TEAM ID : PNT2022TMID14142

SPIRNT 2

Date	4 Nov 2022
Team ID	PNT2022TMID14142
Project Name	Smart Waste Management System For Metropolitan Cities

Code for Data Transfer from Sensors

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```
#include <WiFi.h>                                   // libraryfor wifi
#include <PubSubClient.h>                           // libraryfor MQTT#include
<LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27,20, 4);

//_____credentials of IBM Accounts_____-

#define ORG "9gbe4w"                                // IBM organisation id
#define DEVICE_TYPE "SWMSMC"                        // Device type mentioned in ibm watson iot platform
#defineDEVICE_ID "ibmproject"                       // DeviceID mentioned in ibm watson iot platform
#define TOKEN "sUNA41tG6-Pq)0rk5X"                  // Token

//_____customise above values_____-_____

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";  // server namechar
publishTopic[] = "iot-2/evt/data/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String";          // cmd Represent type and command is test format of strings
char authMethod[] = "use-token-auth";               // authentication methodchar
token[]= TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;  //Client id

//_____

WiFiClient wifiClient;                              // creatinginstance for wificlient
PubSubClient client(server, 1883, wifiClient);

#defineECHO_PIN 12
#define TRIG_PIN13float dist;

void setup()
{
 Serial.begin(115200); pinMode(LED_BUILTIN,
 OUTPUT); pinMode(TRIG_PIN, OUTPUT);
 pinMode(ECHO_PIN, INPUT);
 //pir pin pinMode(4, INPUT);

 //ledpins
 pinMode(23, OUTPUT);
 pinMode(2, OUTPUT);
 pinMode(4, OUTPUT);
 pinMode(15, OUTPUT);


 lcd.init(); lcd.backlight();
 lcd.setCursor(1, 0);
 lcd.print("");

 wifiConnect();
```

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```
  mqttConnect();
}

float readcmCM()
{
  digitalWrite(TRIG_PIN, LOW); delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10); digitalWrite(TRIG_PIN,
  LOW);
  int duration = pulseIn(ECHO_PIN, HIGH);return
  duration * 0.034/ 2;
}

void loop()
 {

  lcd.clear();

  publishData();
  delay(500);
  if (!client.loop())
    {
      mqttConnect();                                          // functioncall to connectto IBM
    }
}

/*_____-retrieving to cloud_____*/

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(".");
           delay(500);
         }
       initManagedDevice();
       Serial.println();
     }
 }
void  initManagedDevice()
 {
   if (client.subscribe(topic))
     {
       Serial.println("IBM subscribe to cmd OK");
     }
   else
     {
```

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```
      Serial.println("subscribe to cmd FAILED");
    }
 }
void publishData()
{
 float cm = readcmCM();

 if(digitalRead(34))                                          //PIR motion detection
 {
  Serial.println("Motion Detected");
  Serial.println("Lid Opened"); digitalWrite(15,
  HIGH);

 }
 else
 {
  digitalWrite(15, LOW);
 }

 if(digitalRead(34)==true)
 {
 if(cm <= 100)                                                //Bin level detection
 {
  digitalWrite(2, HIGH);
  Serial.println("High Alert!!!,Trash bin is about to be full");
  Serial.println("Lid                Closed");
  lcd.print("Full!        Don't        use");
  delay(2000);
  lcd.clear(); digitalWrite(4,
  LOW); digitalWrite(23, LOW);
 }
 else if(cm > 150 && cm < 250)
 {
  digitalWrite(4,  HIGH);
  Serial.println("Warning!!,Trash is about to cross 50% of bin level");digitalWrite(2,
  LOW);
  digitalWrite(23, LOW);
 }
 else if(cm > 250 && cm <=400)
 {
  digitalWrite(23, HIGH);
  Serial.println("Bin is available");
  digitalWrite(2,LOW); digitalWrite(4,
  LOW);
 }
  delay(10000);
  Serial.println("Lid Closed");
 }
 else
 {
  Serial.println("No motion detected");
 }



 if(cm <= 100)
{
digitalWrite(21,HIGH);
String payload= "{\"High Alert!!\":\"";
payload+= cm;
payload += "left\" }"; Serial.print("\n");
```

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```
Serial.print("Sending payload: ");
Serial.println(payload);


if (client.publish(publishTopic, (char*) payload.c_str()))        // ifdata is uploaded to cloud successfully,prints publish ok or printspublish failed
{
Serial.println("Publish OK");
}
}
if(cm <= 250)
{
digitalWrite(22,HIGH);
String payload= "{\"Warning!!\":\"";
payload+= dist;
payload += "left\" }"; Serial.print("\n");
Serial.print("Sending distance: ");
Serial.println(cm);
if(client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
else
{
Serial.println("Publish FAILED");
}
}

 float inches = (cm / 2.54);                                                    //print on LCD
 lcd.setCursor(0,0);
 lcd.print("Inches");
 lcd.setCursor(4,0);
 lcd.setCursor(12,0);
 lcd.print("cm");
 lcd.setCursor(1,1);
 lcd.print(inches, 1);
 lcd.setCursor(11,1);
 lcd.print(cm, 1);
 lcd.setCursor(14,1);
 delay(1000); lcd.clear();
}
```

