APPLICATION OF USING GY-61 ACCLEROMETER SENSOR AS PEDOMETER

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INTRODUCTION

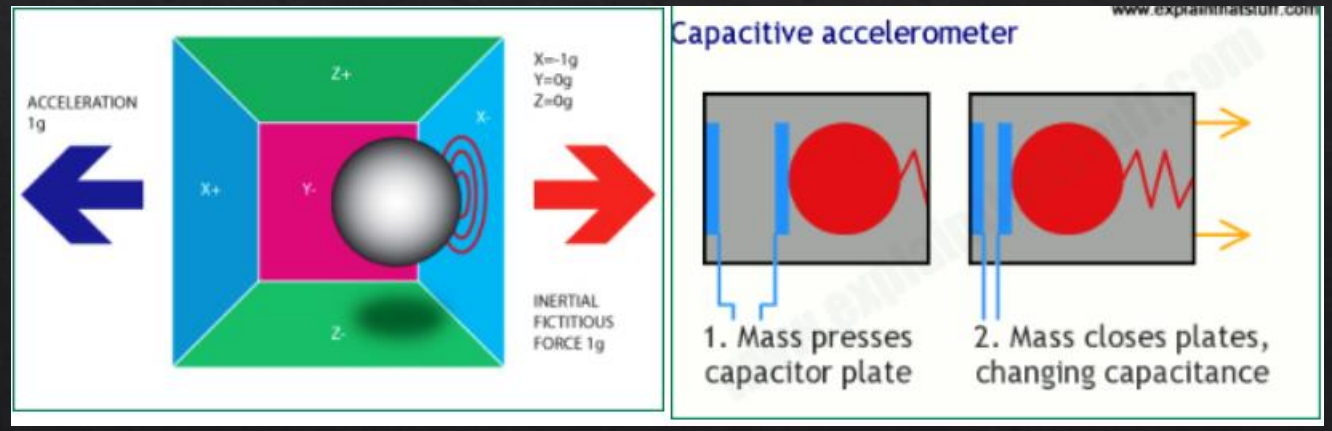
- Pedometer using GY-61 ADXL335 can be used to measure the number of steps taken by a person by detecting changes in acceleration that are characteristic of a step.

- The sensor can be programmed using Arduino IDE to detect changes in acceleration and calculate the number of steps taken, which can then be used to estimate the distance traveled and the number of calories burned.

- The output from the sensor will displayed on an OLED display or transmitted wirelessly to a smartphone and computer using BLYNK IOT App.

GY-61 ACCLEROMETER SENSOR

- The ADXL335 is a complete 3-axis Analog accelerometer X,Y,Z, and it works on the principle of capacitive sensing.
- This sensor is commonly used for detecting motion, orientation, and step counting.
- The sensor works by converting the physical acceleration of an object into an electrical signal that can be read and analyzed by a microcontroller

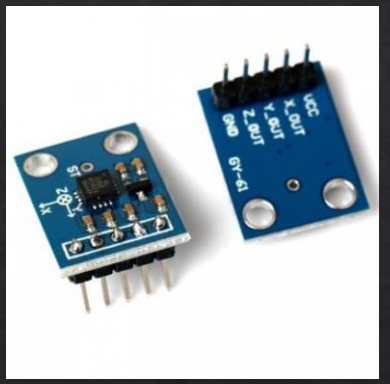


OBJECTIVE

- Construct the circuit and develop code program using Arduino IDE.
- Collecting information from analog sensor for processing on a computer.
- Accurately measure number of steps and using the equation to find the calories and distances taken by a person.
- Make a graph to presenting the data.
- Monitor the output data using OLED display and Blynk App.

