

Assignment - 4

Distance Detection Using Ultra Sonic Sensor

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Question 1:

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

CODE:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQTT

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

//-----credentials of IBM Accounts-----

#define ORG "f59trs"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicsensor"//Device type mentioned in ibm watson
IOT Platform
#define DEVICE_ID "distancedetection"//Device ID mentioned in ibm watson IOT
Platform
#define TOKEN "AlGMGaaF01nawa1QA3" //Token
String data3; float dist;

//----- 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/test/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

  int LED = 4;
  int trig = 5;
  int echo = 18;
  void setup()
  {
    Serial.begin(115200);
    pinMode(trig,OUTPUT);
    pinMode(echo,INPUT);
    pinMode(LED, OUTPUT);
    delay(10);
    wificonnect();
    mqttconnect();
  } void loop()// Recursive
Function
  {    digitalWrite(trig,LOW);
    digitalWrite(trig,HIGH);
    delayMicroseconds(10);
    digitalWrite(trig,LOW);    float
dur = pulseIn(echo,HIGH);    float
dist = (dur * 0.0343)/2;

    Serial.print ("Distancein cm");
    Serial.println(dist);

    PublishData(dist);
  delay(1000);    if
(!client.loop()) {
  mqttconnect();
    }
  }

/*.....retrieving to
Cloud.....*/
  void PublishData(float dist) {
  mqttconnect();//function call for connecting to ibm
    /*    creating the String in in form JSON to update the data to ibm
cloud    */
    String object;
    if (dist <100)

```

```

{
    digitalWrite(LED,HIGH);
    Serial.println("object is near");
object = "Near";
}
else
{
    digitalWrite(LED,LOW);
    Serial.println("no object found");
object = "No";
}

String payload = "{\"distance\": ";
payload += dist;    payload += ", "
"\"object\": \"";    payload += object;
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=="Near")
//    {
//        Serial.println(data3);
//        digitalWrite(LED,HIGH);

//    }

//    else
//    {
//        Serial.println(data3);
//        digitalWrite(LED,LOW);

```

```
//    }
data3="";

}
```

OUTPUT:

When the object is not near to ultrasonic sensor

WOKWI SAVE SHARE Docs

sketch.ino • diagram.json • libraries.txt • Library Manager

