Assignment-4

Distance Detection Using Ultrasonic Sensor

Date	26 October 2022
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Maximum Marks	2 Marks

Question 1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 centimeters it should send “alert” to IBM cloud and display in device recent events.

Code:

```
#include <WiFi.h>//library for wifi
#include <Pubsubclient.h>//library for Hott
void callback(char subscribetopic, byte payload, unsigned int payloadLength);


#define ORG 4h0jp"//IBM ORGANITION IO
#define DEVICE_TYPE "ULTRASON
#define DEVICE_ID "DISTANCEDETECT
#define TOKEN "wuo5s7PR)ZSegvk&Rx"
String data3;
float dist;
char server[] -ORG ".messaging internetofthings.ibmcloud.com";// Server Name
char publishTopic[] "iot-2/evata/fmt/json";
char authMethod[]"use-token-auth";// authentication method
char token[] TOKEN;
char clientId[]"d:" ORG ":" DEVICE_TYPE":"DEVICE_ID;//client id

int LED = 4;
int trig 5;
int echo= 18;
void setic()
{
Serial.begin(115200);
}
```

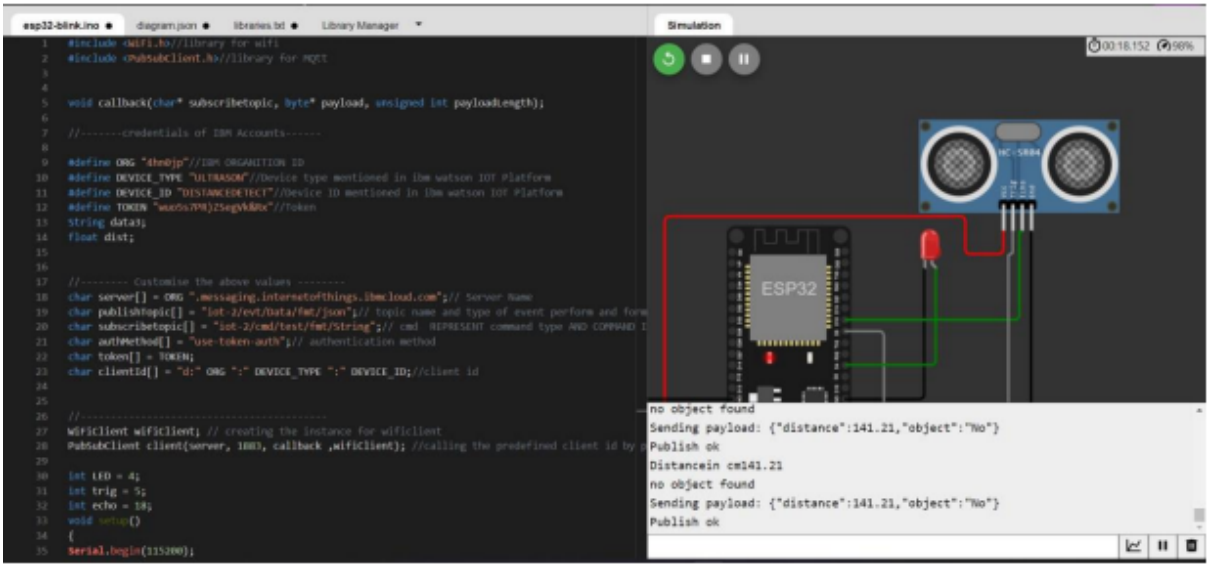
```
pinMode(trig,OUTPUT);
pinMode(echo,INPUT);
pinMode(LED, OUTPUT);
delay(10);
wificonnect();
mqttconnect();
}
void loop()// Recursive Function
{

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


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



/*.....................................retrieving to Cloud.............................*/

void PublishData(float dist) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
```

```
    creating the String in in form JSon to update the data to ibm cloud
    */
    String object;
    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);
```