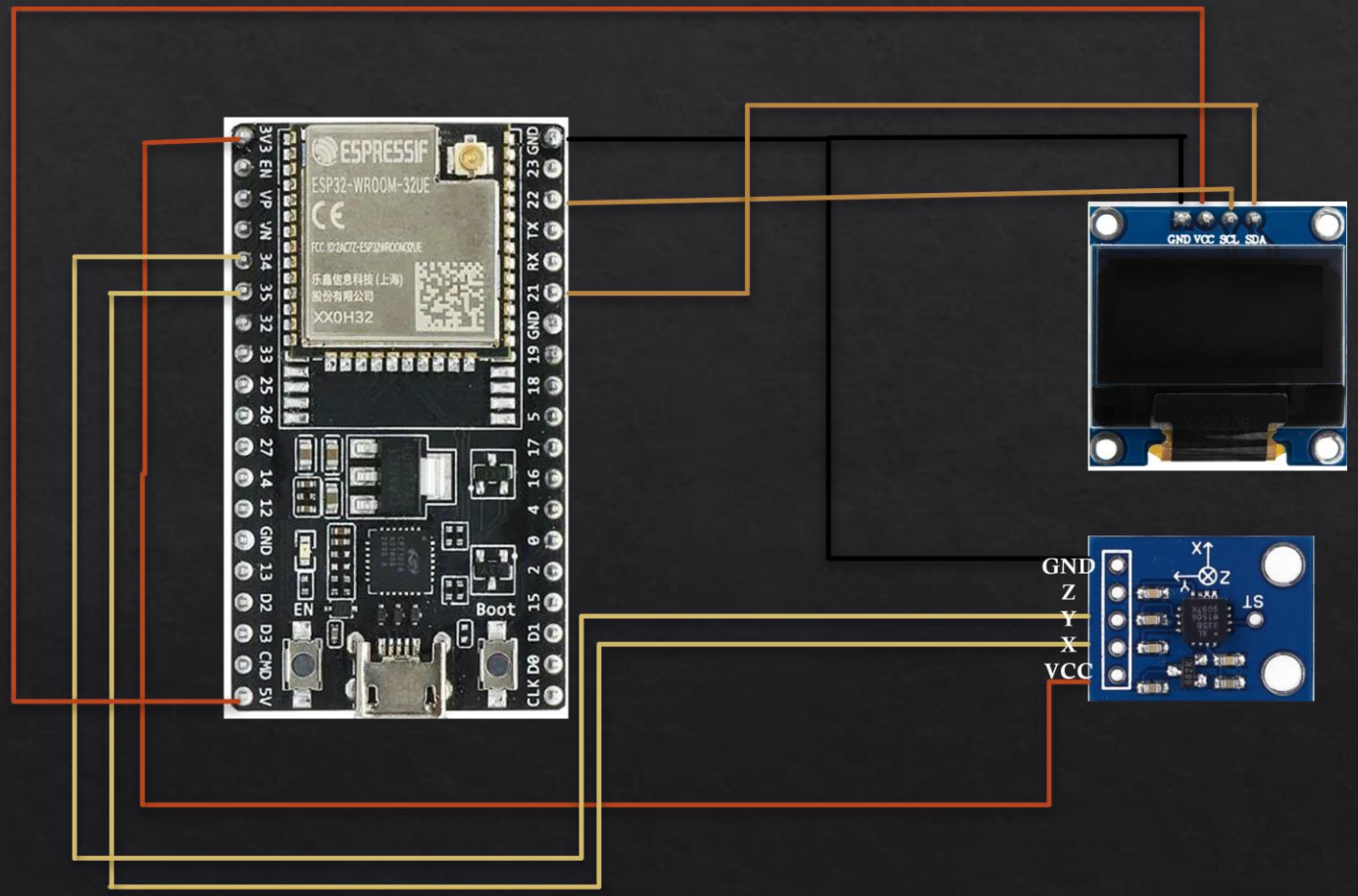
COMPONENT & SOFTWARE

- ESP 32
- GY-61 ADXL 335 ACCLEROMETER SENSOR
- OLED DISPLAY
- ARDUINO IDE
- BLYNK IOT APP



DESIGN/SIMULATION/ DATA ANALYSIS

SCHEMATIC CIRCUIT DIAGRAM



CODE PROGRAM

```
void sendSensor(){

x = analogRead(xanalog);
y = analogRead(yanalog);
if ( x <= 1700 && y>=2050)
{ count++;
//MySerial.print(count);
delay(200);
}
if ( x >= 2080 && y<=2080)
{
count++;
// MySerial.print(count);
delay(200);
}
calories = count * 0.050; /
distance = count * 0.0006;
```

```
Blynk.virtualWrite(V0, x);
Blynk.virtualWrite(V1, y);
Blynk.virtualWrite(V2, count);
Blynk.virtualWrite(V3, calories);
Blynk.virtualWrite(V4, distance);

Serial.println("Value X :");
Serial.println(x);

Serial.println("Value Y :");
Serial.println(y);

Serial.println("Steps :");
Serial.println(count);

Serial.println("Calorie :");
Serial.println(calories);

Serial.println("Steps :");
Serial.println(distance);

}
```

```
void loop()
{
  sendSensor();
  display.clearDisplay();
  display.print("Value X :");
  display.print(x);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.setCursor(0, 0);
