

Write up for Major Project- IOT Based Smart Wardrobe

Code and it's explanation

```
1 #include <dht.h>           // Include library
2 #define outPin 7           // Defines pin number to which the sensor is connected
3
4 dht DHT;                   // Creates a DHT object
5
6 int[] temporalData;
7 int count;
8
9 void setup() {
10   Serial.begin(9600);
11   count = 0;
12 }
13
14 void loop() {
15   int readData = DHT.read11(outPin);
16
17   float t = DHT.temperature; // Read temperature
18   float h = DHT.humidity;    // Read humidity
19   float odour = readAde(0);
20
21   temporalData[count] = t;
22   temporalData[count++] = h;
23   temporalData[count++] = odour;
24
25   Serial.print("Temperature = ");
26   Serial.print(t);
27   Serial.print("°C | ");
28   Serial.print((t*9.0)/5.0+32.0); // Convert celsius to fahrenheit
29   Serial.println("°F ");
30   Serial.print("Humidity = ");
31   Serial.print(h);
32   Serial.println("%");
33   Serial.println("");
34   Serial.print("Odour = ");
35   Serial.print(odour);
36   Serial.println(" ");
37   Serial.println("");
38
39   int sensorValue = analogRead(A0);
40   int sensorValue2 = analogRead(A1);
41   // Convert the analog reading (which goes from 0 - 1023) to a voltage (0 - 5V):
42   float voltage = sensorValue * (5.0 / 1023.0);
43   float voltage2 = sensorValue2 * (5.0 / 1023.0);
44   // print out the value you read:
45   Serial.println("Load Cell 1");
46   Serial.println(voltage);
47
48   Serial.println("Load Cell 2");
49   Serial.println(voltage2);
50
51   int stdVal = std(temporalData);
52   int varVal = var(temporalData);
53
54   if(h > 75 && stdVal > 0.5) {
55     Serial.println("Humidity level is high, please check for molds");
56   }
57   if(h > 75 && t < 30) {
58     Serial.println("Probably the wardrobe is wet");
59   }
60
61   if(odour > 300 & varVal > 0.9) {
62     Serial.println("Odour level is HIGH, please check for smell in clothes");
63   } else if(odour > 150 & stdVal > 0.4) {
64     Serial.println("Odour level is MEDIUM, please check for smell in clothes");
65   } else {
66     Serial.println("Odour level is LOW, please clothes are OK");
67   }
68   if(h > 75 && t < 30) {
69     Serial.println("Probably the wardrobe is wet");
70   }
71 }
```

Step-by-step explanation of the code:

1. Include the necessary library: **#include <dht.h>**. This line includes the library for the DHT sensor, which is used to read temperature and humidity values.
2. Define the output pin for the sensor: **#define outPin 7**. This line defines the pin number to which the DHT sensor is connected.
3. Create a DHT object: **dht DHT**;. This line creates an instance of the DHT class.

4. Declare variables: **int[] temporalData** is an array to store temperature, humidity, and odor readings, and **int count** is a counter variable.
5. The **setup()** function is called once when the Arduino board is powered on or reset. In this case, it initializes the serial communication with a baud rate of 9600 and sets the initial value of **count** to 0.
6. The **loop()** function is the main body of the sketch and is executed repeatedly.
7. Read temperature, humidity, and odor values from the DHT sensor using **DHT.read11(outPin)**. Store the temperature value in **float t**, humidity value in **float h**, and odor value in **float odour**.
8. Store the current temperature, humidity, and odor values in the **temporalData** array at the current index **count**. Then increment **count** using the post-increment operator **count++**.
9. Print the temperature in Celsius and Fahrenheit using **Serial.print()** and **Serial.println()**.
10. Print the humidity value.
11. Print the odor value.
12. Read the analog value from pin A0 and A1 using **analogRead(A0)** and **analogRead(A1)**. Convert the analog reading to voltage and store it in the **float voltage** and **float voltage2** variables respectively.
13. Print the voltage values for the load cells.
14. Calculate the standard deviation (**stdVal**) and variance (**varVal**) of the **temporalData** array using custom functions **std()** and **var()**.
15. Check conditions and print corresponding messages based on the sensor readings:
 - a) If humidity is greater than 75 and the standard deviation (**stdVal**) is greater than 0.5, print a message about high humidity and the need to check for molds.
 - b) If humidity is greater than 75 and temperature (**t**) is less than 30, print a message indicating a wet wardrobe.
 - c) If odor level (**odour**) is greater than 300 and the variance (**varVal**) is greater than 0.9, print a message about a high odor level and the need to check for smell in clothes.
 - d) If odor level (**odour**) is greater than 150 and the standard deviation (**stdVal**) is greater than 0.4, print a message about a medium odor level and the need to check for smell in clothes.
 - e) If none of the above conditions are met, print a message indicating a low odor level and that the clothes are okay.
 - f) If humidity is greater than 75 and temperature (**t**) is less than 30, print a message indicating a wet wardrobe (duplicate condition).
16. Add a delay of 2000 milliseconds (2 seconds) using **delay(2000)** to pause between iterations of the loop.

How to run the Code

1. Set up the hardware:
 - Connect the DHT temperature and humidity sensor to the Arduino board. Connect the sensor's VCC pin to 5V, GND pin to GND, and the data pin to pin 7 (or any other digital pin of your choice). Make sure to check the pin assignments and connections based on your specific hardware setup.
 - Connect an analog load cell to the Arduino board. Connect the load cell's output pin to analog pin A0 and optionally, another load cell to analog pin A1.
2. Open the Arduino IDE on your computer.
3. Create a new sketch and copy the provided code into the sketch.
4. Verify the code for any syntax errors by clicking on the "Verify" button (checkmark icon) or by selecting "Verify" from the "Sketch" menu. Fix any errors if they occur.
5. Connect your Arduino board to your computer using a USB cable.
6. Select the appropriate board and port from the "Tools" menu in the Arduino IDE.
7. Upload the code to the Arduino board by clicking on the "Upload" button (right arrow icon) or by selecting "Upload" from the "Sketch" menu.
8. Once the code is uploaded successfully, open the serial monitor in the Arduino IDE by clicking on the magnifying glass icon in the top right corner or by selecting "Serial Monitor" from the "Tools" menu.
9. Set the baud rate of the serial monitor to 9600 (the same as specified in the code).
10. You should now see the sensor readings and alerts printed in the serial monitor. The code will continue to run in a loop, displaying updated readings every few seconds.

Make sure that you have the necessary libraries installed in the Arduino IDE. In this case, you need the "dht" library to interface with the DHT sensor. If you don't have the library installed, you can install it by going to the "Library Manager" in the "Sketch" menu, searching for "dht", and clicking the "Install" button for the library.