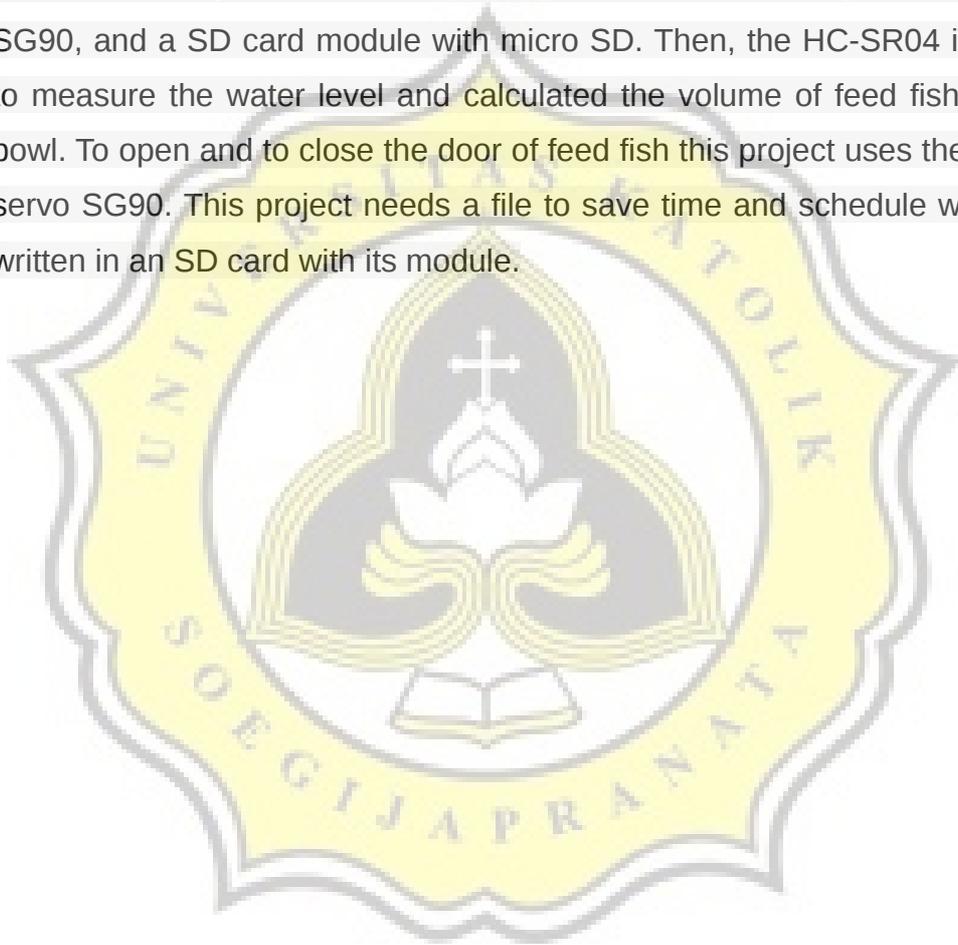


CHAPTER IV

ANALYSIS AND DESIGN

4.1 Analysis

The microcontroller in this project is a nodeMCU. This project uses several devices, there are a nodeMCU, an HC-SR04 sensor, a micro servo SG90, and a SD card module with micro SD. Then, the HC-SR04 is used to measure the water level and calculated the volume of feed fish in the bowl. To open and to close the door of feed fish this project uses the micro servo SG90. This project needs a file to save time and schedule which is written in an SD card with its module.