Connection Diagram

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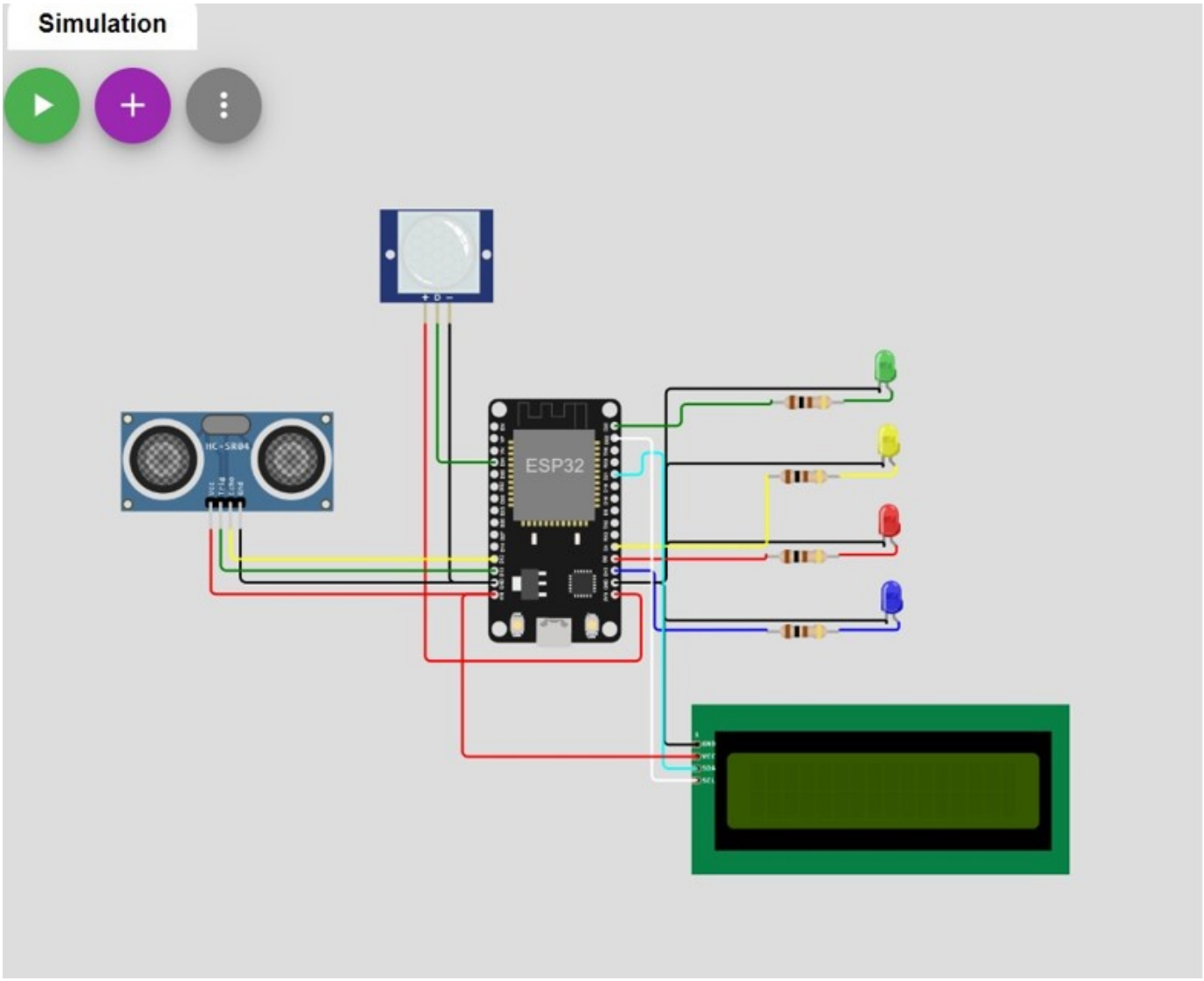

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