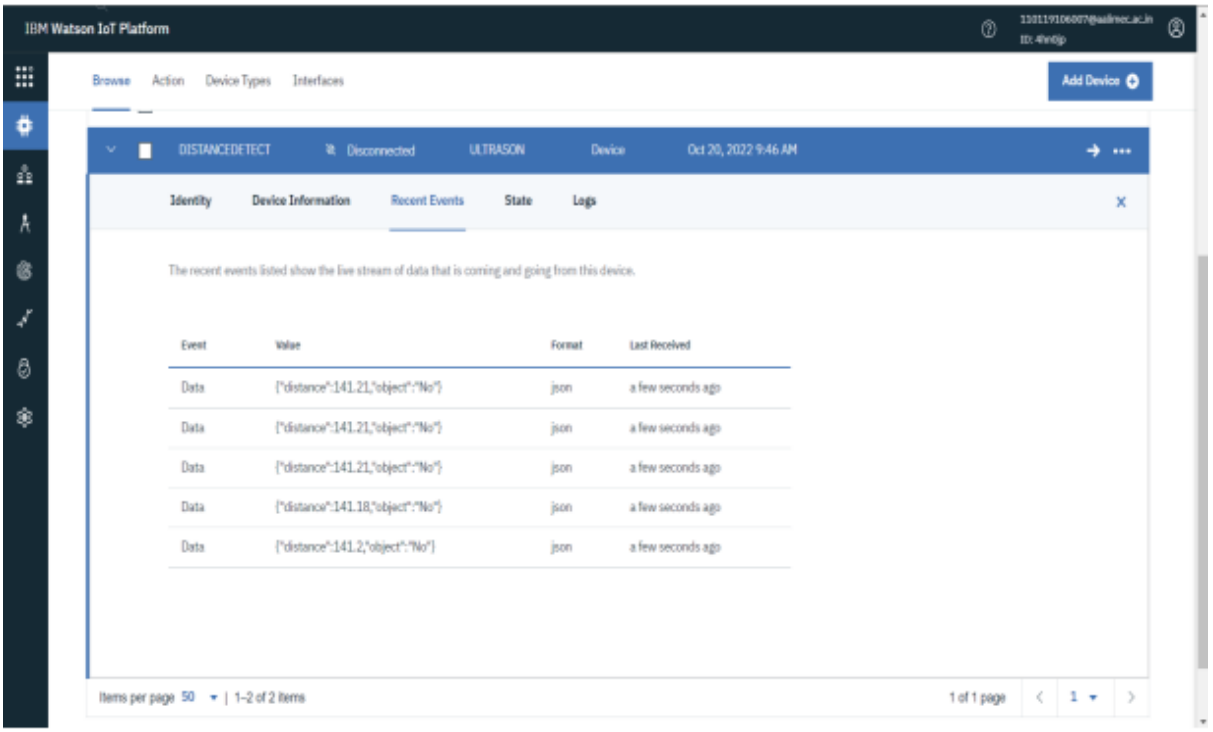
```
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failed
  } else {
    Serial.println("Publish failed");
  }

}
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() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
```

```
  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  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");
  }
}

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++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }

//   Serial.println("data: "+ data3);
//   if(data3=="Near")
//   {
// Serial.println(data3);
```

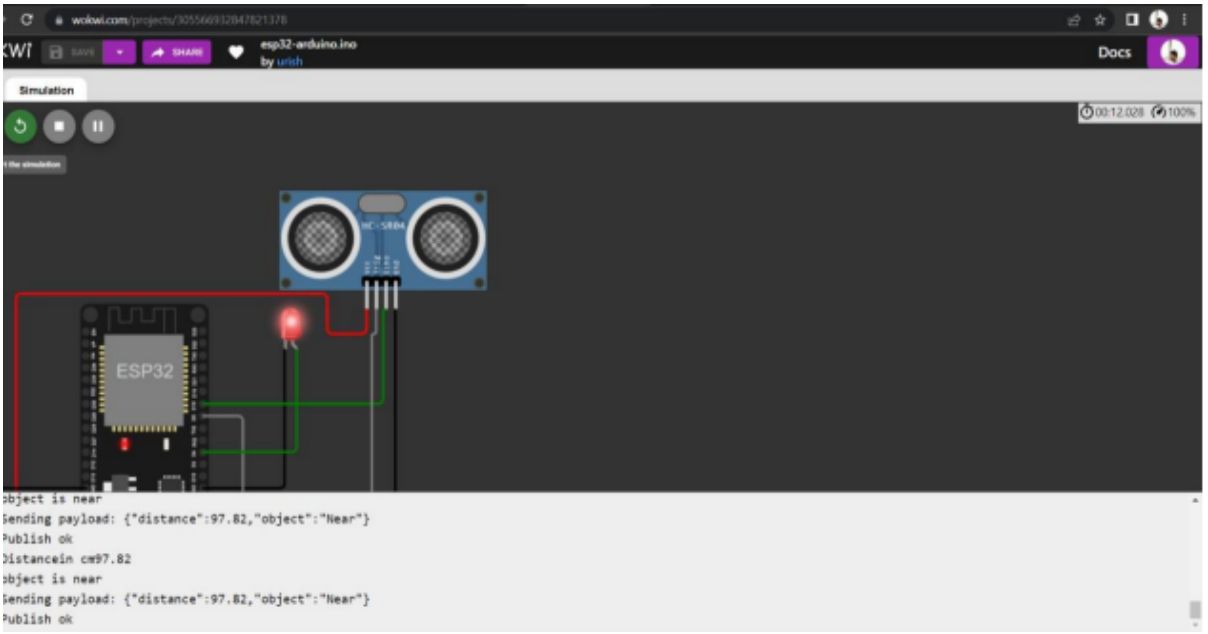
```
}

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++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }

//   Serial.println("data: "+ data3);
//   if(data3=="Near")
//   {
// Serial.println(data3);
// digitalWrite(LED,HIGH);

//   }

//   else
//   {
// Serial.println(data3);
// digitalWrite(LED,LOW);

//   }
data3="";


}
```



