

CHAPTER 5

IMPLEMENTATION AND RESULTS

5.1. Implementation

```
1. #include <Servo.h> // menambahkan libray servo
2. #include <HX711_ADC.h> //menambahkan libray timbangan
3. #include "DHT.h" // menambahkan libray suhu
4. #define DHTPIN 8 //menambahkan angka 8 sebagai port milik dht
5. #define DHTTYPE DHT11 //menambahkan dht11 sebagai type dht
6. int sensor_hujan = A1; //sebagai port Sensor Hujan
7. int hujan,cahaya,suhu,berat; //var kontrol
8. int HX711_dout = 6; //menambahkan angka 6 sebagai value dari variabel
   HX711_dout
9. int HX711_sck = 9; //menambahkan angka 9 sebagai value dari variabel
   HX711_sck
10. Servo myservo;
11. DHT dht(DHTPIN, DHTTYPE);
12. HX711_ADC LoadCell (HX711_dout, HX711_sck);
```

The above code 1-12 is an addition to the library and determines the port for Arduino Uno

```
13. void setup() {
14.   Serial.begin(9600);
15.   myservo.attach(11);
16.   pinMode(sensor_hujan, INPUT);
17.   dht.begin();
18.   LoadCell.begin();
19.   LoadCell.start(2000);
20.   LoadCell.setCalFactor(1.0);
21. }
22. uint8_t panas, terang;
```

The code 13-21 above is void setup is a sketch or Arduino program starts, running the void setup() function. This function is used to initialize variables, declare which pins to use, use libraries, etc..

```
23. void loop() {
```

Void loop() is executed after the setup() function finishes executing. The void loop() function is intended to run the program created. This function actively controls the Arduino board to read input or change output. Runs the void loop() function periodically, unlike void setup() which is only run once by arduino. That's why it's called void loop(), which means loop.

```
24. //cahaya
```

```

25. int analogValue = analogRead(A0);
26. Serial.println("nilai"+String(analogValue));
27. Serial.println((String)((terang!=(analogValue
700))?"terang":"gelap")+"\r\n");

```

>

Reading light sensor

```

28. //hujan
29. Serial.println((String)((hujan=!digitalRead(sensor_hujan))?"hujan":"
cerah")+"\r\n"); }

```

Reading rain sensor

```

30. //temperatur
31. float suhu = dht.readTemperature();
32. Serial.println((String)"Suhu: " + String(suhu));
33. Serial.println((String)((panas=suhu>30)"panas":"dingin")+"\r\n");

```

Reading temperature sensor

```

34. //timbangan
35. LoadCell.update();
36. int32_t berat = LoadCell.getData();
37. Serial.print((String)"Weight:" + String(berat)+"\r\n");
38. berat=berat>50;

```

Reading the weighing sensor

```

39. myservo.write((berat?hujan?0:terang?panas?1:0:0:0)?150:10);
40.
41. delay(3000);
42. }

```

Execute the all sensors

5.2. Results

Rain sensor	Light sensor	DHT11 sensor	Weighing sensor	Expected results	Real result	Result
Rainy weather	Dark light	Temperature < 30	Weight < 500	Closed	Closed	True Positive
Rainy weather	Dark light	Temperature < 30	Weight > 500	Closed	Closed	True Positive
Rainy weather	Dark light	Temperature > 30	Weight < 500	Closed	Closed	True Positive
Rainy weather	Bright light	Temperature < 30	Weight < 500	Closed	Closed	True Positive

Rainy weather	Dark light	Temperature > 30	Weight > 500	Closed	Closed	True Positive
Rainy weather	Bright light	Temperature < 30	Weight > 500	Closed	Closed	True Positive
Rainy weather	Bright light	Temperature > 30	Weight < 500	Closed	Closed	True Positive
Rainy weather	Bright light	Temperature > 30	Weight > 500	Closed	Closed	True Positive
Sunny weather	Dark light	Temperature < 30	Weight < 500	Closed	Closed	True Positive
Sunny weather	Dark light	Temperature < 30	Weight > 500	Closed	Closed	True Positive
Sunny weather	Dark light	Temperature > 30	Weight < 500	Closed	Closed	True Positive
Sunny weather	Bright light	Temperature < 30	Weight < 500	Open	Closed	False Negative
Sunny weather	Dark light	Temperature > 30	Weight > 500	Open	Closed	False Negative
Sunny weather	Bright light	Temperature < 30	Weight > 500	Open	Closed	False Negative
Sunny weather	Bright light	Temperature > 30	Weight < 500	Open	Closed	False Negative
Sunny weather	Bright light	Temperature > 30	Weight > 500	Open	Open	True Negative

