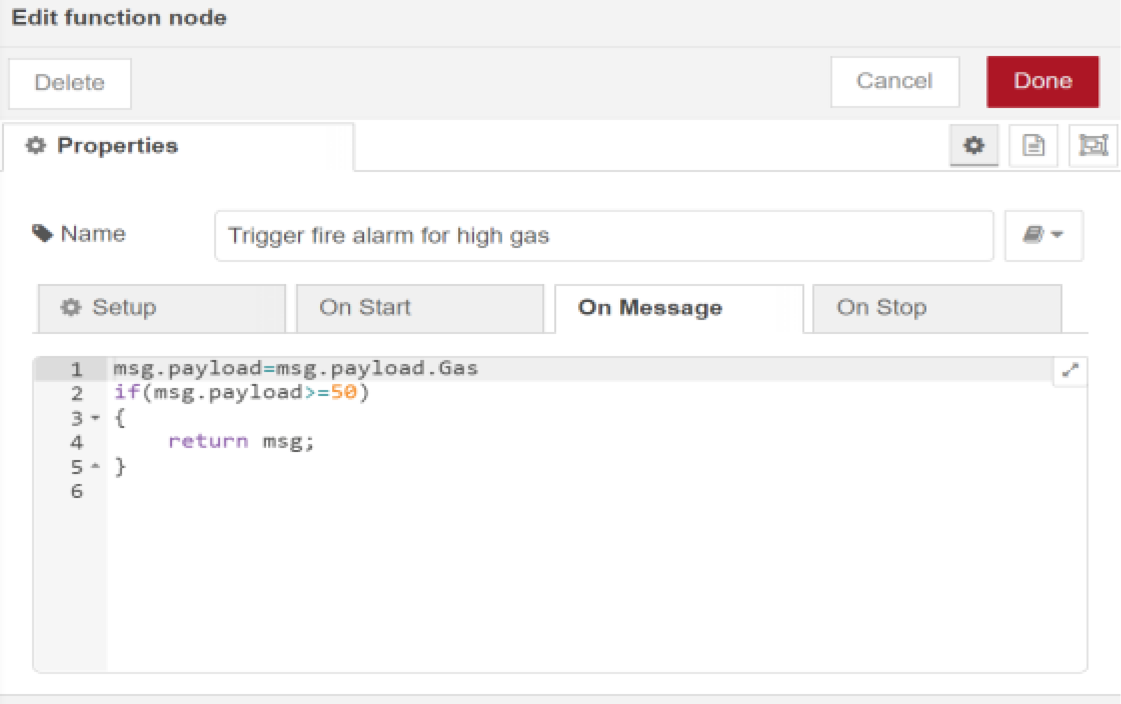
Name: Trigger fire alarm for high temperature

```
msg.payload=msg.payload.temperature
if(msg.payload>=59)
{
    return msg;
}

```



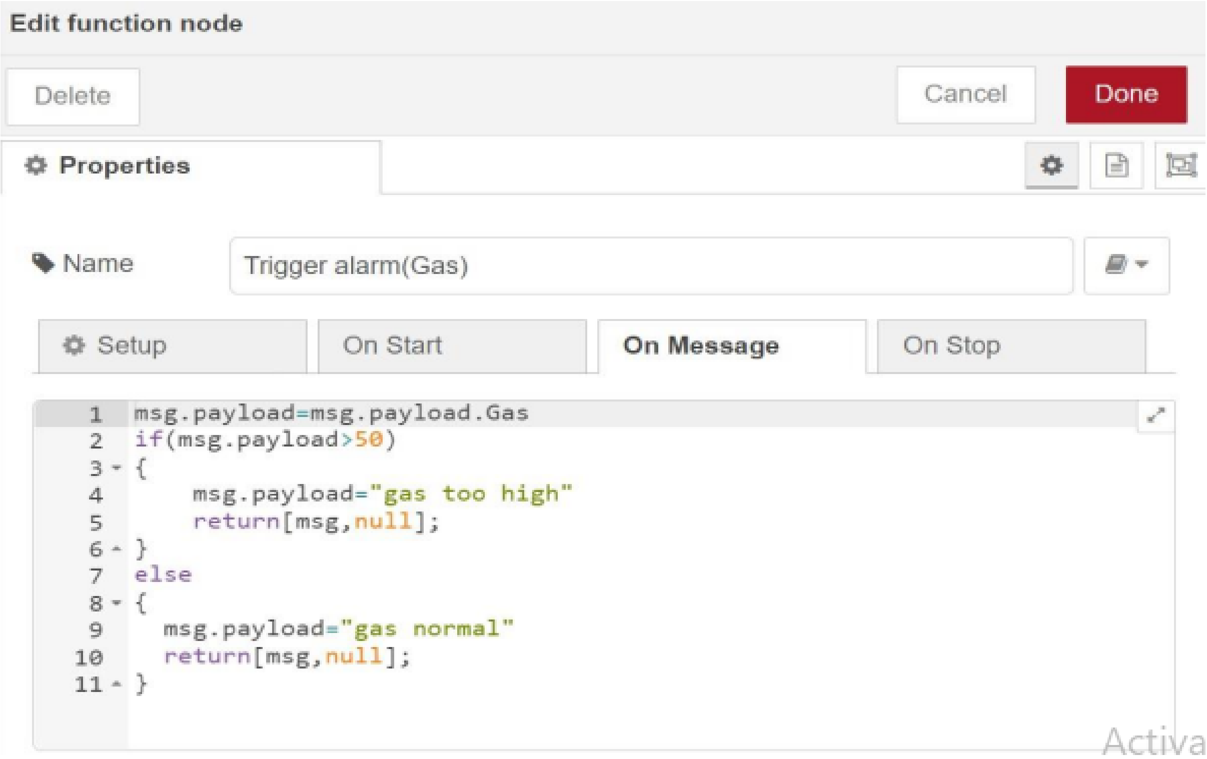
Name: Trigger alarm(Temperature)

```
msg.payload=msg.payload.temperature
if(msg.payload>59)
{
    msg.payload="Temperature too high"
    return[msg,null];
}
else
{
  msg.payload="Temperature normal"
  return[msg,null];
}
```



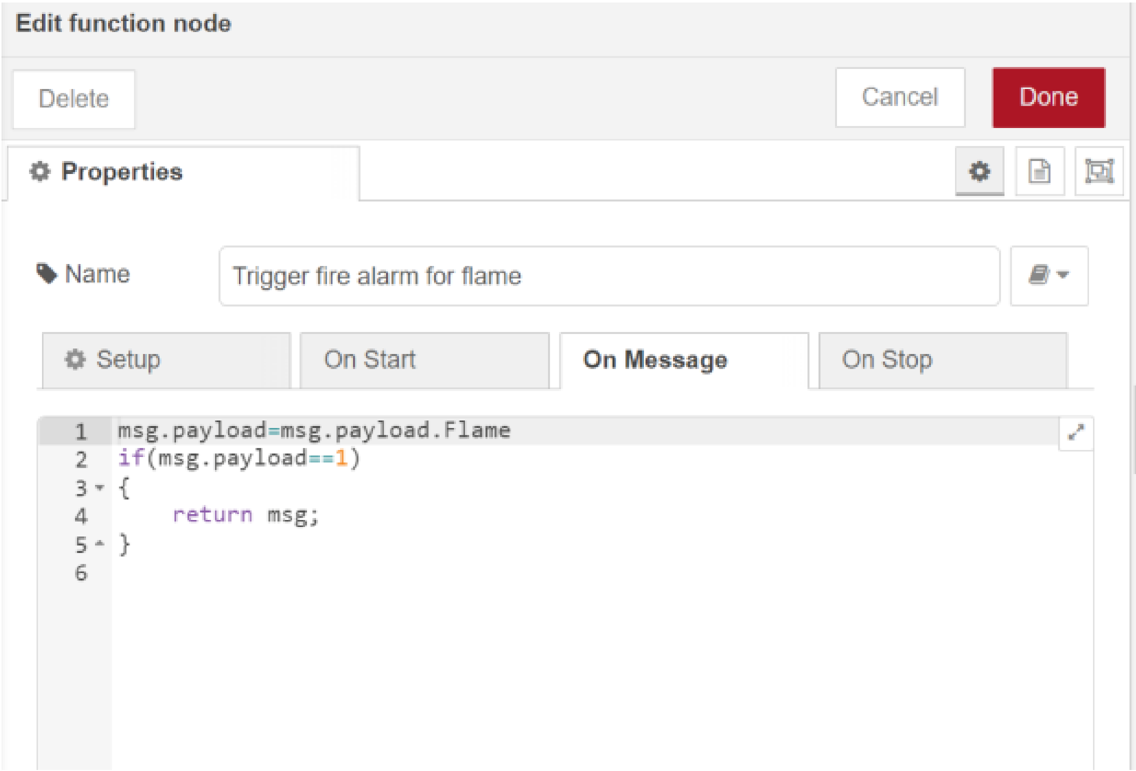
Name: Trigger fire alarm for high gas

```
msg.payload=msg.payload.Gas
if(msg.payload>=50)
{
    return msg;
}