4.2 Design

4.2.1 Flowchart

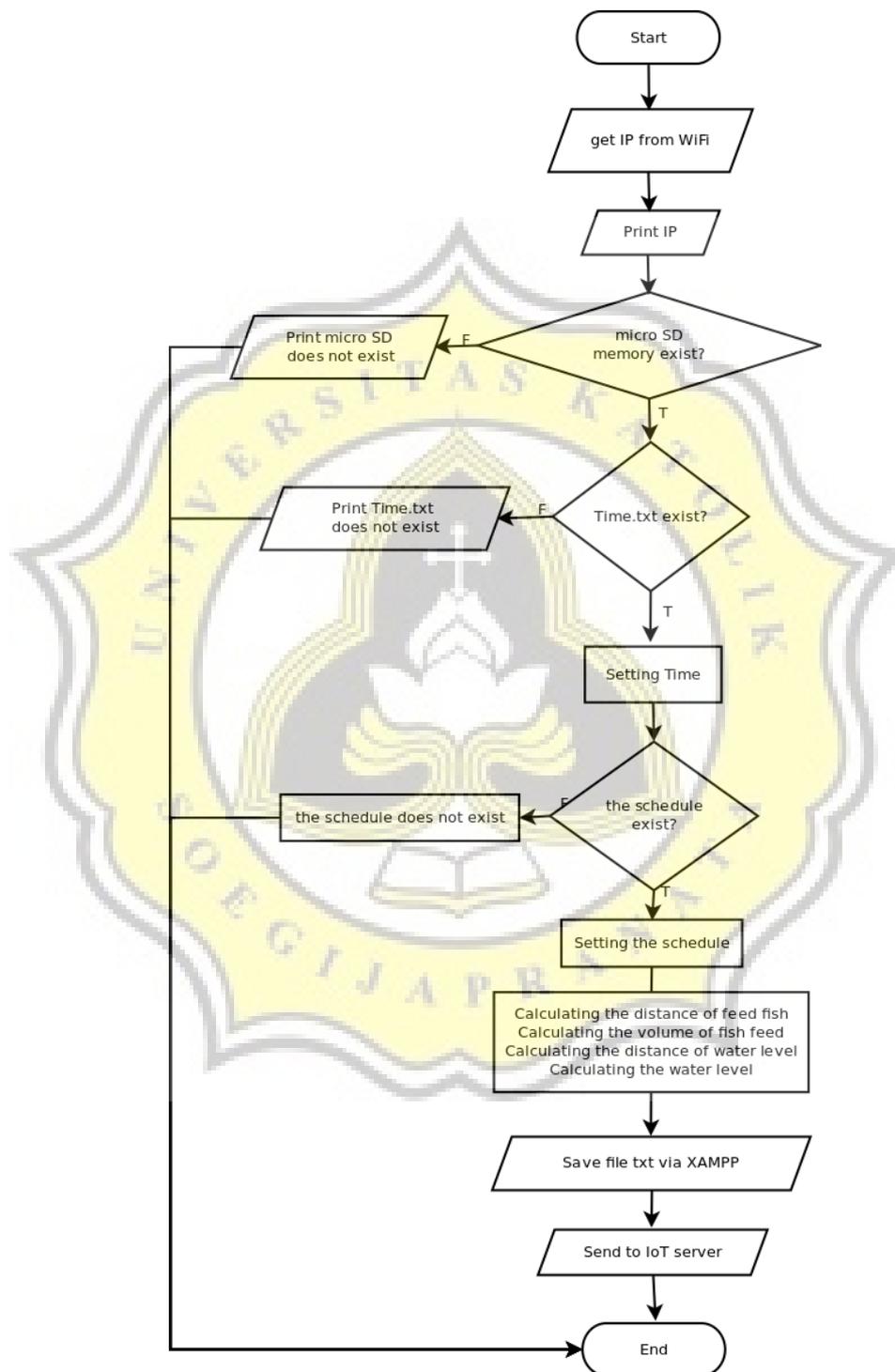


Figure 6: Flowchart

This program starts of the nodeMCU. The nodeMCU will connect to Wi-Fi. When the status of Wi-Fi is connected, the nodeMCU will get an IP address. After that, the nodeMCU will detect micro SD contained in the micro SD module. When the micro SD is detected then it will continue to read the time.txt file to set the time. After setting the time, nodeMCU will read the alarm.txt file and then continued to set the schedule to open and close the door of fish feed can.

This program will be continued with reading the distance of fish feed can. When the distance ≤ 0 cm and the distance > 50 cm, the distance is 0 cm. But when the distance > 0 cm and the distance < 50 cm, the distance will be calculated using the formula volume tube that will produce the volume of fish feed can. In the measurement of water levels also have requirements. When the water distance ≤ 0 cm and the distance the water > 21 cm, then the distance of water is 0 cm. But when the water distance > 0 cm and the water distance < 21 cm then the water distance will be calculated to determine the water level. After that the volume and the water level will be sent using HTTP protocol (port 81) and will also be sent to the IoT server (www.thingspeak.com).

4.2.2 Design Schematic

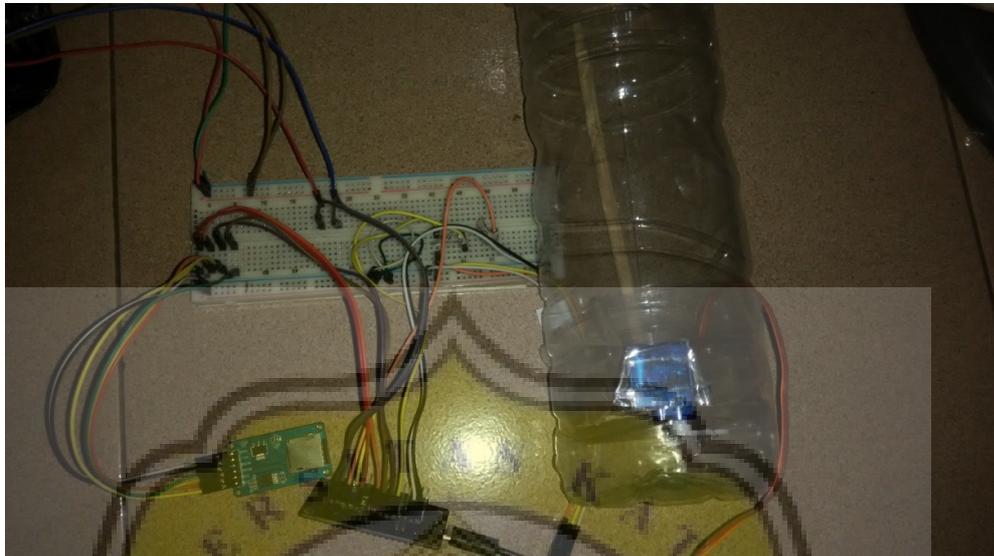


Figure 7: Design Schematic

Information:

The NodeMCU pin used in this project is 11 pins. That is D0,D1,D2,D3,D4,D5,D6,D7,D8,3V,GND. The HC-SR04 has 4 pins. That is VCC, GND, Trig, and Echo. The micro SD module has 6 pins. That is VCC, GND, MISO, MOSI, SCK, and CS. The micro servo has 4 pins. That is VCC, GND, and PWM.

The assembly of this machine as follows:

D0 - Trig (water level).

D1 - Echo (water level).

D2 - Echo (fish feed).

D3 - Trig (fish feed).

D4 - CS.

D5 - SCK.

D6 - MISO.

D7 - MOSI.

D8 - PWM.

VCC (3V) - Breadbord (+).

GND - Breadboard (-).