

Assignment-4

Distance Detection Using Ultrasonic Sensor

Assignment Date	05 November 2022
Student Name	VARUN PRAKASH V
Student Roll Number	621319106098
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.

WOKWI LINK : <https://wokwi.com/projects/347459854010417746>

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
#include <ArduinoJson.h>
WiFiClient wifiClient;
#define ORG "9tg03j"
#define DEVICE_TYPE "RaspberryPi"
#define DEVICE_ID "12345"
#define TOKEN "12345678"
#define speed 0.034
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/status1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();
const int trigpin=5;
const int echopin=19;
String command;
String data="";
String name="Alert";
String icon="";
long duration;
int dist;
void setup()
{
Serial.begin(115200);
pinMode(trigpin, OUTPUT);
pinMode(echopin, INPUT);
wifiConnect();
mqttConnect();
}
void loop() {
publishData();
delay(500);
if (!client.loop()) {
mqttConnect();
}
}
void wifiConnect() {
Serial.print("Connecting to "); Serial.print("Wifi");
}
```

```

WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) {
delay(500);
Serial.print(".");
}
Serial.print("WiFi connected, IP address: "); Serial.println(WiFi.localIP());
}

void mqttConnect() {
if (!client.connected()) {
Serial.print("Reconnecting MQTT client to "); Serial.println(server);
while (!client.connect(clientId, authMethod, token)) {
Serial.print(".");
Serial.print("*");
delay(1000);
}
}
initManagedDevice();
Serial.println();
}

void initManagedDevice() {
if (client.subscribe(topic)) {
Serial.println(client.subscribe(topic));
Serial.println("subscribe to cmd OK");
}
else {
Serial.println("subscribe to cmd FAILED");
}
}
}

void publishData()
{
digitalWrite(trigpin,LOW);
digitalWrite(trigpin,HIGH);
delayMicroseconds(10);
digitalWrite(trigpin,LOW);
duration=pulseIn(echopin,HIGH);
dist=duration*speed/2;
if(dist<100){
dist=100-dist;
icon="Not-Crashed";
}
else{
dist=0;
icon="Crashed";
}
DynamicJsonDocument doc(1024);
String payload;
doc["Name"]=name;
doc["Impact"]=icon;
doc["Distance"]=dist;
serializeJson(doc, payload);
delay(3000);
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish OK");
}
else {
Serial.println("Publish FAILED");
}
}

```

OUTPUT:

The screenshot shows the Arduino IDE interface with the following details:

- Sketch:** sketch.ino
- File menu:** File, Edit, View, Sketch, Tools, Examples, Help
- Sketch menu:** Run, Stop, Simulation
- Sketch content:**

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 #include <ArduinoJson.h>
4 WiFiClient wifiClient;
5 #define ORG "9tg03j"
6 #define DEVICE_TYPE "RaspberryPi"
7 #define DEVICE_ID "12345"
8 #define TOKEN "12345678"
9 #define speed 0.034
10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
11 char publishTopic[] = "iot-2/cmd/home/fmt/String";
12 char topic[] = "iot-2/evt/status1/fmt/json";
13 char authMethod[] = "use-token-auth";
14 char token[] = TOKEN;
15 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
16 PubSubClient client(server, 1883, wifiClient);
17 void publishData();
18 const int trigpin=5;
19 const int echopin=19;
20 String command;
21 String data="";
22 String name="Alert";
23 String icon="";
24 long duration;
25 int dist;
26 void setup()
27 {
28   Serial.begin(115200);
29   pinMode(trigpin, OUTPUT);
30   pinMode(echopin, INPUT);
31   wifiConnect();
32   mqttConnect();
33 }
```
- Simulation window:** Shows an ESP32 board connected to two HC-SR04 ultrasonic sensors. A red line connects pin 5 (Trig) of the first sensor to digital pin 5 of the ESP32. A green line connects pin 19 (Echo) of the first sensor to digital pin 19 of the ESP32. A red line connects pin 5 (Trig) of the second sensor to digital pin 13 of the ESP32. A green line connects pin 19 (Echo) of the second sensor to digital pin 11 of the ESP32.
- Serial monitor output:**

```
Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":100}
Publish OK

Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":100}
Publish OK
```

The screenshot shows a device monitoring interface. On the left is a vertical sidebar with icons for Browse, Action, Device Types, Interfaces, and Add Device. The main area has tabs for Identity, Device Information, Recent Events, State, and Logs. The Recent Events tab is selected, displaying a table of data. The table has columns for Event, Value, Format, and Last Received. The data shows five entries of 'Data' events with the value being a JSON object {"distance":235.02,"object":"No"}, all in json format and received a few seconds ago. Below the table, it says 'Items per page 50 | 1–1 of 1 item'. To the right of the table, it says '0 Simulations running'. The top bar shows the device name 'distancedetection', status 'Connected', type 'ultrasonicsensor', and last update 'Oct 19, 2022 11:56 AM'. There is also a '...' button and a close 'X' button.

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

Items per page 50 | 1–1 of 1 item

0 Simulations running