```



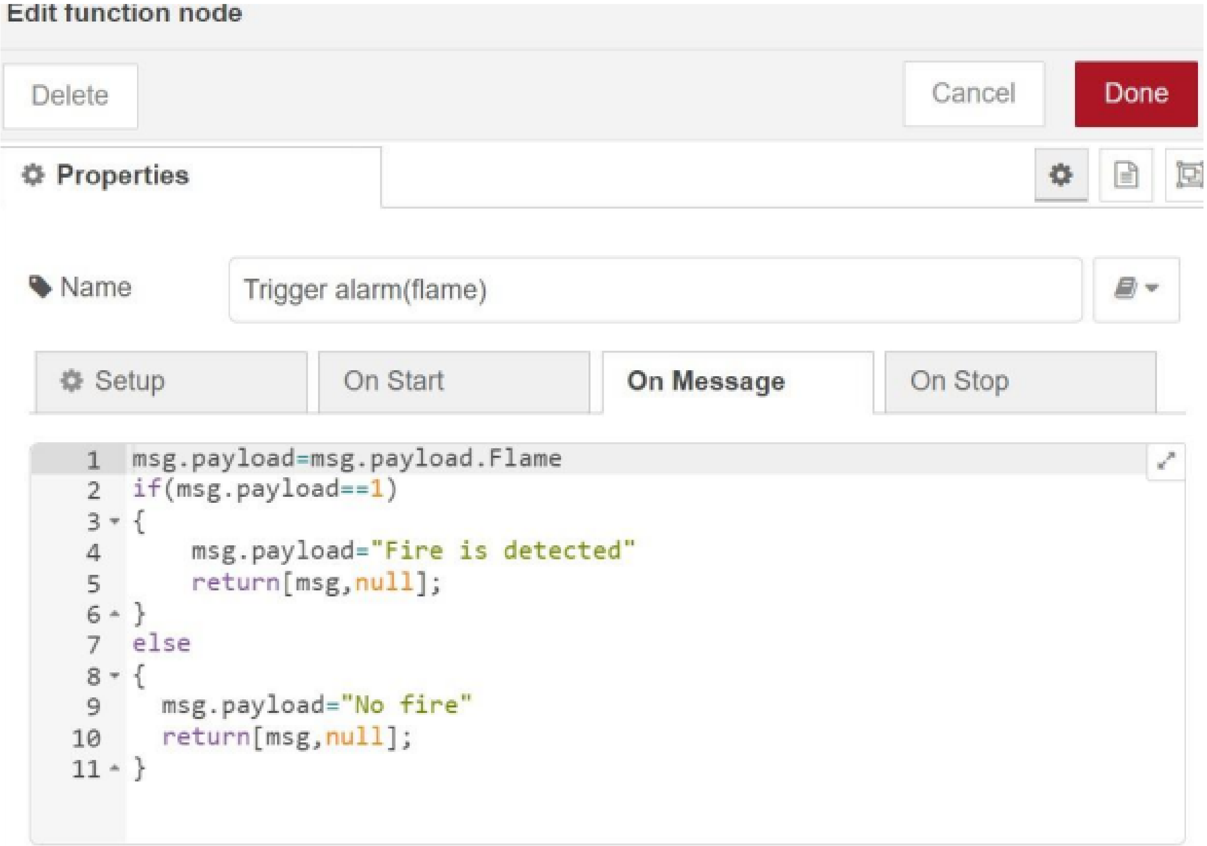
Name: Trigger alarm(Gas)

```
msg.payload=msg.payload.Gas
if(msg.payload>50)
{
    msg.payload="gas too high"
    return[msg,null];
}
else
{
  msg.payload="gas normal"
  return[msg,null];
}
```



Name: Trigger fire alarm for flame

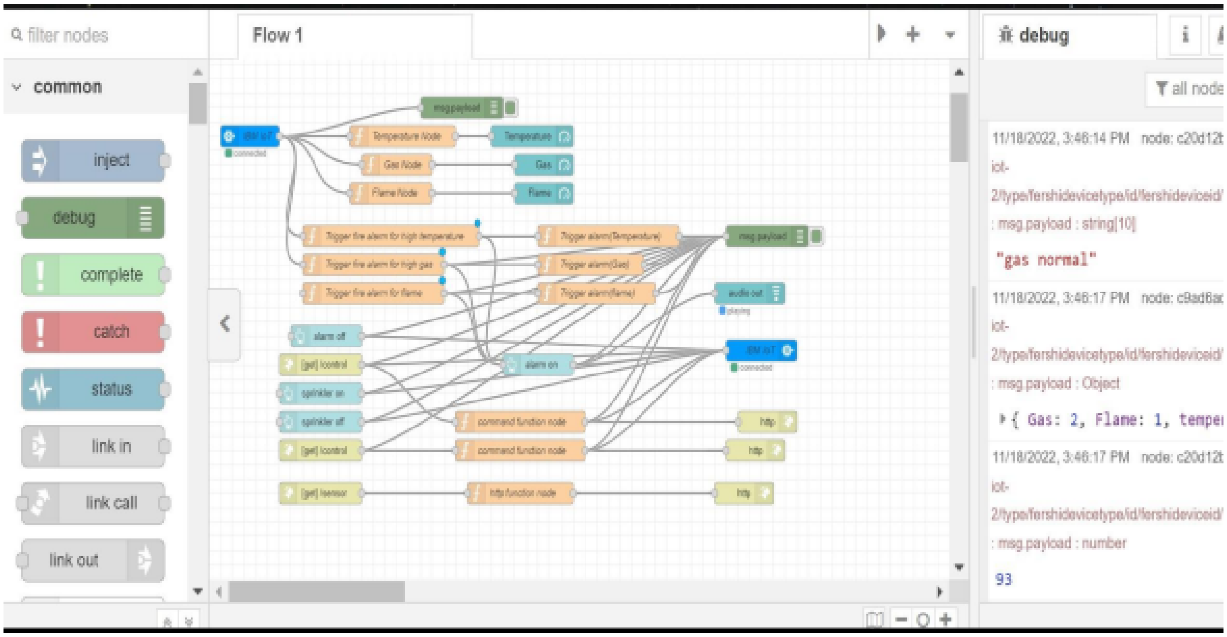
```
msg.payload=msg.payload.Flame
if(msg.payload==1)
{
    return msg;
}

```



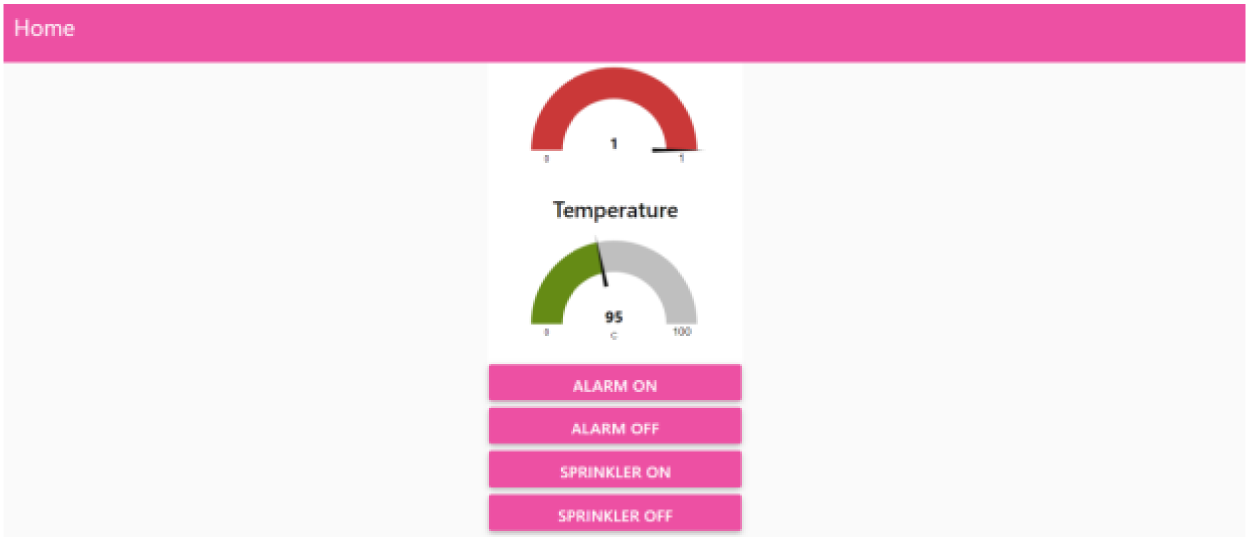
Name: Trigger alarm(flame)