Table 5.1. Results

Precision

$$\text{precision} = \frac{tp}{tp + fp} = \frac{11}{11 + 0} = 1$$

Recall

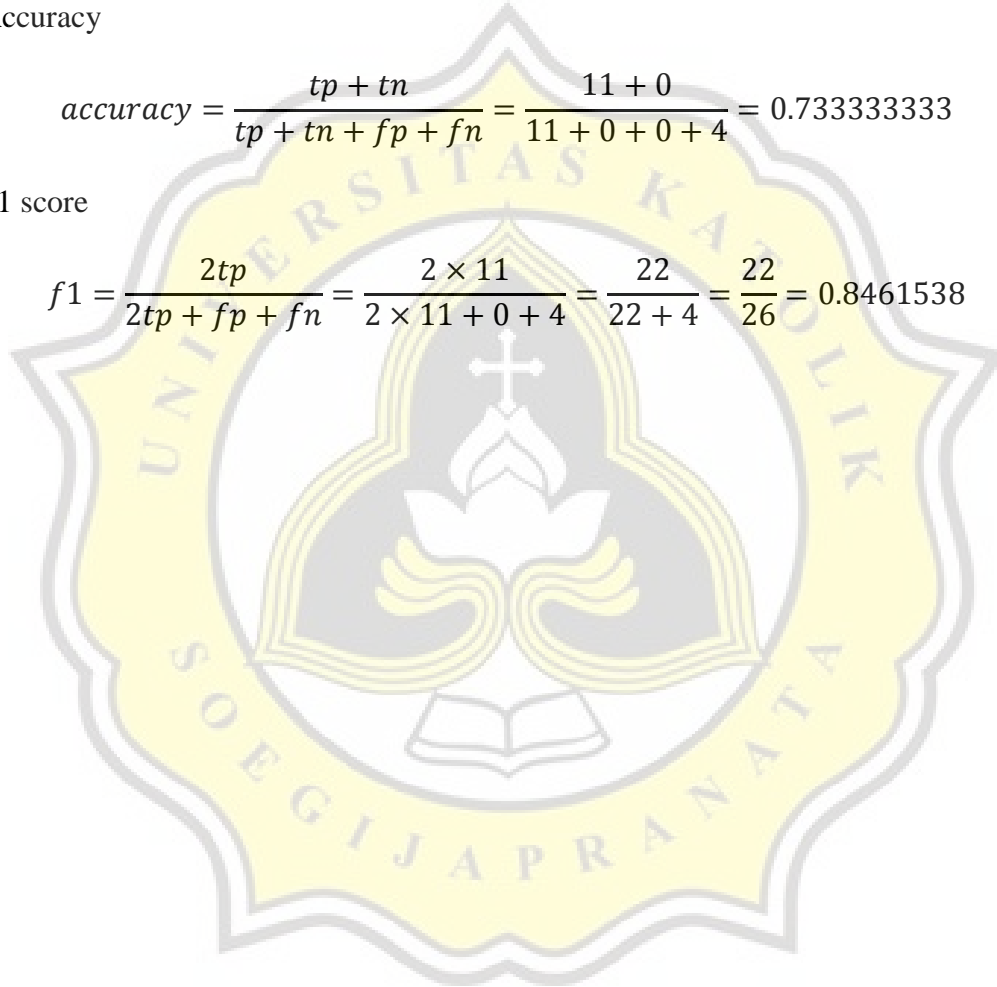
$$\text{recall} = \frac{tp}{tp + fn} = \frac{11}{11 + 4} = 0.733$$

Accuracy

$$\text{accuracy} = \frac{tp + tn}{tp + tn + fp + fn} = \frac{11 + 0}{11 + 0 + 0 + 4} = 0.733333333$$

