CHAPTER 3
RESEARCH METHODOLOGY

3.1.   Literatur Study

This research begins with a literature study, by looking for ten scientific journals containing smart sticks based on the Wemos D1 Mini microcontroller, NodeMCU and Arduino Uno and connecting the Ultrasonic buzzer sensor and GPS module. Several scientific journals cover how to connect and maximize the sensors and modules they have.

3.2.   Collecting Data

The data used in this study are distance and angle data from objects and humans that are used to detect obstacles using ultrasonic sensors, and data is also taken when passing through ditches and down stairs and passing through potholes. All of data using Ultrasonic Sensors HC-SR04.

3.3.   Implementation Program

Make a program using Wemos D1 Mini as a Microcontroller, Ultrasonic Sensor to determine the distance from objects/obstacles, buzzer that emits sound. in this program the output is a list of satellites, speed, direction, longitude and latitude, Buzzer emits sound, and Led emits light. Buzzer and LED notify if the sensor detects an obstacle/object in front with 0 - 15 degrees. The design of the program code uses the C/C++ programming language using the Arduino IDE software application.

3.4.   Testing

Test with all the data that has been measured. This study uses ultrasonic sensor distance data with human objects and walls to detect distance. After that, the next test is to determine the size of the distance 133cm, 200cm and 400cm and each distance is tested with an angle of 0°, 45° and 90°. The test is done manually and tested one by one starting from the angle tested for 100 tests, the 45° angle was tested for 30 tests and the 90° angle was tested for 30 tests. For testing the descent and descending stairs were tested for 100 tests and divided into 2 stages, namely testing down stairs for 50 tests and potholes / gutters for 50 tests.