

HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANTS POWERED BY IOT

SUBMITTED BY

SATHEESH KUMAR S

CITC1904045

**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/346737091615392340>

WOKWI
SAVE
SHARE
Docs

sketch.ino
diagram.json
libraries.txt
Ultrasonic.h
Ultrasonic.cpp
Library Manager
Simulation

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9 Ultrasonic ultrasonic(13, 12);
10 int distance;
11
12 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
13
14 //-----credentials of IBM Accounts-----
15
16 #define ORG "dvisnq" //IBM ORGANIZATION ID
17 #define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
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20 String data3;
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29 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
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31
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32

```

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

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 | 1-1 of 1 item

1 of 1 page

WOKWI SAVE SHARE Docs

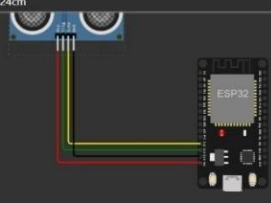
sketch.ino diagram.json libraries.txt Ultrasonic.h Ultrasonic.cpp Library Manager

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26 char publishTopic[] = "iot-2/evt/data/fmt/json"; // Topic name and type of event perform
27 char subscribTopic[] = "iot-2/cmd/command/fmt/string"; // cmd REPRESENT command type ALL
28 char authMethod[] = "use-token-auth"; // authentication method
29 char token[] = TOKEN;
30 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
31
32
```

Simulation

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