```

1  #include <WiFi.h> //library for wifi
2  #include <PubSubClient.h> //library for MQTT
3
4
5  void callback(char* subscribetopic, byte* payload, unsigned int payloadlength);
6
7  //-----credentials of IBM Accounts-----
8
9  #define ORG "occozu" //IBM ORGANITION ID
10 #define DEVICE_TYPE "ultrasonicsensor" //Device type mentioned in ibm watson IOT Platform
11 #define DEVICE_ID "distancedetection" //Device ID mentioned in ibm watson IOT Platform
12 #define TOKEN "TXGe6EJ00bmt&K4n1B" //Token
13 String data3;
14 float dist;
15
16
17 //----- Customise the above values -----
18 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
19 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform
20 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND
21 char authMethod[] = "use-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
24
25
26 //-----
27 WiFiClient wificlient; // creating the instance for wificlient
28 PubSubClient client(server, 1883, callback, wificlient); //calling the predefined client
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);

```

Simulation

01:18.211 99%

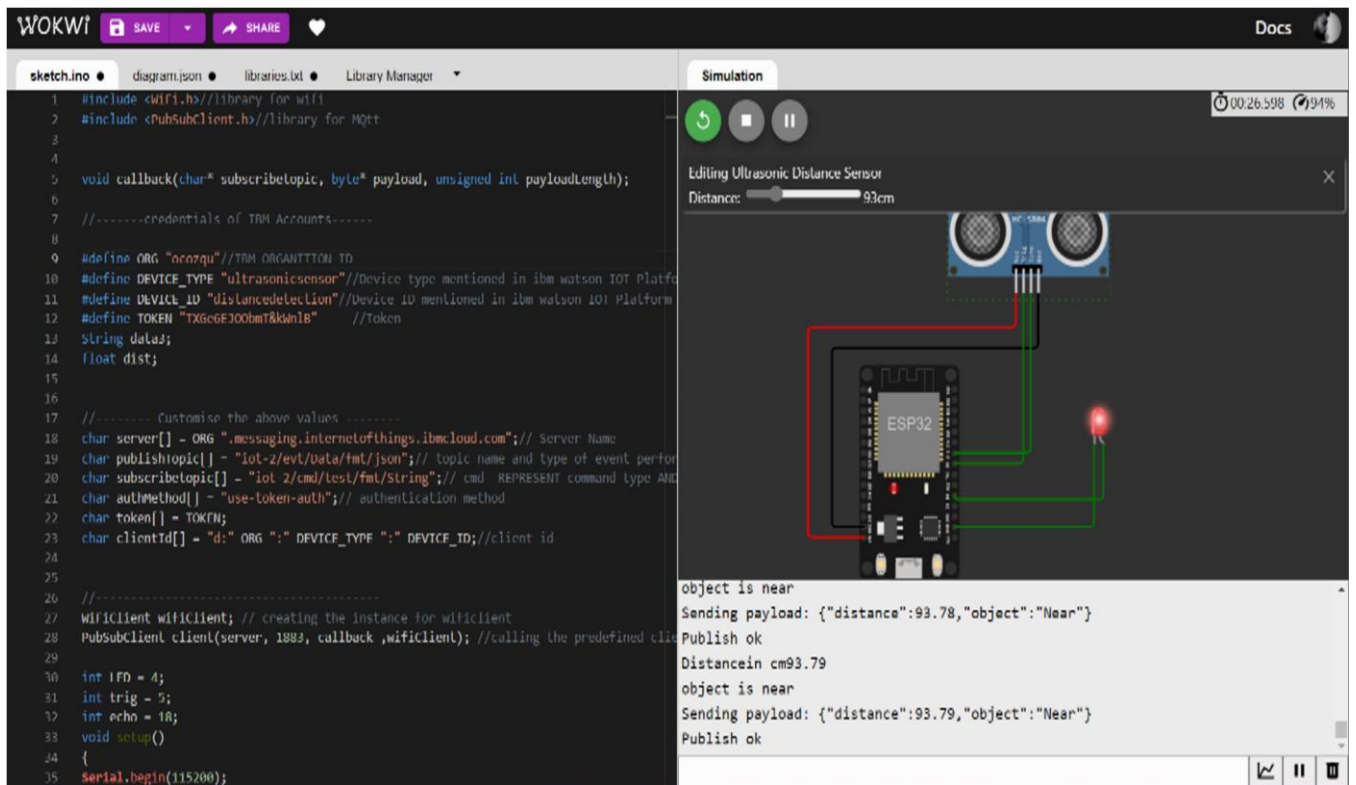
no object found
Sending payload: {"distance":236.00,"object":"No"}
Publish ok
Distancein cm236.02
no object found
Sending payload: {"distance":236.02,"object":"No"}
Publish ok

Data sent to the IBM Cloud device when the object is far