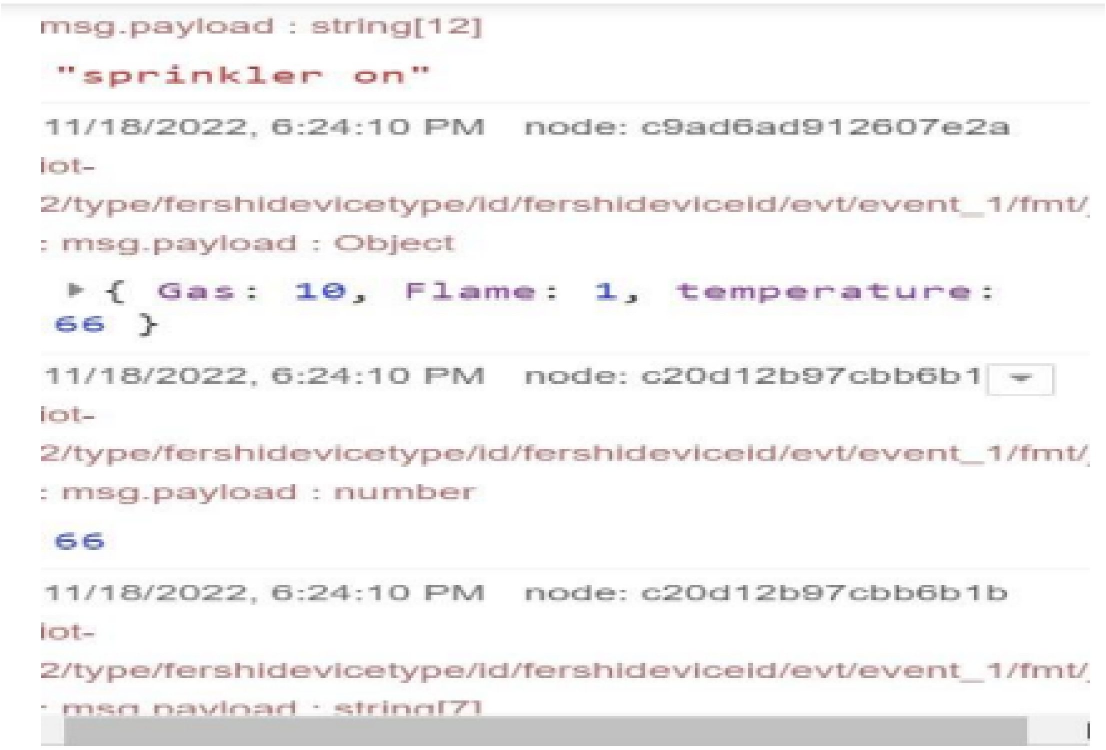
```
msg.payload=msg.payload.Flame
if(msg.payload==1)
{
    msg.payload="Fire is detected"
    return[msg,null];
}
else
{
  msg.payload="No fire"
  return[msg,null];
}
```

Turning the sprinkler ON whenever temperature, gas, flame exceeds a particular value, Turning the sprinkler OFF:

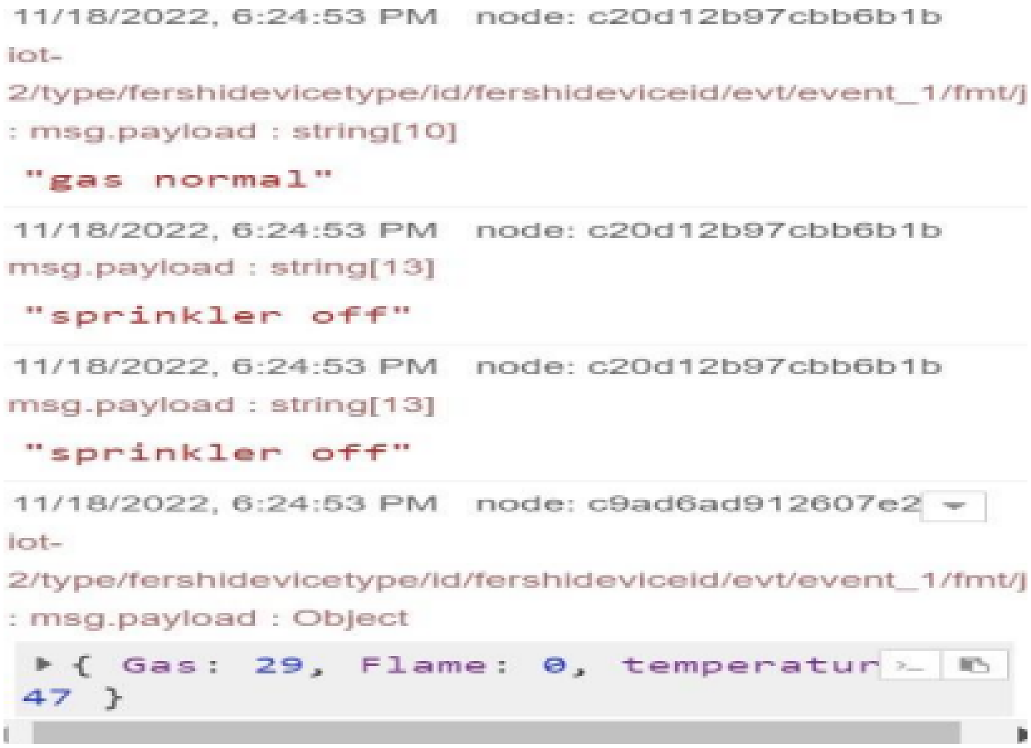


```
11/18/2022, 3:46:14 PM   node: c20d12t
iot-
2/type/fershidevicetype/id/fershideviceid/
: msg.payload : string[10]
"gas normal"
11/18/2022, 3:46:17 PM   node: c9ad6ac
iot-
2/type/fershidevicetype/id/fershideviceid/
: msg.payload : Object
▸{ Gas: 2, Flame: 1, tempe
11/18/2022, 3:46:17 PM   node: c20d12t
iot-
2/type/fershidevicetype/id/fershideviceid/
: msg.payload : number
93
```





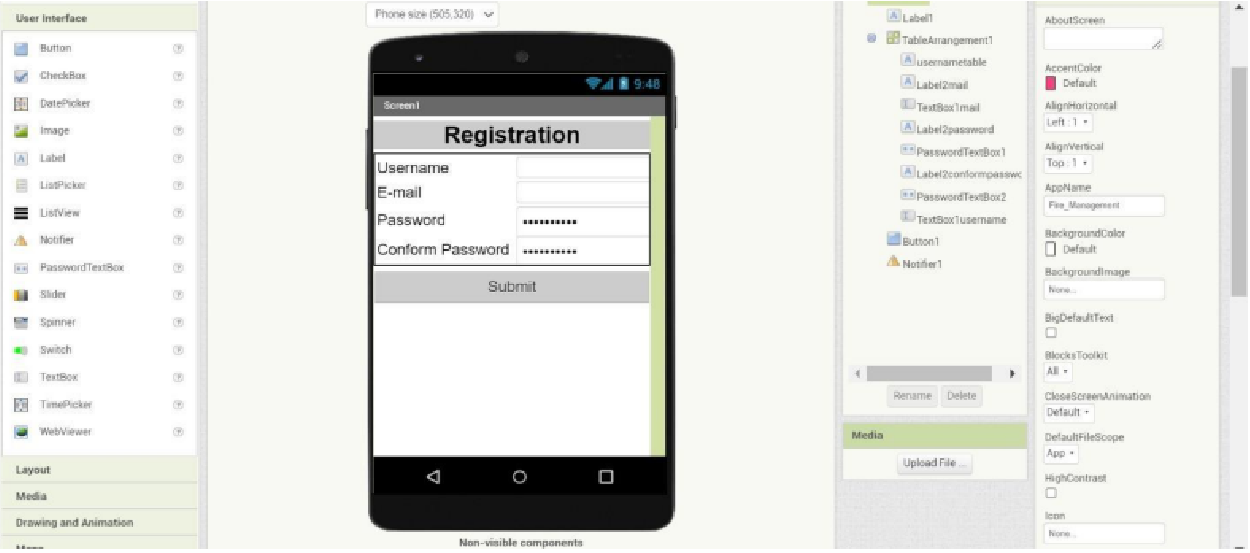
```
msg.payload : string[12]
"sprinkler on"
11/18/2022, 6:24:10 PM   node: c9ad6ad912607e2a
iot-
2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/
: msg.payload : Object
▶ { Gas: 10, Flame: 1, temperature:
66 }
11/18/2022, 6:24:10 PM   node: c20d12b97cbb6b1
iot-
2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/
: msg.payload : number
66
11/18/2022, 6:24:10 PM   node: c20d12b97cbb6b1b
iot-
2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/
: msg.payload : string[7]
```



