
ASSIGNMENT-4
DISTANCE DETECTION USING ULTRASONIC SENSOR

Project Name: IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING
AND NOTIFICATION

Batch Number: B5-51ME



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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.

WOKWI LINK :

<https://wokwi.com/projects/305566932847821378>

CODE :

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4
5 void callback(char* subscribtopic, byte* payload, unsigned int payloadlength);
6
7 //-----credentials of IBM Accounts-----
8
9 #define ORG "4hn0jp" //IBM ORGANIZATION 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)Z5egV&Rx" //token
13 String data;
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 subscribtopic[] = "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, port and wificredential
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
```

```
esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▼
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

```

```

esp32-blink.ino • diagram.json • libraries.txt • Library Manager
99
100 if (client.publish(publishTopic, (char*) payload.c_str())) {
101     Serial.println("Publish ok");// if it successfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failed
102 } else {
103     Serial.println("Publish failed");
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         initManagedDevice();
115         Serial.println();
116     }
117 }
118
119 void wificonnect() //function definition for wifi connect
120 {
121     Serial.println();
122     Serial.print("Connecting to ");
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());

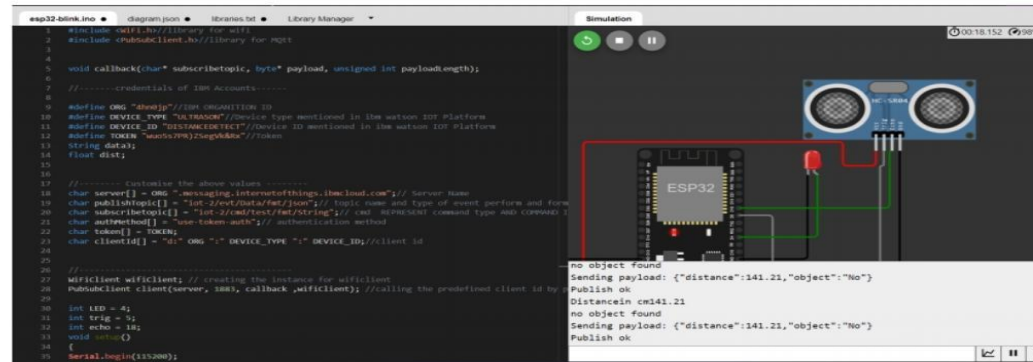
```

```
esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▼
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     // }
```



```
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:

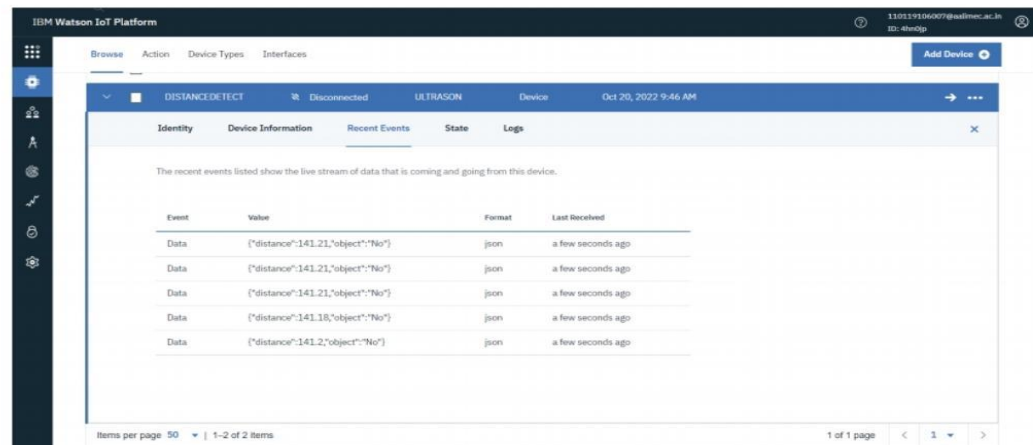


```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for mqtt
3
4
5 void callback(char* topic, byte* payload, unsigned int payloadLength);
6
7 //-----credentials of IBM Accounts-----
8
9 #define MQTT_HOST "ibm-organization-id"
10 #define DEVICE_TYPE "ULTRASON" //device type mentioned in the Watson IoT Platform
11 #define DEVICE_ID "DISTANCEDETECT" //device ID mentioned in the Watson IoT Platform
12 #define TOKEN "token" //token
13 String data;
14 float dist;
15
16 //-----Customize the above values-----
17
18 char server[] = MQTT_HOST.messaging.internetofthings.ibmcloud.com; // Server Name
19 char publishTopic[] = "iot-2/evt/data/evt/json"; //topic name and type of event perform and form
20 char subscribeTopic[] = "iot-2/cmd/rst/rst/string"; //cmd RESPONSE command type msg (RESPONSE)
21 char authMethod[] = "use-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "d-" MQTT_HOST "-" DEVICE_TYPE "-" DEVICE_ID /client id
24
25 //-----
26 WiFiClient wifiClient; // creating the instance for wifiClient
27 PubSubClient client(server, 8883, callback, wifiClient); //calling the predefined client id by
28
29 int LED = 4;
30 int trig = 5;
31 int echo = 18;
32 void setup()
33 {
34 }
35 Serial.begin(115200);
```

