CHAPTER 3
RESEARCH METHODOLOGY

3.1 Preparing the device

The Devices needed for this research are Arduino Uno as a microcontroller based on ATmega28P, Ethernet Shield W5100 to connect Arduino to the Internet, USB Cable type A to B, LAN cable used to connect Ethernet Shield to the internet. Jumper cables are used to connect Arduino to all sensors and devices. Arduino Uno serves to accommodate data from the sensor reading water with parameters of turbidity and solute levels. The sensor used to read the level of turbidity is LDR (*Light Dependent Resistor*), while to measure the amount of dissolved substances in water using a TDS (sensor*Total Dissolved Solid*). While the website serves to display the results of sensors, and water quality.

3.2 Create Database

At this stage, XAMPP is installed and created a database using the phpMyAdmin web-based application to store data received by the LDR sensor and TDS sensor.

3.3 Data Source

In this study, the data used to perform this analysis is in the form of various types of water. 10 types of water as this data was carried out by direct observation at the author's residence. From the data obtained as follows:

- Aquades
- Faucet Water
- Salt Water
- Rice Washing Water
- Tea
- Orange Water
- Coca-Cola
- Milk
- Coffee
- Flour Water

3.4 Fuzzy Logic Sugeno Methods

Fuzzy logic is the logic of which contain elements of uncertainty or called vague. This logic has a membership degree in the range of 0 to 1. This study uses the Sugeno method of Fuzzy Logic. In this process, there is a way to find the membership value of each parameter and create a rule based on the fuzzification stage to produce output.

3.5 Building Project

The Steps below explain how to build this research:

1. Connecting the LDR sensor, TDS sensor, and Ethernet Shield to the Arduino Uno.
2. Connect the green, yellow, red LEDs to the breadboard that is already connected to the Arduino Uno.
3. The LDR sensor is installed at the bottom of the cup container
4. Places the water sample into the cup container and then puts it into the cup that has the LDR sensor installed
5. The TDS sensor is inserted into the water sample
6. After all sensors work to read the water sample, the results of The sensor will be processed using Fuzzy Logic, then the data will be sent to the database.