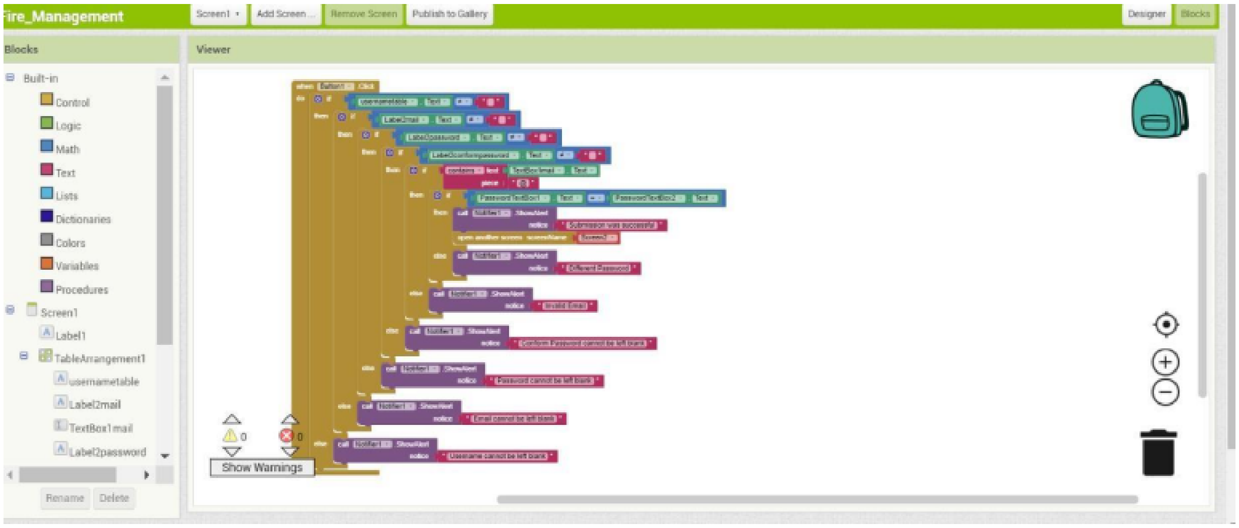
```
11/18/2022, 6:24:53 PM   node: c20d12b97cbb6b1b
iot-
2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/j
: msg.payload : string[10]
"gas normal"
11/18/2022, 6:24:53 PM   node: c20d12b97cbb6b1b
msg.payload : string[13]
"sprinkler off"
11/18/2022, 6:24:53 PM   node: c20d12b97cbb6b1b
msg.payload : string[13]
"sprinkler off"
11/18/2022, 6:24:53 PM   node: c9ad6ad912607e2
iot-
2/type/fershidevicetype/id/fershideviceid/evt/event_1/fmt/j
: msg.payload : Object
▶ { Gas: 29, Flame: 0, temperatur
47 }
```

Register for the application by entering email, password, and confirming the password:

Design:

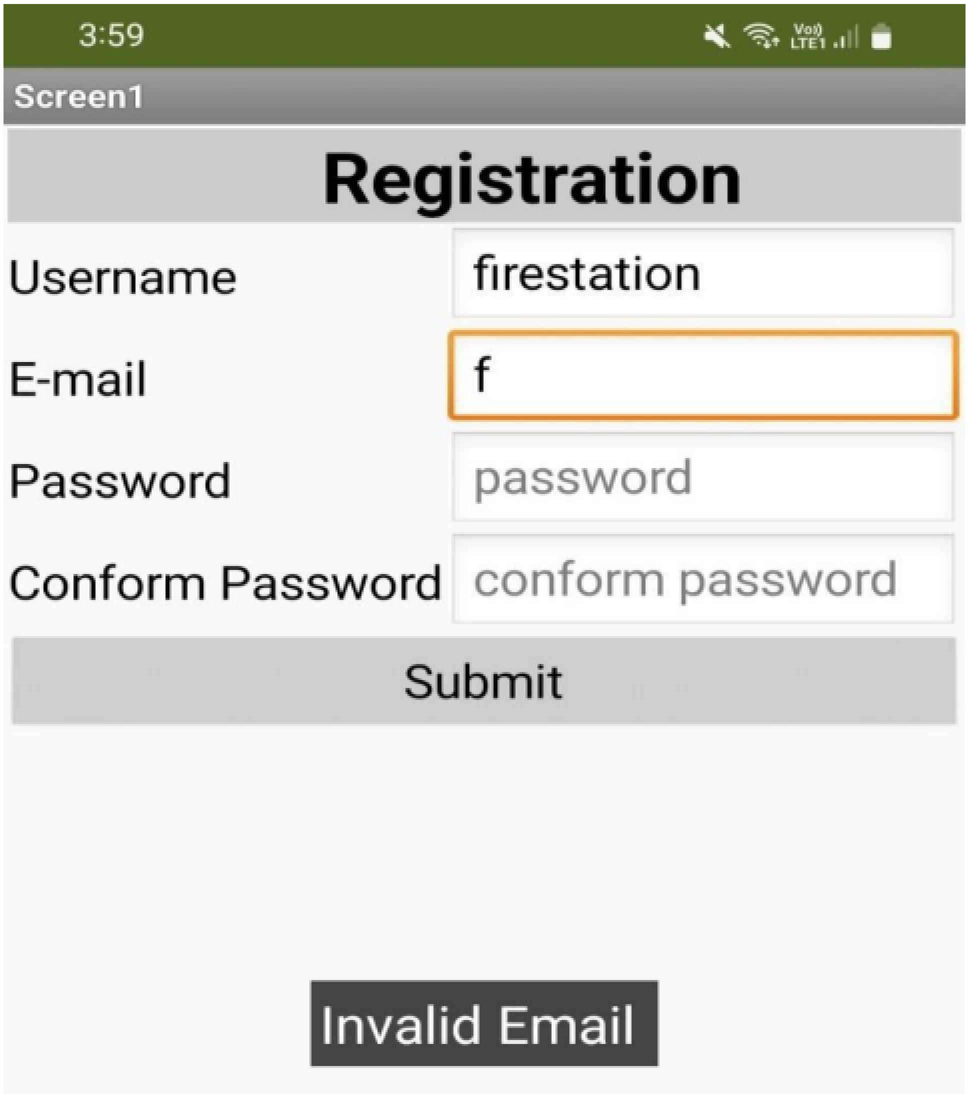


Block:



```
when Button1 .Click
do  if  usernametable . Text ≠ " "
    then  if  Label2mail . Text ≠ " "
          then  if  Label2password . Text ≠ " "
                then  if  Label2conformpassword . Text ≠ " "
                      then  if  contains text  TextBox1mail . Text
                                        piece  " @ "
                            then  if  PasswordTextBox1 . Text = PasswordTextBox2 . Text
                                  then  call Notifier1 .ShowAlert
                                                   notice  " Submission was successful "
                                        open another screen  screenName  " Screen2 "
                                  else  call Notifier1 .ShowAlert
                                                   notice  " Different Password "
                            else  call Notifier1 .ShowAlert
                                             notice  " Invalid Email "
                      else  call Notifier1 .ShowAlert
                                       notice  " Conform Password cannot be left blank "
                else  call Notifier1 .ShowAlert
                                 notice  " Password cannot be left blank "
          else  call Notifier1 .ShowAlert
                           notice  " Email cannot be left blank "
    else  call Notifier1 .ShowAlert
                     notice  " Username cannot be left blank "
```

Alert if entered email is wrong:



3:59

Screen1

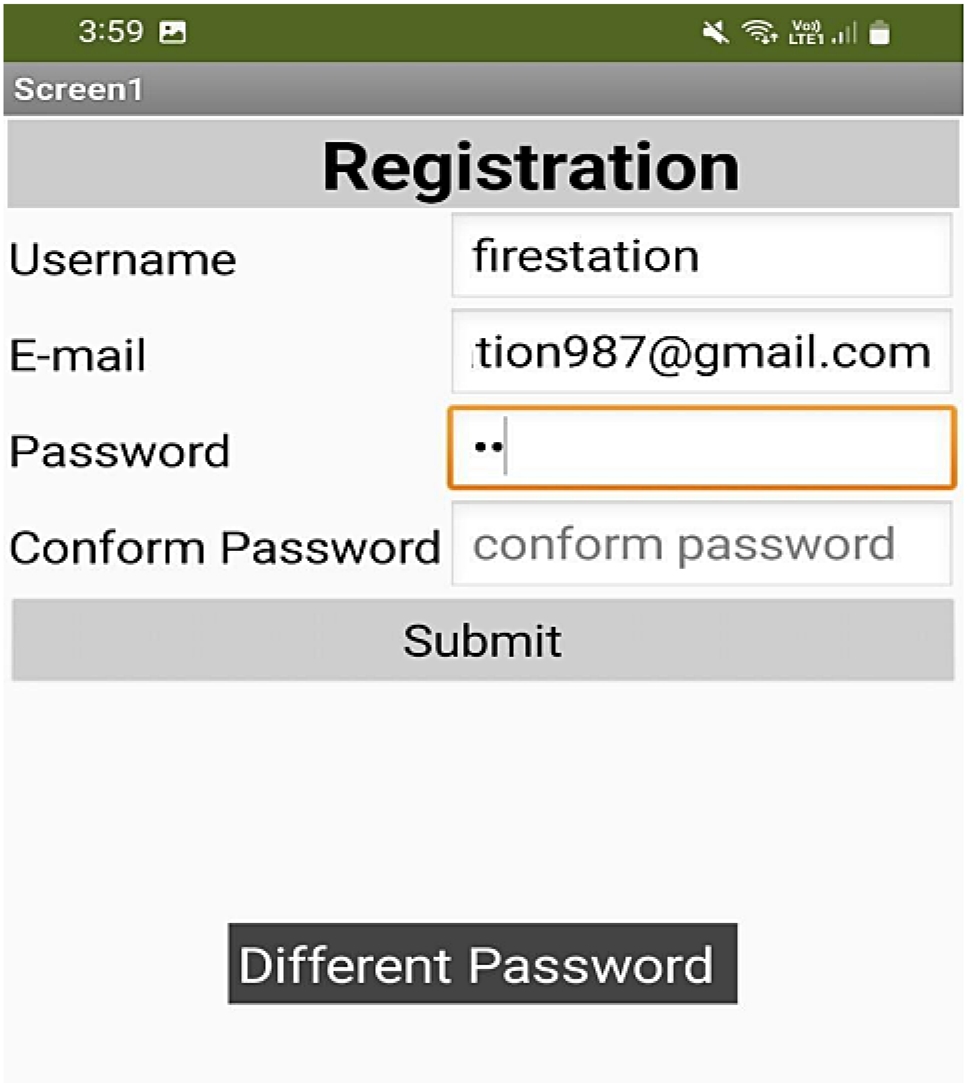
Registration

Username	firestation
E-mail	f
Password	password
Conform Password	conform password

Submit

Invalid Email

Alert if entered password is wrong:



3:59

Screen1

Registration

Username: firestation

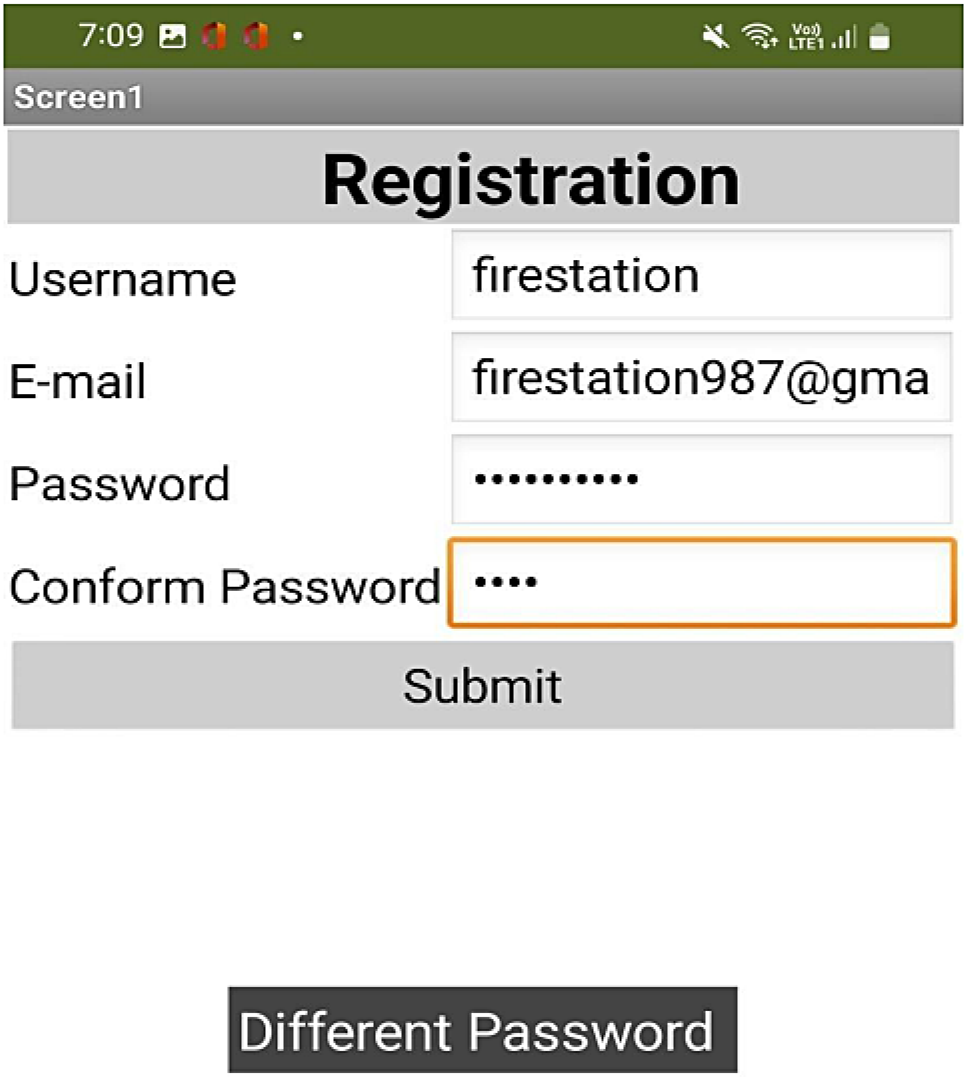
E-mail: tion987@gmail.com

Password: ••

Conform Password: conform password

Different Password

Alert if password entered in conform password is wrong:

