

## ASSIGNMENT-4

### DISTANCE DETECTION USING ULTRASONIC SENSOR

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**PROJECT TITLE: Gas leakage monitoring and alerting system.**

#### Question1 :

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:

```
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 "4hn0jp"//IBM ORGANITION ID
10 #define DEVICE_TYPE "ULTRASON"//Device type mentioned in ibm watson IOT Platform
11 #define DEVICE_ID "DISTANCEDETECT"//Device ID mentioned in ibm watson IOT Platform
12 #define TOKEN "wuo5s7PR)ZSegV&Rx"//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 and format in which data to be send
20 char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING
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 id by passing parameter like server id,portand wificredential
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
```

```
36  pinMode(trig,OUTPUT);
37  pinMode(echo,INPUT);
38  pinMode(LED, OUTPUT);
39  delay(10);
40  wifiConnect();
41  mqttconnect();
42  }
43  void loop()// Recursive Function
44  {
45
46      digitalWrite(trig,LOW);
47      digitalWrite(trig,HIGH);
48      delayMicroseconds(10);
49      digitalWrite(trig,LOW);
50      float dur = pulseIn(echo,HIGH);
51      float dist = (dur * 0.0343)/2;
52      Serial.print ("Distancein cm");
53      Serial.println(dist);
54
55
56      PublishData(dist);
57      delay(1000);
58      if (!client.loop()) {
59          mqttconnect();
60      }
61  }
62
63
64
65  /*.....retrieving to Cloud.....*/
66
67  void PublishData(float dist) {
68      mqttconnect();//function call for connecting to ibm
69      /*
70      | | creating the String in in form JSON to update the data to ibm cloud
```

```

70     creating the String in in form JSON to update the data to ibm cloud
71     */
72     String object;
73     if (dist <100)
74     {
75         digitalWrite(LED,HIGH);
76         Serial.println("object is near");
77         object = "Near";
78     }
79     else
80     {
81         digitalWrite(LED,LOW);
82         Serial.println("no object found");
83         object = "No";
84     }
85
86     String payload = "{\"distance\":";
87     payload += dist;
88     payload += "," " \"object\":";
89     payload += object;
90     payload += "\"}";
91
92
93     Serial.print("Sending payload: ");
94     Serial.println(payload);
95
96
97
98