Simulation

no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok

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



IBM Watson IoT Platform

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ID: 4hw0p

Browse Action Device Types Interfaces

ADD DEVICE

DISTANCEDETECT Disconnected ULTRASON Device Oct 20, 2022 9:46 AM

Identity Device Information Recent Events State Logs

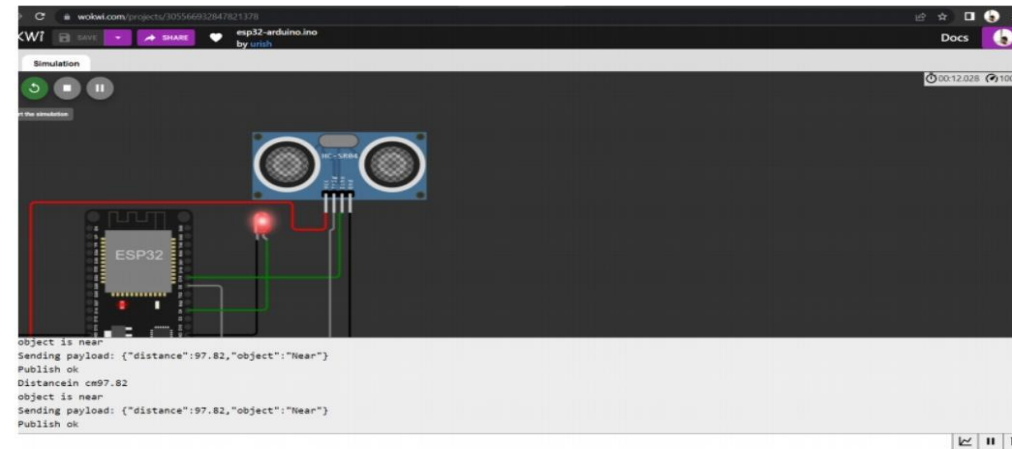
The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

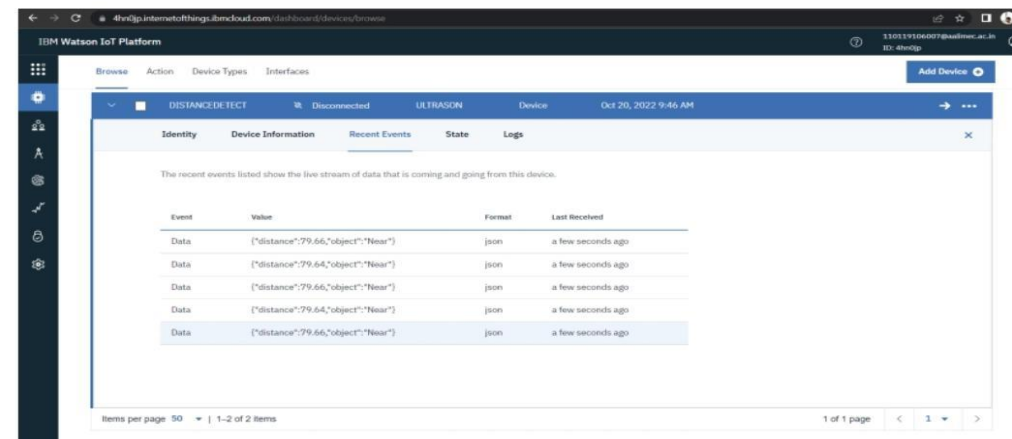
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when object is near to the ultrasonic sensor



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



<https://wokwi.com/projects/305566932847821378>