

Assignment-4
Distance Detection Using Ultrasonic Sensor

Assignment Date	19 October2022
Student Name	Mathavan B
Student Roll Number	621319106054
Maximum Marks	2 Marks

Question-1:

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.

WOKWILINK : <https://wokwi.com/projects/346515191471538772>

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>

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

#define ORG "f59trs"
#define DEVICE_TYPE "ultrasonicsensor"
#define DEVICE_ID "distancedetection"
#define TOKEN "ALMGaaF01nawa1QA3"
String data3;
float dist;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);

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()
{
    digitalWrite(trig, LOW);
    digitalWrite(trig, HIGH);
    delayMicroseconds(10);
    digitalWrite(trig, LOW);
    float dur = pulseIn(echo, HIGH);
    float dist = (dur * 0.0343)/2;
    Serial.print ("Distance in cm :");
    Serial.println(dist);

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

void PublishData(float dist) {
    mqttconnect();
    String object;
    if (dist < 100)

```

```

    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");
    } 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()
{
    Serial.println();
    Serial.print("Connecting to ");
    WiFi.begin("Wokwi-GUEST", "", 6);
    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");
    }
}

```

```

        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++) {
        data3 += (char)payload[i];
    }
    data3="";
}

```

OUTPUT:

When object is not near to the ultrasonic sensor

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sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3
4 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
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6 #define ORG "f59trs"
7 #define DEVICE_TYPE "ultrasonicsensor"
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9 #define TOKEN "AlGMGaaF01nawa1QA3"
10 String data3;
11 float dist;
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13 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
14 char publishTopic[] = "iot-2/evt/Data/fmt/json";
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17 char token[] = TOKEN;
18 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
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21 WiFiClient wifiClient;
22 PubSubClient client(server, 1883, callback, wifiClient);
23
24 int LED = 4;
25 int trig = 5;
26 int echo = 18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(trig, OUTPUT);
```

Simulation

00:12.360 79%

no object found
Sending payload: {"distance":403.49,"object":"No"}
Publish ok
Distance in cm :403.49
no object found
Sending payload: {"distance":403.49,"object":"No"}
Publish ok

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

The screenshot shows the AWS IoT console interface. At the top, there's a navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. A blue button 'Add Device +' is on the right. Below this is a header bar for the selected device 'distancedetection', which is 'Connected' and has a status of 'ultrasonicsensor'. The date and time are 'Oct 19, 2022 11:56 AM'. The main content area has tabs for 'Identity', 'Device Information', 'Recent Events' (which is selected), 'State', and 'Logs'. Below the 'Recent Events' tab, there's a message: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this message is a table with the following data:

Event	Value	Format	Last Received
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago
Data	{"distance":235.02,"object":"No"}	json	a few seconds ago

At the bottom of the console, there's a status bar showing 'Items per page: 50' and '1-1 of 1 item'. On the right side of the bottom bar, it says '0 Simulations running'.

When object is nearer to the ultrasonic sensor

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```
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24 int LED = 4;
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27 void setup()
28 {
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30   pinMode(trig,OUTPUT);
```

Simulation

00:54.571 100%

Editing Ultrasonic Distance Sensor

Distance: 52cm

object is near
Sending payload: {"distance":52.44,"object":"Near"}
Publish ok
Distance in cm :52.44
object is near
Sending payload: {"distance":52.44,"object":"Near"}
Publish ok

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

The screenshot shows the Wokwi IoT dashboard interface. At the top, there are tabs for 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar is located below the tabs. On the right, there is a blue 'Add Device' button. The main content area displays a list of devices. The first device, 'distancedetection', is highlighted in blue and has a status of 'Connected'. Below the device list, there are tabs for 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is selected, showing a message: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this message is a table with the following data:

Event	Value	Format	Last Received
Data	{"distance":91.77,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.75,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.77,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.79,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.8,"object":"Near"}	json	a few seconds ago

At the bottom right of the dashboard, it says '0 Simulations running'.

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