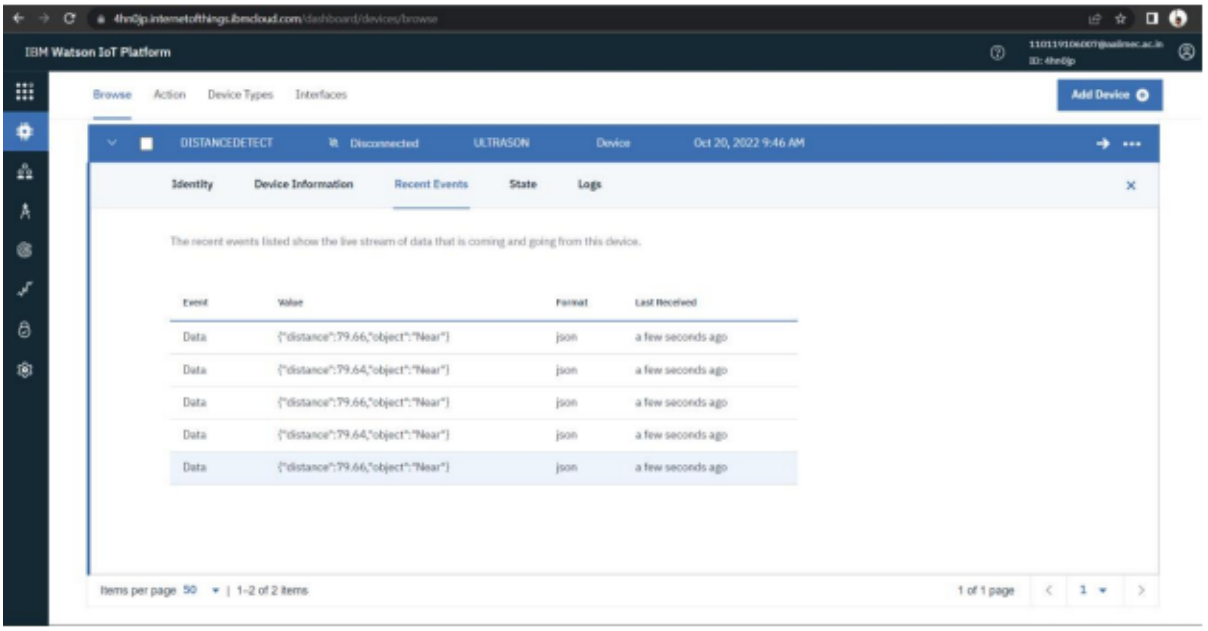
Data send to the IBM cloud service when the object is far



When object is near to the ultrasonic sensor



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


4hn0jp.internetofthings.ibmcloud.com/dashboard/devices/browse
IBM Watson IoT Platform
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":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
Items per page 50
1–2 of 2 items
1 of 1 page
1