Code for Data Transfer from Sensors

```
#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 "ktymlx"                  // IBM organisation id
#define DEVICE_TYPE "new"             // Device type mentioned in ibm watson iot
                                      platform
#define DEVICE_ID "09876"             // Device ID mentioned in ibm watson
                                      iot platform
#define TOKEN "Kamesh@2002"           // 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[] = "usetoken- auth"; //
authentication method char token[] = TOKEN;
char client[] = "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);
```

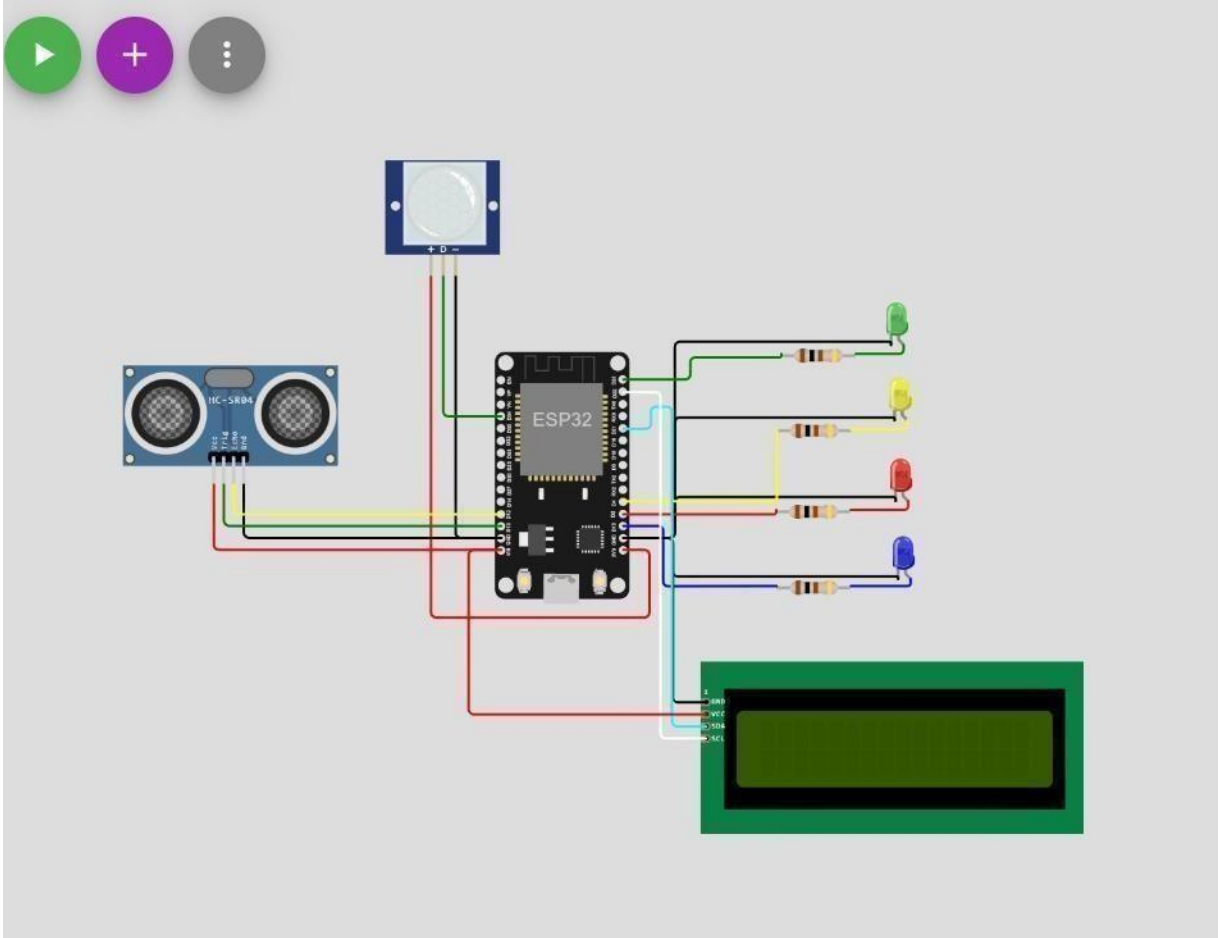
```
    pinMode(ECHO_PIN,
    INPUT);      //pir      pin
    pinMode(4, INPUT);

    //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();
    }
```

Connection Diagram


HC-SR04
ESP32