```

```

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98
99     if (client.publish(publishTopic, (char*) payload.c_str())) {
100         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
101     } else {
102         Serial.println("Publish failed");
103     }
104
105 }
106 void mqttconnect() {
107     if (!client.connected()) {
108         Serial.print("Reconnecting client to ");
109         Serial.println(server);
110         while (!client.connect(clientId, authMethod, token)) {
111             Serial.print(".");
112             delay(500);
113         }
114
115         initManagedDevice();
116         Serial.println();
117     }
118 }
119 void wificonnect() //function defination for wificonnect
120 {
121     Serial.println();
122     Serial.print("Connecting to ");
123
124     WiFi.begin("Mokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
125     while (WiFi.status() != WL_CONNECTED) {
126         delay(500);
127         Serial.print(".");
128     }
129     Serial.println("");
130     Serial.println("WiFi connected");
131     Serial.println("IP address: ");
132     Serial.println(WiFi.localIP());

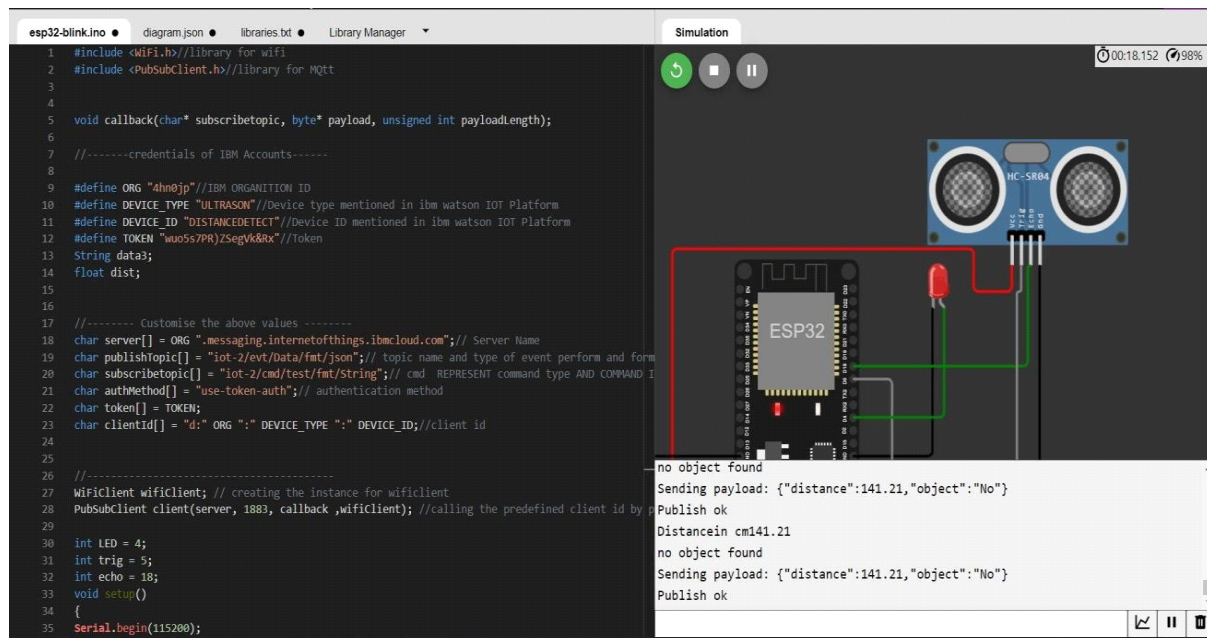
```

```
123
124   WiFi.begin("Wokwi-GUEST", "", 6); // passing the wifi credentials to establish the connection
125   while (WiFi.status() != WL_CONNECTED) {
126       delay(500);
127       Serial.print(".");
128   }
129   Serial.println("");
130   Serial.println("WiFi connected");
131   Serial.println("IP address: ");
132   Serial.println(WiFi.localIP());
133 }
134
135 void initManagedDevice() {
136     if (client.subscribe(subscribetopic)) {
137         Serial.println(subscribetopic);
138         Serial.println("subscribe to cmd OK");
139     } else {
140         Serial.println("subscribe to cmd FAILED");
141     }
142 }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145 {
146
147     Serial.print("callback invoked for topic: ");
148     Serial.println(subscribetopic);
149     for (int i = 0; i < payloadLength; i++) {
150         // Serial.print((char)payload[i]);
151         data3 += (char)payload[i];
152     }
153
154     // Serial.println("data: " + data3);
155     // if(data3=="Near")
156     // {
157     //     Serial.println(data3);
158     // }
159     // Serial.println("data: " + data3);
160 }
```

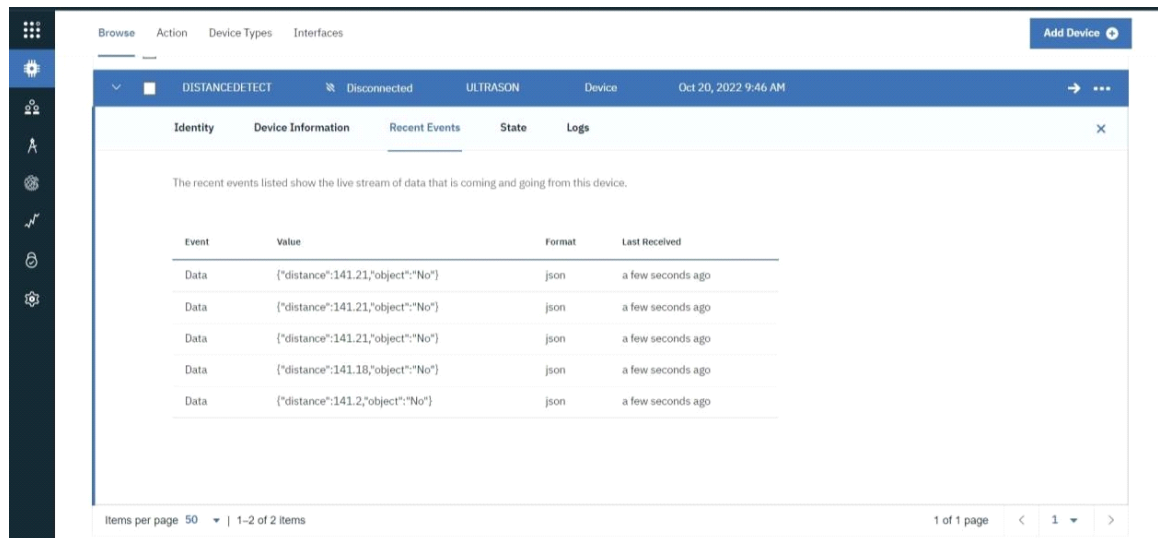
```
esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▼
142 }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145 {
146
147     Serial.print("callback invoked for topic: ");
148     Serial.println(subscribetopic);
149     for (int i = 0; i < payloadLength; i++) {
150         //Serial.print((char)payload[i]);
151         data3 += (char)payload[i];
152     }
153
154     // Serial.println("data: "+ data3);
155     // if(data3=="Near")
156     // {
157     // Serial.println(data3);
158     // digitalWrite(LED,HIGH);
159
160     // }
161
162     // else
163     // {
164     // Serial.println(data3);
165     // digitalWrite(LED,LOW);
166
167     // }
168     data3="";
169
170
171 }
```