  display.print("Value Y :");
  display.print(y);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.setCursor(0, 10);
  display.print("Steps :");
  display.print(count);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.setCursor(0, 20);
  display.print("Calories :");
  display.print(calories);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.setCursor(0, 30);
  display.print("Distance :");
  display.print(distance);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.setCursor(0, 40);
  display.display();
  Blynk.run();
  timer.run();
```

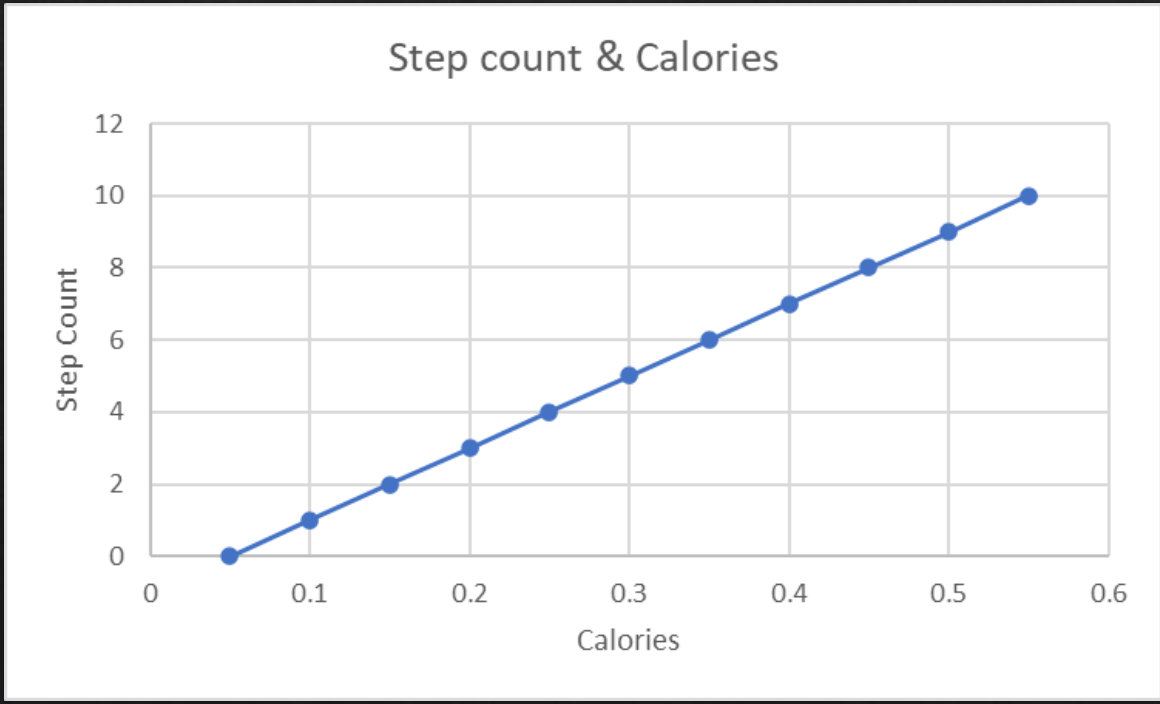
```
void setup()
{
  // Debug console
  Serial.begin(115200);
  WiFi.mode(WIFI_STA); // SETS TO STATION MODE!
  WiFi.begin(ssid, pass);
   if(!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println(F("SSD1306 allocation failed"));
    for(;;);
  }

  Blynk.begin(auth, ssid, pass);
  timer.setInterval(200L, sendSensor);
}
```

DATA ANALYSIS

- The equation to find the calories is :-

  calories = (count × 50) ÷1000

- 50 is the calories that come out every 1000 steps depending on the person's weight and height.



