CHAPTER 4
ANALYSIS AND DESIGN

4.1. Analysis

In a study entitled IoT-based smart clothesline using the Fuzzy algorithm. Does the clothesline get enough sunlight for clothes to be dried and the scale sensor on the clothesline can weigh wet or dry clothes perfectly.

4.2. Hardware

Figure 4.1 Arduino uno

Using arduino uno as microcontroller to execute all code, calibrate all sensors and fuzzy algorithm to identify the right roof category
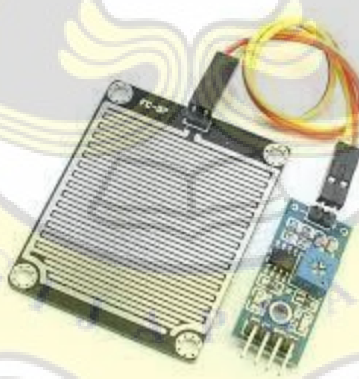
4.3. Sensor

There are four sensors that affect the work of this smart clothesline, namely:

1. Light sensor (LDR)

Figure 4.1 sensor LDR (Light Dependert Resistor)

LDR (Light Dependent Resistor) is a resistive component whose resistance changes with the intensity of light hitting the sensor. LDR can also be used as a light sensor. That the resistance of this sensor is very dependent on the intensity of the light.

2. Rain sensor

Figure 4.2 Sensor hujan

The rain sensor (raindrop) is a module that is used as a sensor for water drops that fall on the boards. To detect rainwater over a wide range, the electrodes are winded to reduce the rainwater resistance, and the output voltage according to the rain sensor logic (raindrop) is shown in Figure 4.2. The working voltage of this sensor is 5V The output of this sensor can be

logic high or low (on or off). This sensor module also has an output in the form of a voltage. Allows connection to the analog-to-digital converter pins on the microcontroller.

3. DHT11 sensor (temperature sensor)

Figure 4.3 The DHT11 sensor is a temperature and humidity sensor

The DHT11 sensor is a sensor module that is used to detect the temperature and humidity of objects with an analog voltage output that can be further processed by the microcontroller.
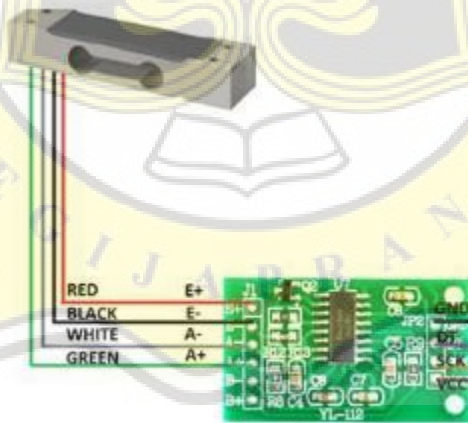
4. Weighing sensor (HX711)

Figure 4.4 Weighing sensor (HX711)

A weight sensor (load cell) is a device that converts a force or load into a measurable output. A strain gauge load cell is the most common and is defined as a device that converts a force or load into an equivalent electrical signal.

4.4. Fuzzy Algorithm Logic

Decision logic applies fuzzy rules to fuzzy input and evaluates each rule. In decision logic, fuzzy systems are also called linguistic rules. That is, mappings from input to output, some of which are characterized by if-then rules or sometimes called implication functions. The general form of the implication function is IF THEN where x and y are scalars and A and B are fuzzy sets. The input of the fuzzy system after IF is associated with the premise, and the output after THEN is associated with the result. This suggestion can also be extended with fuzzy operators such as OR and AND. Therefore, there are two standard forms for representing this if-then rule: multiple-input multiple-output (MIMO) and multiple-input single-output (MISO). Decision logic applies fuzzy rules to fuzzy input and then evaluates. every rule out. In decision logic, fuzzy systems are also called linguistic rules. That is, the mapping from input to output, which is partly characterized by the if-then rule. Or, sometimes called the implication function. The general form of the implication function is IF THEN where x and y are scalars and A and B are fuzzy sets. The input of the fuzzy system after IF is associated with the premise, and the output after THEN is associated with the result. This suggestion can also be extended with fuzzy operators such as OR and AND. So there are two standard forms of expressing this if-then rule. Multi-Input-Multi-Output (MIMO) and Multi-Input-Single-Output (MISO).

4.5. Fuzzy Rule Table

Rain sensor	Light sensor	DHT11 sensor	Weighing sensor	Servo
Rainy weather	Dark light	Temperature< 30	Weight < 500	Closed
Rainy weather	Dark light	Temperature< 30	Weight > 500	Closed
Rainy weather	Dark light	Temperature> 30	Weight < 500	Closed
Rainy weather	Bright light	Temperature< 30	Weight < 500	Closed
Rainy weather	Dark light	Temperature>	Weight > 500	Closed

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Rainy weather	Bright light	Temperature< 30	Weight > 500	Closed
Rainy weather	Bright light	Temperature> 30	Weight < 500	Closed
Rainy weather	Bright light	Temperature> 30	Weight > 500	Closed
Sunny weather	Dark light	Temperature< 30	Weight < 500	Closed
Sunny weather	Dark light	Temperature< 30	Weight > 500	Closed
Sunny weather	Dark light	Temperature> 30	Weight < 500	Closed
Sunny weather	Bright light	Temperature< 30	Weight < 500	Open
Sunny weather	Dark light	Temperature> 30	Weight > 500	Open
Sunny weather	Bright light	Temperature< 30	Weight > 500	Open
Sunny weather	Bright light	Temperature> 30	Weight < 500	Open
Sunny weather	Bright light	Temperature> 30	Weight > 500	Open

Table 4.1. fuzzy rule table