#include <WiFi.h> // library for wifi

#include <PubSubClient.h> // library for MQTT

#include <LiquidCrystal\_I2C.h>

LiquidCrystal\_I2C lcd(0x27, 20, 4);

//----------------------- credentials of IBM Accounts ------------------------------

#define ORG "wsl5rn" // IBM organisation id

#define DEVICE\_TYPE "GARBAGE" // Device type mentioned in ibm watson iot platform

#define DEVICE\_ID "113366" // Device ID mentioned in ibm watson iot platform

#define TOKEN "1122334455678" // Token

//----------------------- customise above values -----------------------------------------------------

char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // server name

char 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 method

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE\_TYPE ":" DEVICE\_ID; //Client id

//---------------------------------------------------------------------------------------------------------------------

WiFiClient wifiClient; // creating instance for wificlient

PubSubClient client(server, 1883, wifiClient);

#define ECHO\_PIN 12

#define TRIG\_PIN 13

float 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();

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(); // function call to connect to 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

{

**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");

**Serial**.print("Sending payload: ");

**Serial**.println(payload);

if (client.publish(publishTopic, (char\*) payload.c\_str())) // if data is uploaded to cloud successfully,prints publish ok or prints publish 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();

}

GOOLE DRIVE LINK FOR DEMO VIDEO

https://drive.google.com/file/d/1xjIljc9zNYWjPE4zmCk6IOeCOCD\_avHS/view?usp=drivesdk