Step Counter	Calories
0	0.00
1	0.05
2	0.1
3	0.15
4	0.2
5	0.25
6	0.3
7	0.35
8	0.4
9	0.45
10	0.5

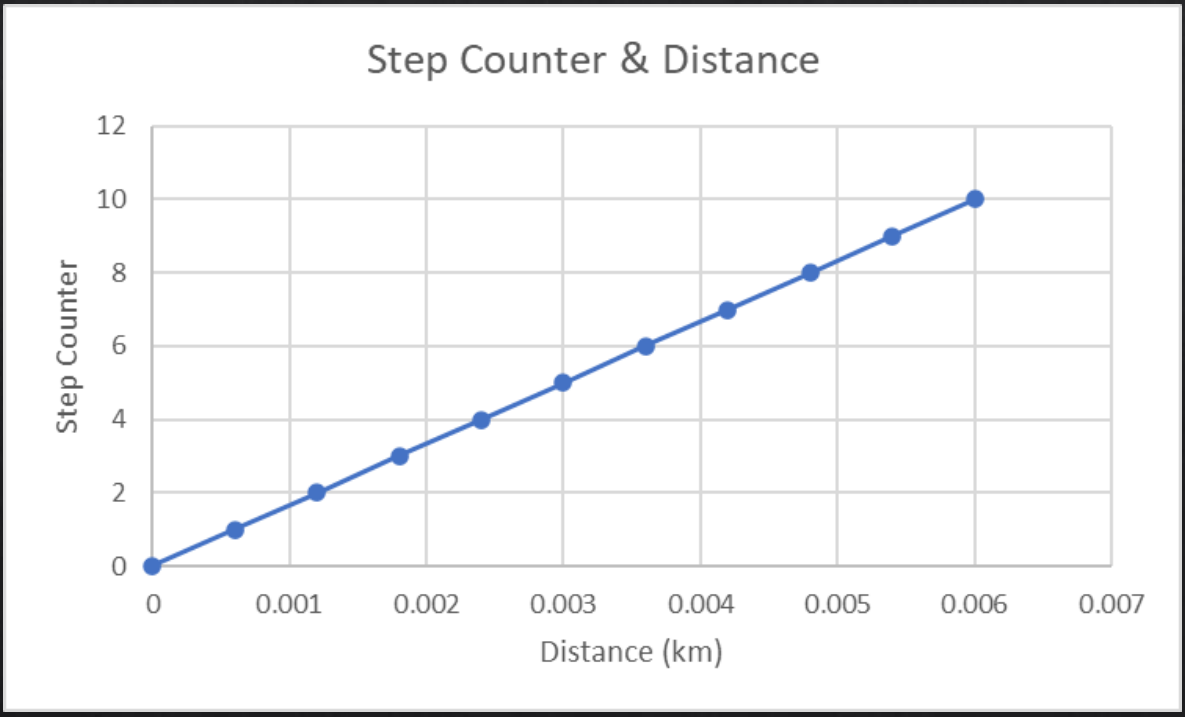
2,200 Steps per Mile (Height 5'6" to 5'11") Calories Burned by Step Count and Weight										
Weight	100 lb	120 lb	140 lb	160 lb	180 lb	200 lb	220 lb	250 lb	275 lb	300 lb
Steps	45 kg	55 kg	64 kg	73 kg	82 kg	91 kg	100 kg	114 kg	125 kg	136 kg
1,000	25 cal.	30	35	40	45	50	55	62	68	75