F1 score

$$f1 = \frac{2tp}{2tp + fp + fn} = \frac{2 \times 11}{2 \times 11 + 0 + 4} = \frac{22}{22 + 4} = \frac{22}{26} = 0.8461538$$



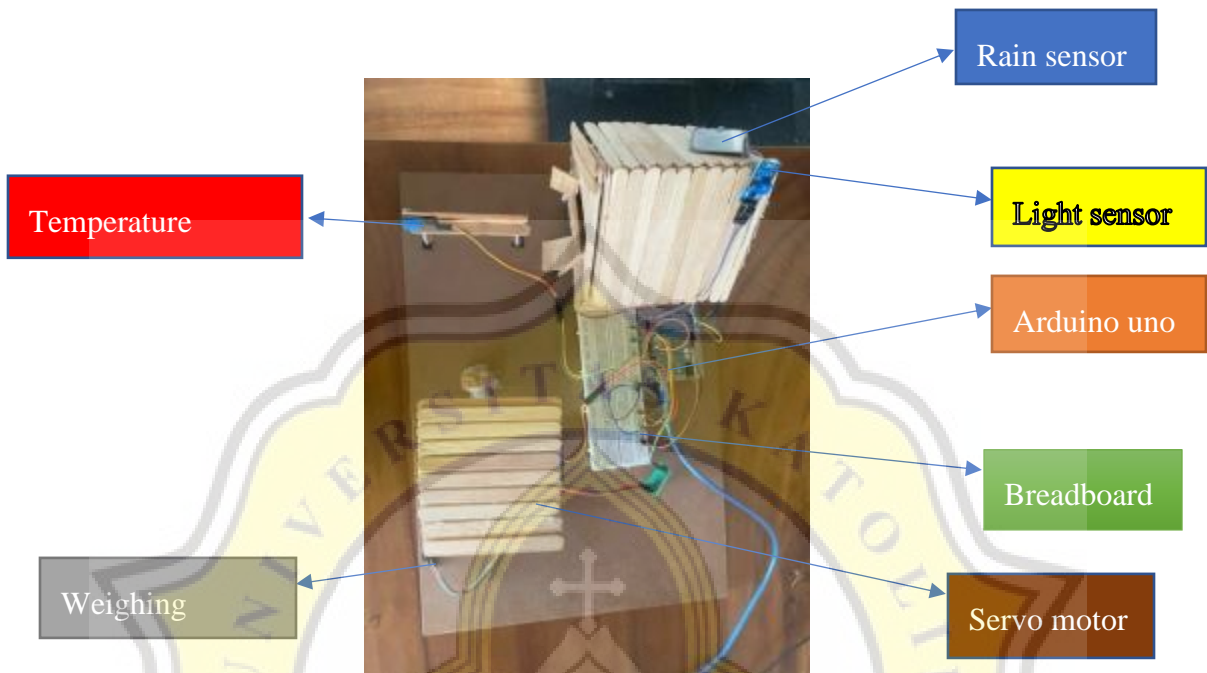


Figure 5.1 Top view



Figure 5.2 Weight sensor

The picture above is a weighing sensor that is useful for calculating the weight of dry clothes and wet clothes.



Figure 5.3 Temperature sensor

The picture above is a temperature sensor that is useful for knowing the hot and cold temperatures around the clothesline.

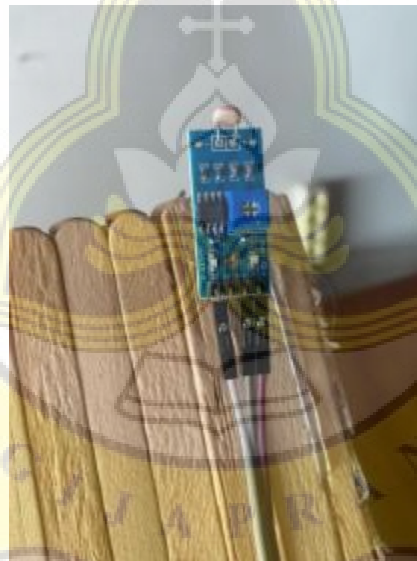


Figure 5.4 Light sensor

The image above is a light sensor that is useful for knowing the sunlight around the clothesline is bright or dark.



Figure 5.5 Rain sensor

The picture above is a rain sensor that is useful for knowing whether it is raining or not raining outside.