**OUTPUT:**



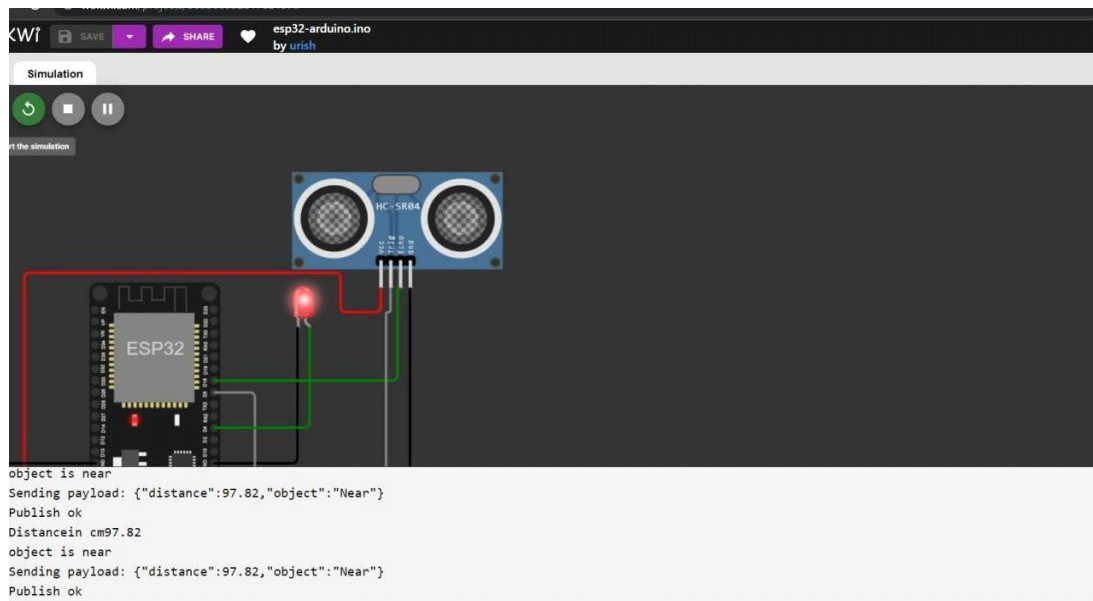


**Data send to the IBM cloud device when the object is far**



when object is near to the ultrasonic sensor

**when object is near to the ultrasonic sensor**



## Data sent to the IBM Cloud Device when the object is near

| Identity   | Device Information                 | Recent Events | State             | Logs |
|--|------------------------------------|---------------|-------------------|------|
| The recent events listed show the live stream of data that is coming and going from this device. |                                    |               |                   |      |
| Event  | Value                              | Format        | Last Received     |      |
| Data   | {"distance":79.66,"object":"Near"} | json          | a few seconds ago |      |
| Data   | {"distance":79.64,"object":"Near"} | json          | a few seconds ago |      |
| Data   | {"distance":79.66,"object":"Near"} | json          | a few seconds ago |      |
| Data   | {"distance":79.64,"object":"Near"} | json          | a few seconds ago |      |
| Data   | {"distance":79.66,"object":"Near"} | json          | a few seconds ago |      |