DATA ANALYSIS

- The equation to find the distances is :-

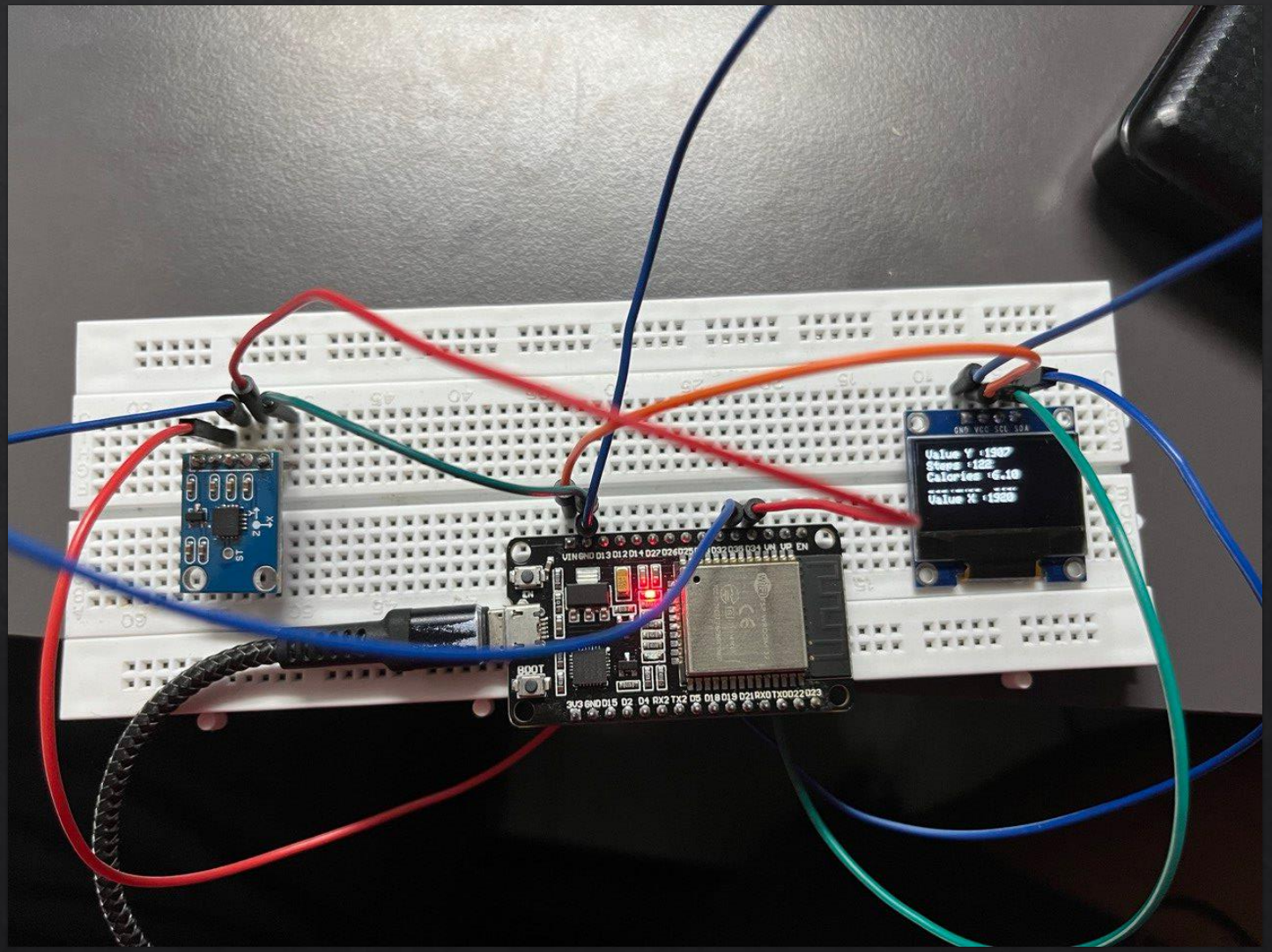
  distance = (count × 60cm)÷10000;

- 60 cm is my average step when walking.

