CHAPTER 4
ANALYSIS AND DESIGN

4.1. Analysis

In this project I use the Sugeno method algorithm to determine the fan speed obtained from the final result of the algorithm calculation. In this calculation using 6 input variables, namely: cold, warm, hot, near, medium and far. There are also 8 output variables, namely: off, slow, fast, very fast, off, dim, bright and very bright. Each input and output variable has a different membership value. There are 3 stages of calculation in the Sugeno fuzzy algorithm, namely: fuzzification, inference and defuzzification. The final result of the Sugeno fuzzy algorithm is a constant. The following is a flowchart for the calculation of the Fuzzy Sugeno algorithm :
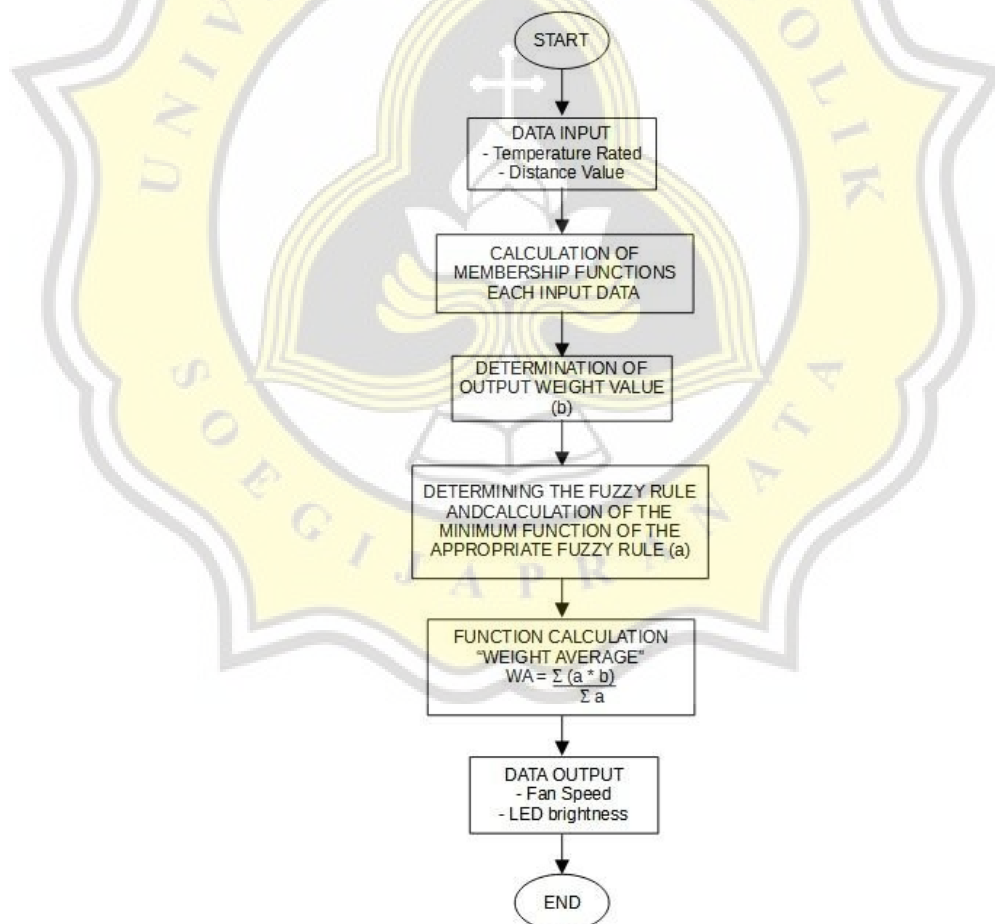

Figure 6 Algorithm Flowchart
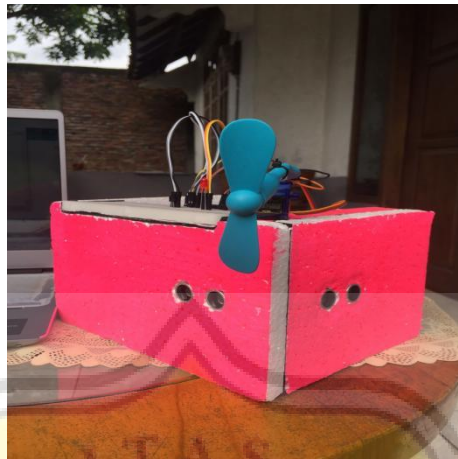
4.2. Design Prototype

Figure 7 Design Prototype

In this prototype I use a portable fan that is connected to a USB ASP Downloader. USB ASP Downloader is a downloader that supports microcontrollers and its use uses a communication line via the "usb port". To move the servo right and left I installed Ultrasonic sensors on the right and left. I also added an LED as an indicator whether the fan is off or on. To find out the temperature value, I use the LM35 sensor.

To test this prototype, I used the object of people and the temperature inside and outside the room during the day and night. When the person is in front of the right ultrasonic sensor, the servo will move to the right following the object of the person and when the object of the person is in front of the left ultrasonic sensor, the servo will move to the left following the object. The LM35 sensor will detect the current temperature. Then I used a lighter to raise the temperature. The value obtained from these two sensors will be calculated using the Fuzzy Sugeno algorithm to get the final result. The final result will affect the fan speed as well as the brightness of the LED. If the final result is < 64 then the LED will go out, the final result < 130 then the LED will light up dimly, the final result < 255 then the LED will light up brightly, then if the final result is worth 255 then the LED will light up very bright.