

## Final Deliverable code

Team ID	PNT2022TMID45391
Project Name	Project-Industry-specific intelligent fire management system

### Submitted by:

Team Leader: ARUL B

Team member: AHAMED HABEEB ANSARI V U

Team member: ARUN KUMAR R

Team member: YUVARAJA E

### Code:

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
#include "DHT.h" // Library for dht11
#include <cstdlib>
#include <time.h>
#include <mjson.h>
#define DHTPIN 15 // what pin we're connected to
#define DHTTYPE DHT22 // define type of sensor DHT 11
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 "4sm1u8"
#define DEVICE_TYPE "arul0906"
#define DEVICE_ID "traingingid"
#define TOKEN "AQ6gu0dvFLO+If!FKW"
String data3 = "";
String accidentstatus = "";
String sprinkstatus = "";
float temp =0;
bool isfanon = false;
bool issprinkon = false;
bool cansprinkoperate = true;
bool canfanoperate = true;
29
bool cansentalert = false;
int gas = 0;
int flame = 0;
int flow = 0;
long int cooldown= 600;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/data/fmt/json";
char subscribetopic[] = "iot-2/cmd/command/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_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();
```

```
//if real gas sensor is used make sure the senor is heated up for acurate readings
```

```
/*
```

- Here random values for readings and stdout were used to show the working of the devices as physical or simulated devices are not available.

```
30
```

```
*/ delay(10);
```

```
Serial.println();
```

```
wificonnect();
```

```
mqttconnect();
```

```
}
```

```
void loop()
```

```
{
```

```
temp = dht.readTemperature();
```

```
//setting a random seed (only for random values not in real life scenarios)
```

```
srand(time(0));
```

```
//initial variable activities like declaring , assigning gas = rand()%400;
```

```
int flamereading = rand()%1024;
```

```
flame = map(flamereading,0,1024,0,1024);
```

```
int flow = ((rand()%100)>50?1:0); //find the accident status 'cause fake alert may be caused by some mischief
```

```
activities
```

```
if(temp < 45 ){ if(flame > 650 ){
```

```
accidentstatus = "Need Auditing";
```

```
if(canfanoperate)
```

```
isfanon = true; else
```

```
isfanon = false;
```

```
issprinkon = false;
```

```
}
```

```
else if(flame <= 10){
```

```
31
```

```
accidentstatus = "nothing happened";
```

```
isfanon = false;
```

```
issprinkon = false;
```

```
}
```

```
}else if(temp >= 45 && temp <= 55 )
```

```
{
```

```
if(flame <=650 && flame >100 )
```

```
{
```

```
if(cansprinkoperate)
```

```
issprinkon = true; else
```

```
issprinkon = false;
```

```
accidentstatus = "moderate";
```

```
if(gas > 160 && canfanoperate )
```

```
{
```

```
isfanon = true;
```

```
}
```

```
else{
```

```
isfanon = false;
```

```
}
```

```
}
```

```
else if(flame <= 100 && flame > 10)
```

```
{
```

```
if(cansprinkoperate)
```

32

```
issprinkon = true; else
issprinkon = false;
isfanon = false;
accidentstatus = "moderate";
}
}
else if(temp > 55)
{
if(flame > 650)
{
gas = 500 + rand()%500;
accidentstatus = "severe";
if(cansprinkoperate)
issprinkon = true; else
issprinkon = false;
if(canfanoperate)
isfanon = true; else
isfanon = false;
}
else if(flame < 650 && flame > 400 )
{
gas = 300 + rand()%500;
accidentstatus = "severe";
if(cansprinkoperate)
issprinkon = true; else
issprinkon = false;
if(canfanoperate)
isfanon = true;
else
isfanon = false;
```

33

```
}
}
else {
accidentstatus = "Need moderate Auditing";
isfanon = false;
issprinkon = false;
}
if(issprinkon){ if(flow)
{
sprinkstatus = "working";
}
else{
sprinkstatus = "not working";
}
}
else if(!issprinkon)
{
sprinkstatus = "ready";
}
else {
sprinkstatus = "something's wrong";
```

34

```
}
PublishData(temp,gas,flame,flow,isfanon,issprinkon);
```

//a cooldown period is set as the values and situations are random in real life sceanarios the time

```

can be
reduced or neglected
if(accidentstatus=="severe" && cooldown >= 600)
{
cooldown = 0;
sendalert();
PublishData(temp,gas,flame,flow,isfanon,issprinkon);
cansentalert = false;
}
if(cooldown > 999999)
{
cooldown = 601;
}
delay(1000);
++cooldown;
if (!client.loop())
{
mqttconnect();
}
}
35
/*.....retrieving to
Cloud. */
void PublishData(float temp, int gas ,int flame ,int flow,bool isfanon,bool issprinkon) {
mqttconnect(); //function call for connecting to ibm
/*
creating the String in in form JSon to update the data to ibm cloud
*/
String payload = "{\"temp\":";
payload += temp;
payload += "," "\"gas\":";
payload += gas;
payload += "," "\"flame\":";
payload += flame;
payload += "," "\"flow\":";
payload += ((flow)?"true":"false");
payload += "," "\"isfanon\":";
payload += ((isfanon)?"true":"false");
payload += "," "\"issprinkon\":";
payload += ((issprinkon)?"true":"false");
payload += "," "\"cansentalert\":";
payload += ((cansentalert)?"true":"false");
payload += "," "\"accidentstatus\":";
payload += "\"" + accidentstatus + "\"";
payload += "," "\"sprinkstatus\":";
payload += "\"" + sprinkstatus + "\"";
payload += "}";
if (client.publish(publishTopic, (char*) payload.c_str())) {
36
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
{
37
Serial.println();
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED)
{
delay(100);
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");
}
}

//handles commands from user side
38
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++)
{
data3 += (char)payload[i];
}
Serial.println("data: " + data3);
const char *s =(char*) data3.c_str();
double pincode = 0;
if(mjson_get_number(s, strlen(s), "$.pin", &pincode))
{
if(((int)pincode)==137153)
{
const char *buf; int len;
if (mjson_find(s, strlen(s), "$.command", &buf, &len)) // And print it

```

```

{
String command(buf,len);
if(command=="cantfan"){
//this works when there is gas sensor reads high value and if there should be a
//manual trigger else it will be automate canfanoperate = !canfanoperate;
}
else if(command=="cantsprink")
{
cansprinkoperate = !cansprinkoperate;
}else if(command=="sentalert"){
39
//this works when there is accident status is severe and if there should be a
//manual trigger else it will be automate resetcooldown();
}
}
}
}
data3="";
}
void resetcooldown()
{
cooldown = 0;
}
//sent alert request to node-red void sendalert(){
cansentalert = true; cooldown = 0;
}

```