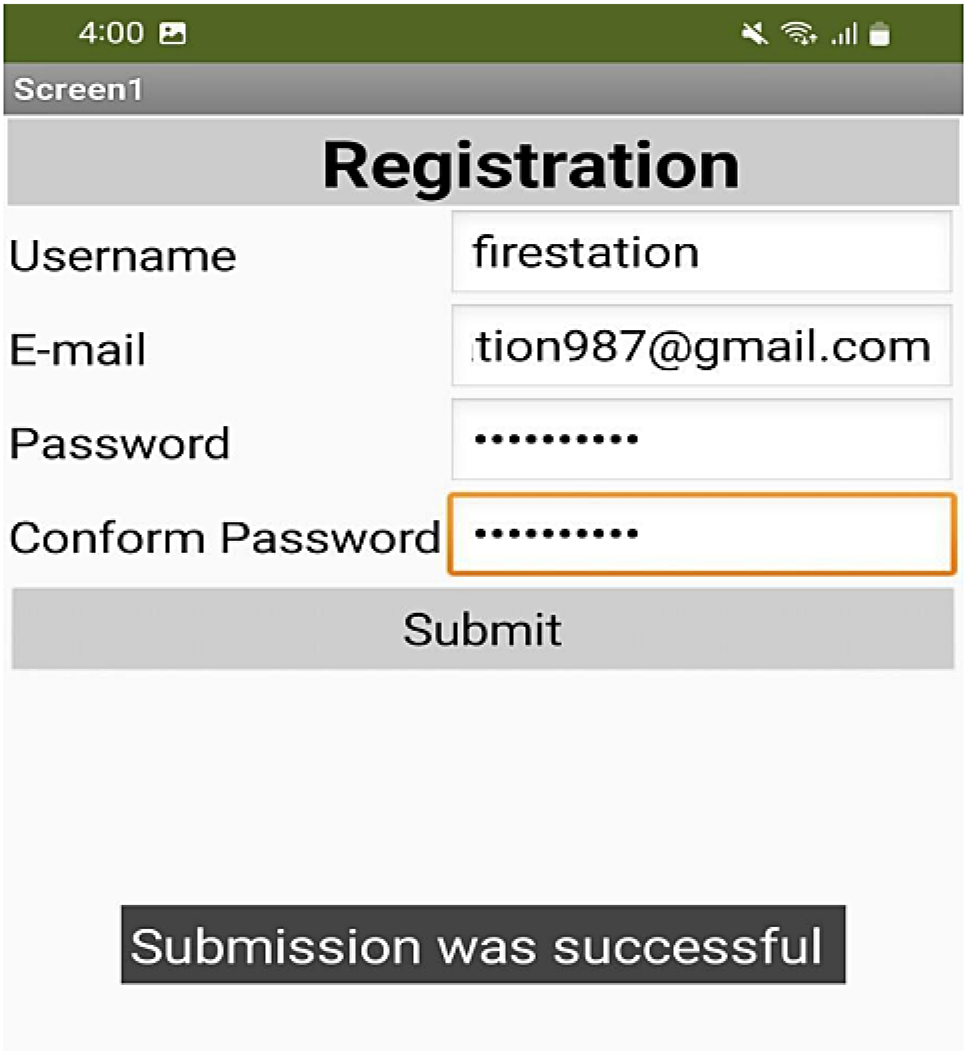


Registration

Username	firestation
E-mail	firestation987@gma
Password	••••••••••
Conform Password	••••

Different Password

Submit Registration:



Registration

Username: firestation

E-mail: tion987@gmail.com

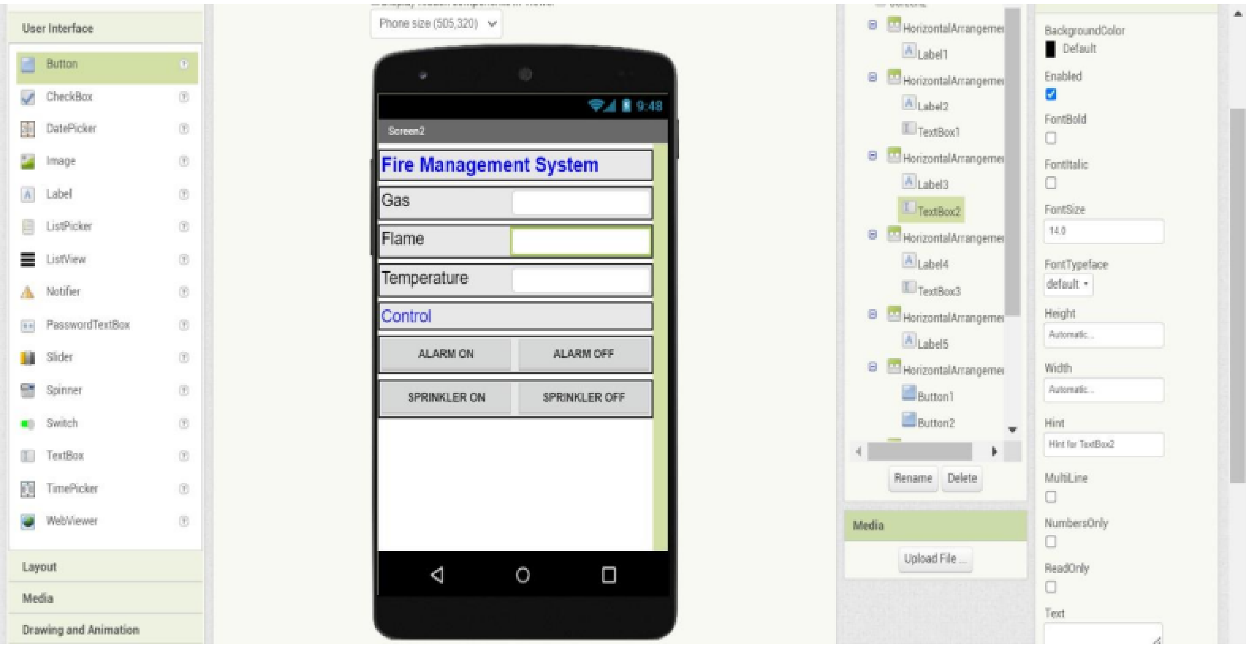
Password: •••••••••••

Conform Password: •••••••••••

Submission was successful

Display gas, flame and temperature sensor values:

Design:



BackgroundColor
■ Default

Enabled
☑

FontBold
□

FontItalic
□

FontSize
14.0

FontTypeface
default ▾

Height
Automatic...

Width
Automatic...

Hint
Hint for TextBox2

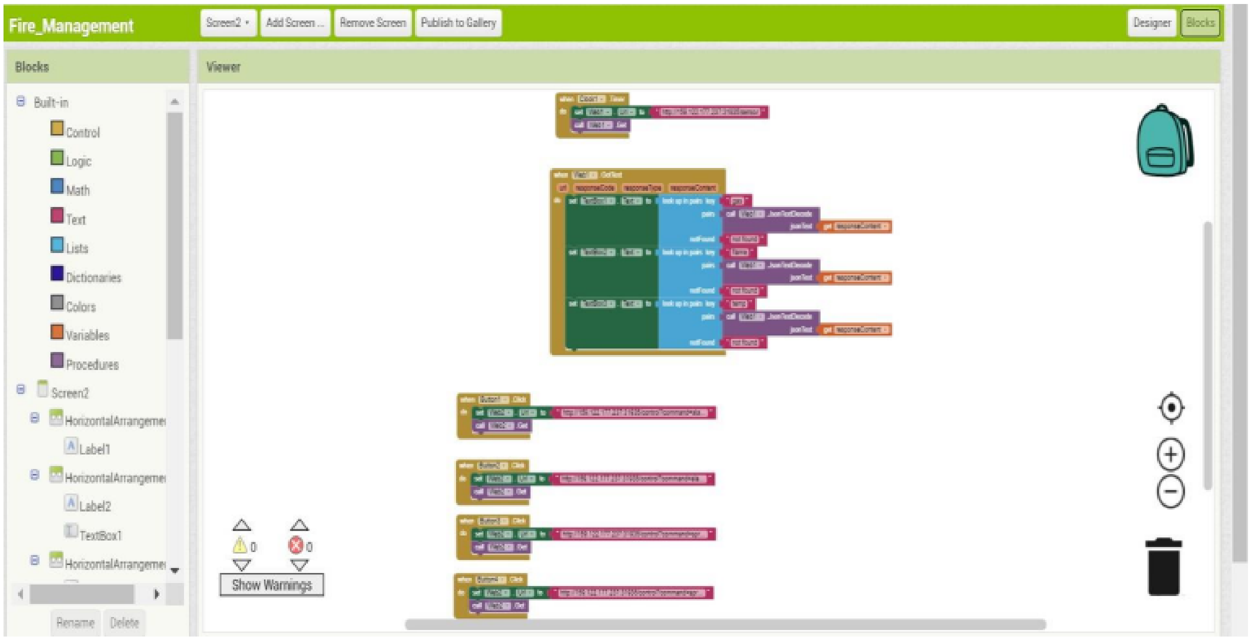
MultiLine
□

NumbersOnly
□

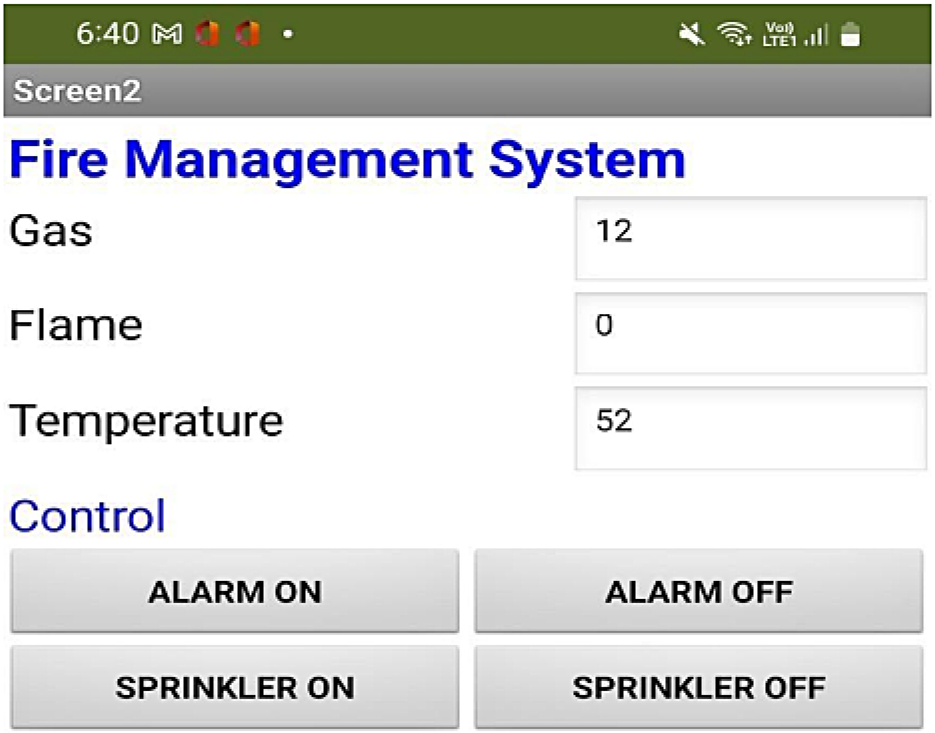
ReadOnly
□

Text

Block:



Turning the alarm ON whenever temperature, gas, flame exceeds a particular value, Turning the alarm OFF:



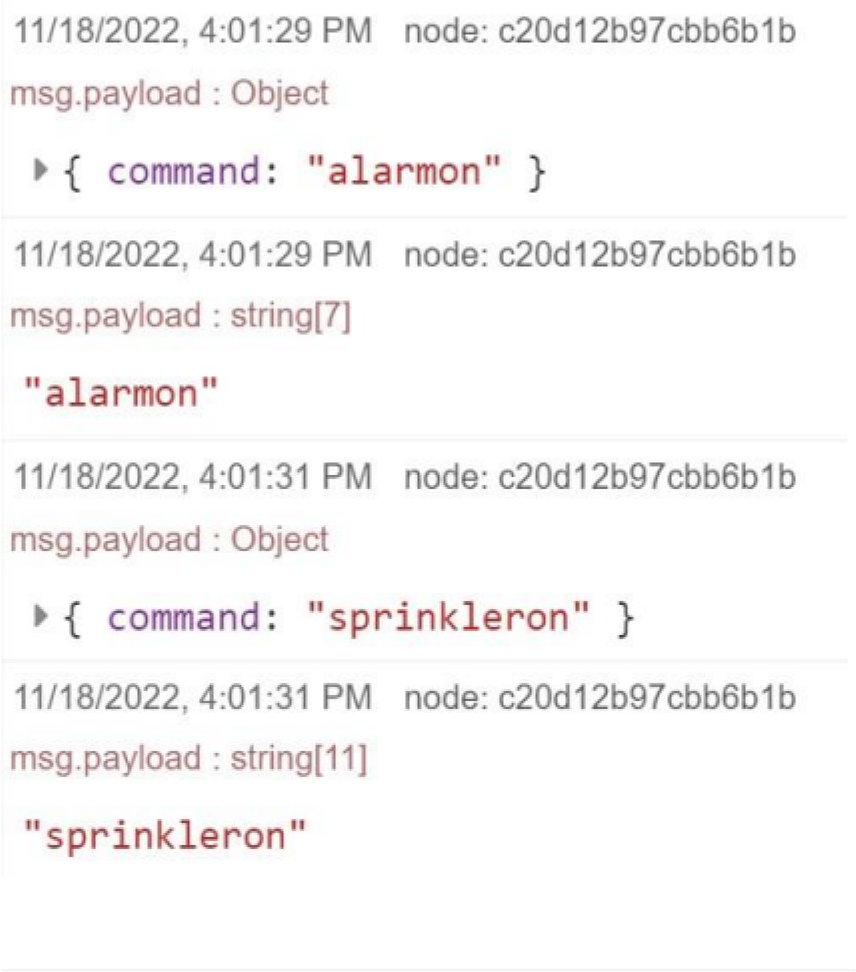
Fire Management System

Gas 12

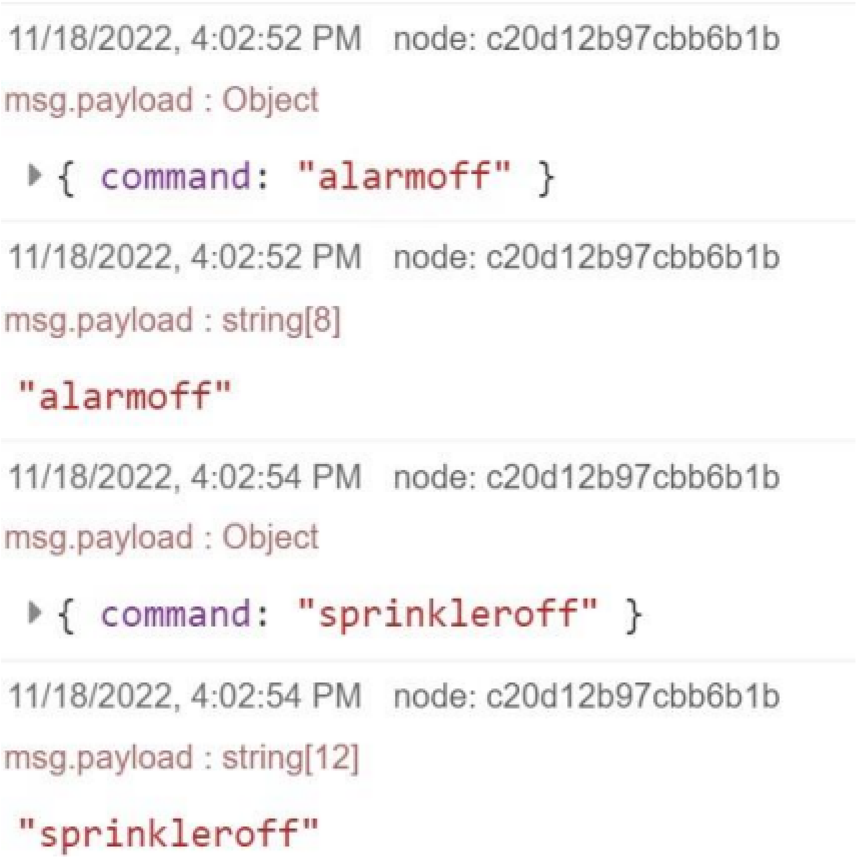
Flame 0

Temperature 52

Control

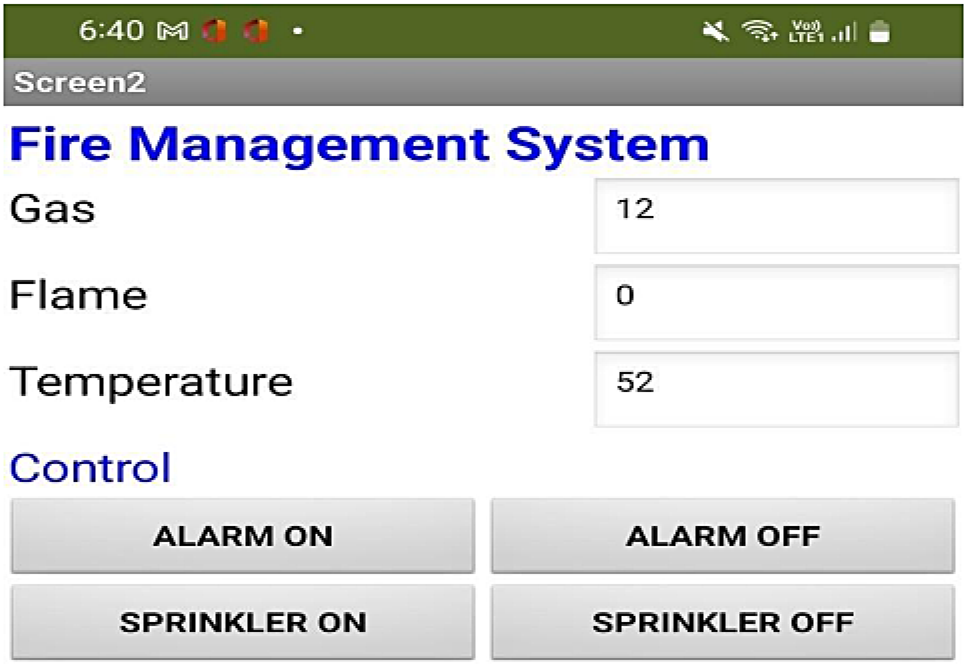


```
11/18/2022, 4:01:29 PM   node: c20d12b97cbb6b1b
msg.payload : Object

 ▸{ command: "alarmon" }

11/18/2022, 4:01:29 PM   node: c20d12b97cbb6b1b
msg.payload : string[7]

 "alarmon"

11/18/2022, 4:01:31 PM   node: c20d12b97cbb6b1b
msg.payload : Object

 ▸{ command: "sprinkleron" }

11/18/2022, 4:01:31 PM   node: c20d12b97cbb6b1b
msg.payload : string[11]

 "sprinkleron"
```



```
11/18/2022, 4:02:52 PM   node: c20d12b97cbb6b1b
msg.payload : Object
 ▸{ command: "alarmoff" }
11/18/2022, 4:02:52 PM   node: c20d12b97cbb6b1b
msg.payload : string[8]
 "alarmoff"
11/18/2022, 4:02:54 PM   node: c20d12b97cbb6b1b
msg.payload : Object
 ▸{ command: "sprinkleroff" }
11/18/2022, 4:02:54 PM   node: c20d12b97cbb6b1b
msg.payload : string[12]
 "sprinkleroff"
```