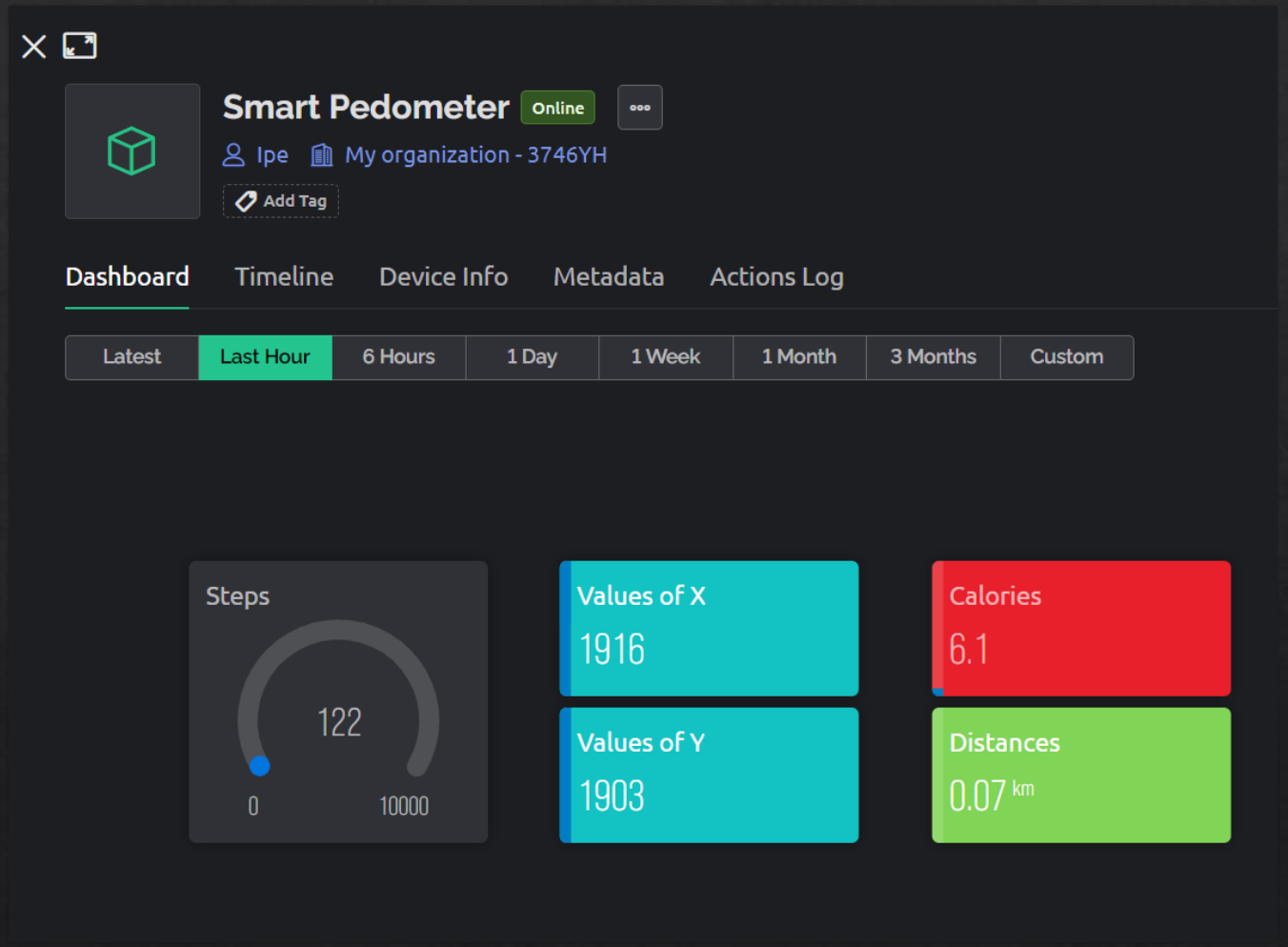


Step Counter	Distance (km)
0	0.0000
1	0.0006
2	0.0012
3	0.0018
4	0.0024
5	0.0030
6	0.0036
7	0.0042
8	0.0048
9	0.0054
10	0.0060

SIMULATION ON OLED DISPLAY



SIMULATION IN BLYNK APP



DISCUSSION

A pedometer can be implemented using an ESP32 microcontroller by combining an accelerometer sensor and programming the Arduino to process the sensor data and count steps, which can be used to estimate the distance traveled and the number of calories burned. The step counter is difficult to process because it is difficult to find the suitable voltage value of X and Y when it moves. This is because when walking, the pedometer can be in any orientation, so the pedometer calculates the steps using the axis whose acceleration change from the person body movement. The equation for calculating calories and distance is to get an estimate of the data that can be used to make an analysis such as a graph that can also help to identify trends, patterns, and relationships within the data. The data output can be displayed on the OLED display and the BLYNK application that has been implemented.

CONCLUSION

In conclusion, the objective of this project is successfully achieved. By combining the data from the accelerometer with some processing and counting algorithms, we can build a device that accurately counts the number of steps taken. By using esp32 we can do wireless communication that can easily send data to Blynk App. Thus it makes it easier for a person to monitor daily step counter, calories burned and distance traveled using smartphone at anywhere.

REFERENCE

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- 3.DIY R. How to make your own pedometer, Fitness band DIY. Robotica DIY. Published July 19, 2019. https://roboticadiy.com/how-to-make-your-own-pedometer-with-arduino/