



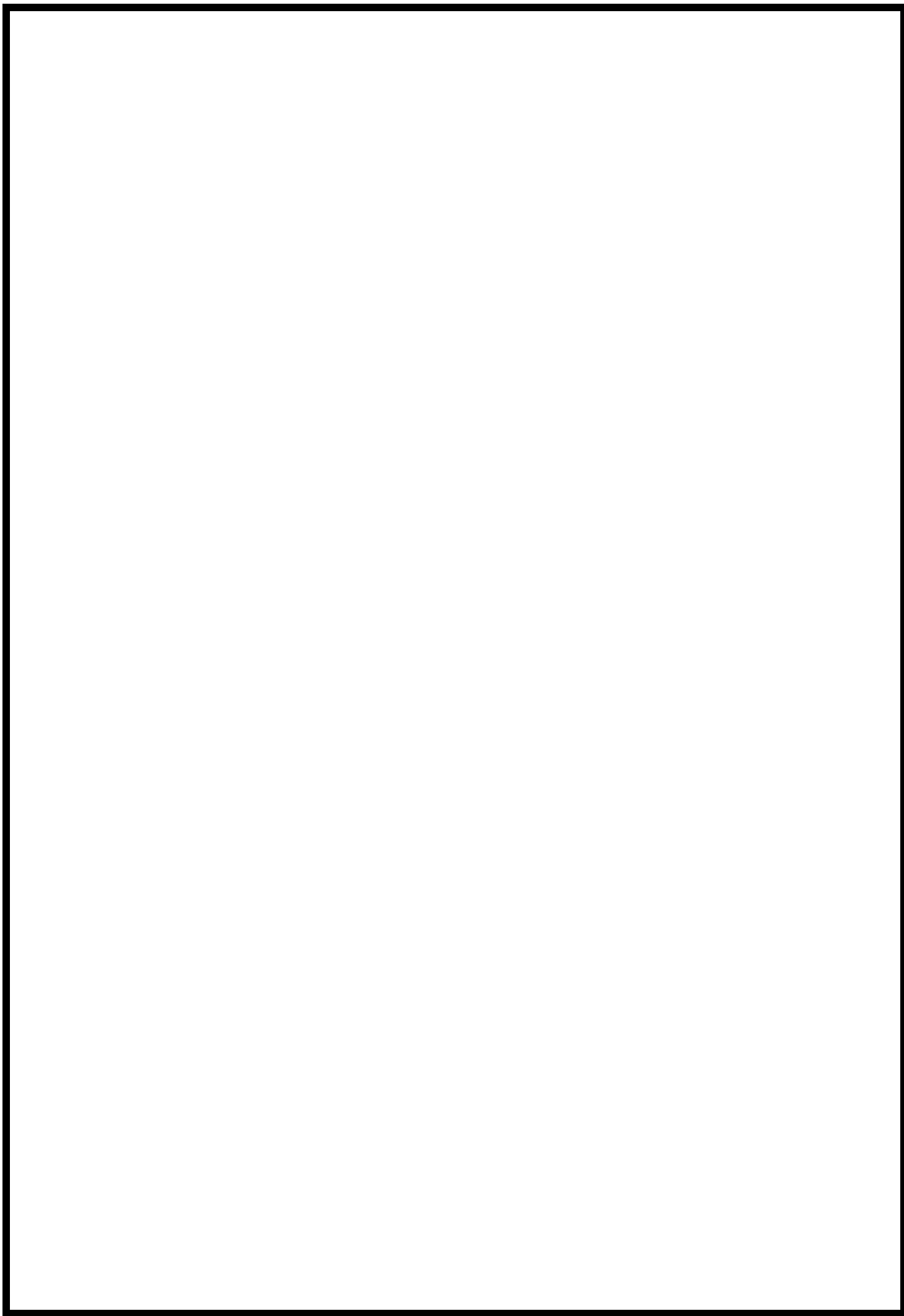
**HAZARDOUS AREA MONITORING FOR  
INDUSTRIAL PLANTS POWERED BY IOT**

**SUBMITTED BY**

**DVS THEJESWARI**

**BACHELOR OF ENGINEERING IN ELECTRONICS  
AND COMMUNICATION ENGINEERING**

**ASSIGNMENT-04**



### Question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send “alert” to ibm cloud and display in device recent events.

Upload document with wokwi share link and images of ibm cloud.

### Solution:

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
#define ECHO_GPIO 12
#define TRIGGER_GPIO 13
#define MAX_DISTANCE_CM 100 // Maximum of 5 meters
#include "Ultrasonic.h"

Ultrasonic ultrasonic(13, 12); int
distance;

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

//-----credentials of IBM Accounts-----
#define ORG "dv1snq" //IBM ORGANITION ID
#define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "45682367915" //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/command/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);
    delay(10); Serial.println();
    wificonnect();
    mqttconnect();
}
void loop()// Recursive
Function
{
distance = ultrasonic.read(CM);
    if(distance < 100){
        Serial.print("Distance in CM: ");
        Serial.println(distance);
        PublishData(distance);
        delay(1000); if
        (!client.loop()) {
            mqttconnect();
        }
    }
    delay(1000);

}

/*.....retrieving to Cloud.
..... */
void PublishData(float temp) {
mqttconnect();//function call for connecting to ibm
    /* creating the String in in form JSON to update the data to ibm
    cloud
    */
    String payload = "{\"Alert Distance\":\"";

```



```

payload += temp; 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);
  } else
  {
Serial.println(data3);
  } data3="";
}

```

**Wokwi link:**

**<https://wokwi.com/projects/346659959540286034>**

WOKWI

SAVE SHARE

Docs

sketch.ino

diagram.json

libraries.txt

Ultrasonic.h

Ultrasonic.cpp

Library Manager

callback

Aa

7 of 4

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Simulation

WOKWI

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Simulation

00:42.062 103%

Editing Ultrasonic Distance Sensor

Distance: 59cm

Publish ok

Distance in CM: 62

Sending payload: {"Alert Distance":62.00}

Publish ok

Distance in CM: 62

Sending payload: {"Alert Distance":62.00}

Publish ok

IBM Watson IoT Platform

201904510@smartinternuz.com ID: dv1snq

Browse

Action

Device Types

Interfaces

Add Device

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

Event	Value	Format	Last Received
Data	{"Alert Distance":62}	json	a few seconds ago
Data	{"Alert Distance":62}	json	a few seconds ago
Data	{"Alert Distance":62}	json	a few seconds ago
Data	{"Alert Distance":62}	json	a few seconds ago
Data	{"Alert Distance":62}	json	a few seconds ago

Items per page 50

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1 of 1 page

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Aa

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of 4

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32
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Simulation

00:39:161 100%

Editing Ultrasonic Distance Sensor

Distance:  124cm

Publish ok

Distance in CM: 56

Sending payload: {"Alert Distance":56.00}

Publish ok

Distance in CM: 56

Sending payload: {"Alert Distance":56.00}

Publish ok