Turning the sprinkler ON whenever temperature, gas, flame exceeds a particular value, Turning the sprinkler OFF:

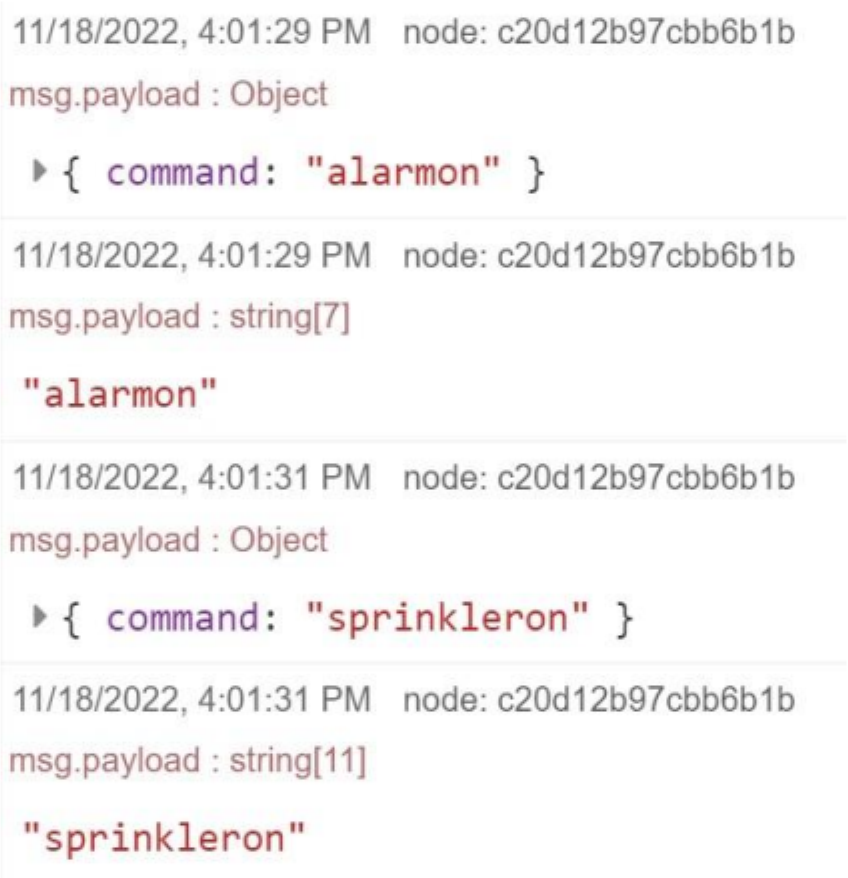


Fire Management System

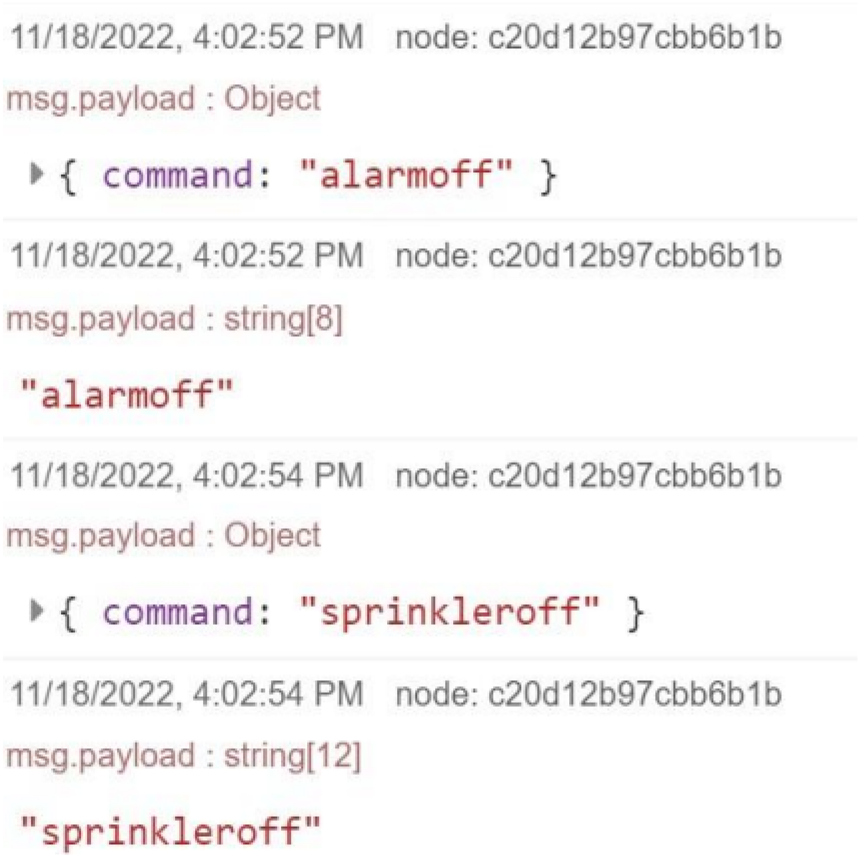
Gas 12

Flame 0

Temperature 52



```
11/18/2022, 4:01:29 PM   node: c20d12b97cbb6b1b
msg.payload : Object
 ▸{ command: "alarmon" }

11/18/2022, 4:01:29 PM   node: c20d12b97cbb6b1b
msg.payload : string[7]
 "alarmon"

11/18/2022, 4:01:31 PM   node: c20d12b97cbb6b1b
msg.payload : Object
 ▸{ command: "sprinkleron" }

11/18/2022, 4:01:31 PM   node: c20d12b97cbb6b1b
msg.payload : string[11]
 "sprinkleron"
```



```
11/18/2022, 4:02:52 PM   node: c20d12b97cbb6b1b
msg.payload : Object
 ▸{ command: "alarmoff" }
11/18/2022, 4:02:52 PM   node: c20d12b97cbb6b1b
msg.payload : string[8]
 "alarmoff"
11/18/2022, 4:02:54 PM   node: c20d12b97cbb6b1b
msg.payload : Object
 ▸{ command: "sprinkleroff" }
11/18/2022, 4:02:54 PM   node: c20d12b97cbb6b1b
msg.payload : string[12]
 "sprinkleroff"
```

7.ADVANTAGES AND DISADVANTAGES

Advantages

● Active monitoring for gas leakage and fire breakout
● Automatic alerting of admin as well as fire authorities using SMS
● Automatically turning on/off sprinkler as well as exhaust fan 25
● Authentication is required to turn on/off of sprinkler and exhaust fan as well as sending SMS alert manually
● It automatically detect false fire breakout reducing unnecessary panic
● by using flow sensors we can confirm that the sprinkler system is working as it intended
● All device status can be shown in a dashboard
● Users can see the dashboard using a web application

Disadvantages

- Always need to connect with the internet [Only to Send the SMS alert]
- If the physical device is damaged the entire operation is collapsed
- Need large database since many data is stored in cloud database every second

8.CONCLUSION

So in conclusion our problem premise is solved using Iot devices by creating a smart management system that solves many inherent problems in the traditional fire management system like actively monitoring for fire breakouts as well as gas leakage and sending SMS alerts to the admin as well as to the fire authorities .

9.FUTURE SCOPE

The existing devices can be modified to work in different specialized environment as well as scale to house use to big labs[Since fire accidents can cause major loss in human lives in homes to big industries] as well as it can be used in public places , vehicles.

DEMO LINK : https://youtu.be/SCsyXp8UAAo