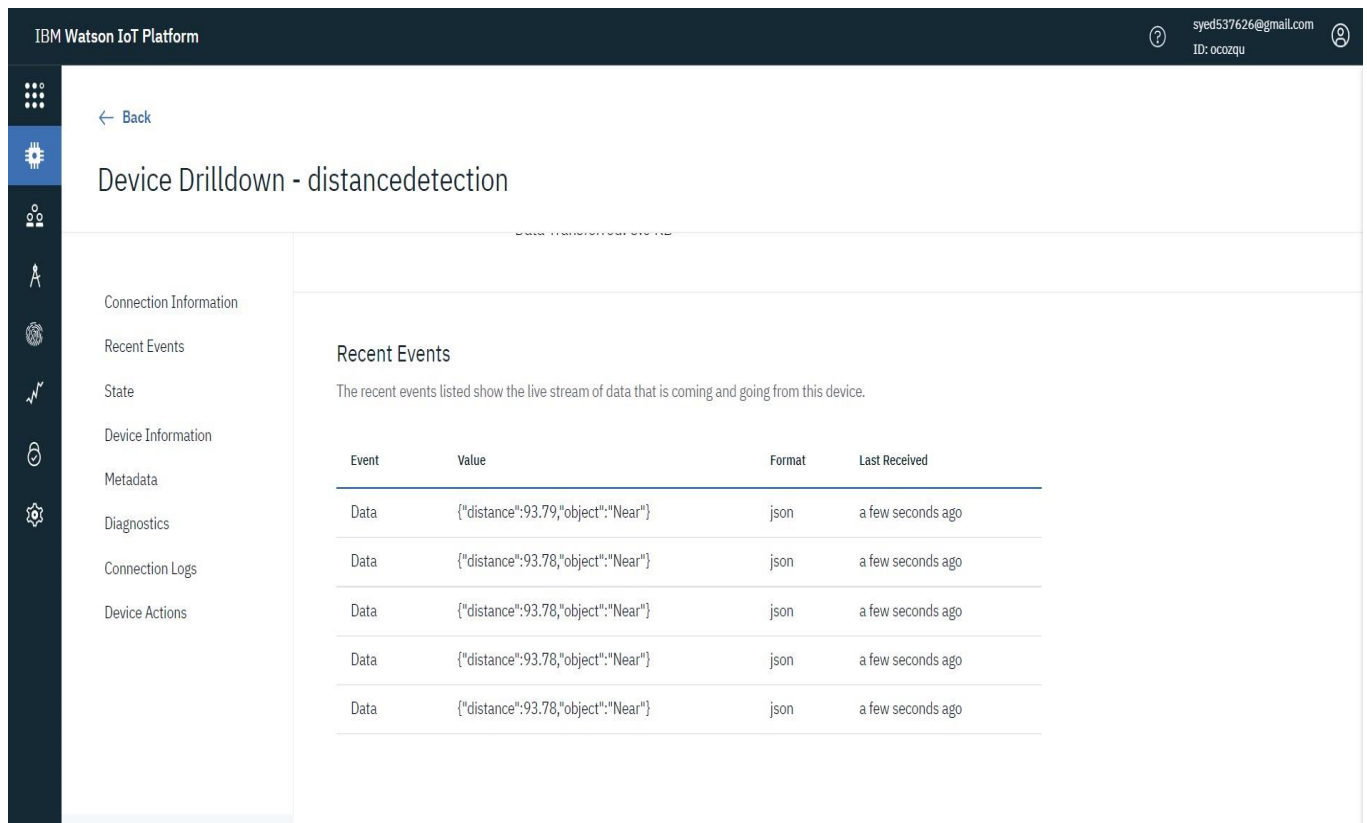
The screenshot displays the IBM Watson IoT Platform interface. The top header shows the platform name, a user profile with email 'syed537626@gmail.com' and ID 'occozqu', and a help icon. A left sidebar contains navigation icons for various functions. The main content area is titled 'Device Drilldown - distancedetection' and includes a 'Back' link. A left-hand menu lists options: Connection Information, Recent Events, State, Device Information, Metadata, Diagnostics, Connection Logs, and Device Actions. The 'Recent Events' section is active, showing a table of live data streams. The table has four columns: Event, Value, Format, and Last Received. It lists five data events, each with a distance value and a 'No' object status, all received 'a few seconds ago' in 'json' format.

Event	Value	Format	Last Received
Data	{"distance":236,"object":"No"}	json	a few seconds ago
Data	{"distance":236.02,"object":"No"}	json	a few seconds ago
Data	{"distance":236,"object":"No"}	json	a few seconds ago
Data	{"distance":236,"object":"No"}	json	a few seconds ago
Data	{"distance":236.55,"object":"No"}	json	a few seconds ago

When the object is nearer to the ultrasonic sensor



Data sent to the IBM Cloud device when the device is near



<https://wokwi.com/projects/346228322074624596>