

ASSIGNMENT-4

DISTANCE DETECTION USING ULTRASONIC SENSOR

Date	22 October 2022
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MaximumMarks	2Marks

Question1:

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

WOKWILINK:

<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* subscribetopic, byte* payload, unsigned int payloadLength);
6
7 //-----credentials of IBM Accounts-----
8
9 #define ORG "4hn0jp" //IBM ORGANITION ID
10 #define DEVICE_TYPE "ULTRASONIC" //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)ZSegvk&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 wifi client
28 PubSubClient client(server, 1883, callback, wifiClient); //calling the predefined client id by passing parameter like server id, port and wifi credential
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 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 ▾

```

98     if (client.publish(publishTopic, (char*) payload.c_str())) {
99         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
100    } else {
101        Serial.println("Publish failed");
102    }
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("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     Serial.print("callback invoked for topic: ");
147     Serial.println(subscribetopic);
148     for (int i = 0; i < payloadLength; i++) {
149         //Serial.print((char)payload[i]);
150         data3 += (char)payload[i];
151     }
152
153 //    Serial.println("data: " + data3);
154 //    if(data3=="Near")
155 //    {
156 //        Serial.println(data3);
157 //        // do something here
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     //    else  
162     //    {  
163     //        Serial.println(data3);  
164     //        digitalWrite(LED,LOW);  
165     //    }  
166     //  
167     data3="";  
168  
169  
170 }  
171 }
```

OUTPUT:

```

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

Simulation
00:18.152 98%

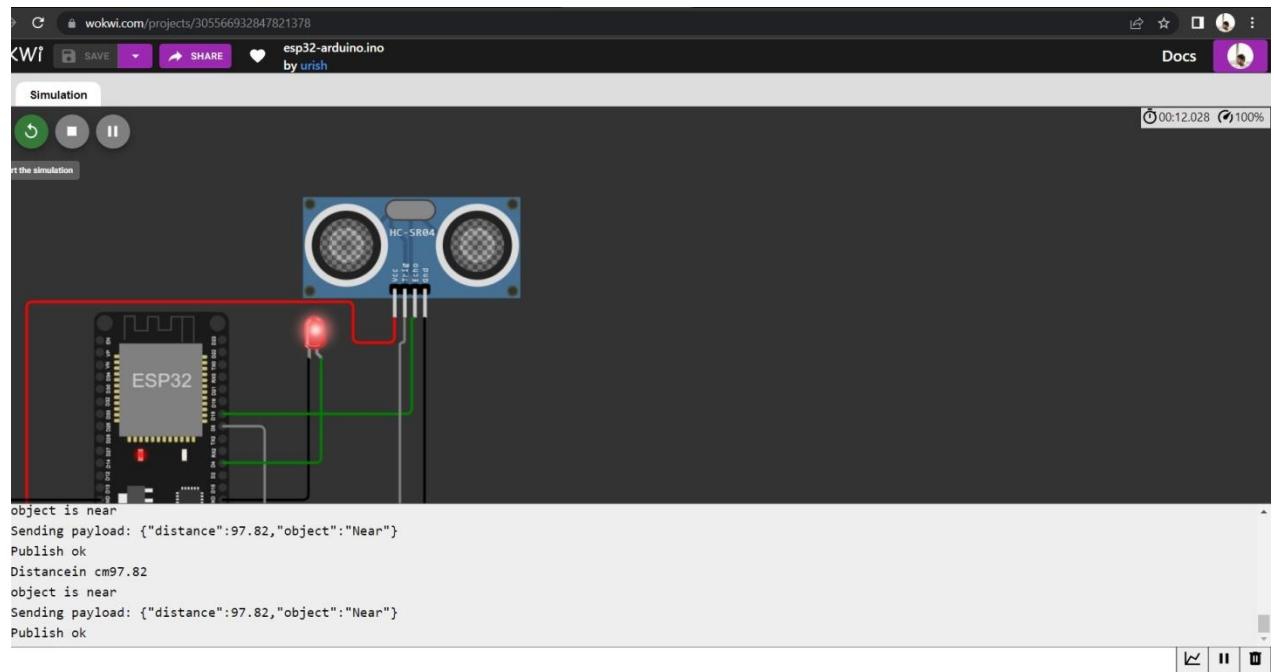
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok

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

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

The screenshot shows the IBM Cloud Device view for the "DISTANCEDETECT" device. At the top, there are tabs for "Browse", "Action", "Device Types", "Interfaces", and "Add Device". The main area shows the device's status as "Disconnected" and its type as "ULTRASONIC". The timestamp is "Oct 20, 2022 9:46 AM". Below this is a table titled "Recent Events" with columns: "Event", "Value", "Format", and "Last Received". The table contains the following data:

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

At the bottom, there are pagination controls: "Items per page 50" and "1 of 1 page".

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