ABSTRACT

Santigi is a type of bonsai plant that is sensitive to the surrounding environment, bonsai plants require soil moisture and adequate water intake as well as an ideal pH content to support plant fertility and freshness. In the treatment process, often bonsai nurses do not know how to detect the required pH levels in plants and still do watering manually without knowing the maximum amount of water that must be given to the plant soil to meet the water content required by the soil so that it is not excessive.

So in this final project, a tool is made to carry out a monitoring system for soil pH and watering plants automatically on santigi type bonsai. This system utilizes IoT (Internet of Things) technology using a NodeMCU microcontroller equipped with an ESP8266 WiFi module and Arduino Uno. Through this tool, the pH level contained in the soil and the soil moisture value can be monitored on the LCD and via a WiFi connection, the pH and soil moisture values will be sent automatically to the firebase database and can be monitored via the website by the user.

Based on the test results on soil in pots containing santigi bonsai plants, the tool can work to detect soil pH levels and soil moisture values well, and can automatically water when the humidity value is below 40% and watering will automatically stop when it reaches a value of 60. %. From the test results, the lowest average soil moisture value was at 18.00 (43.95%, 39.8% and 39.34%) and the highest soil moisture value was at 21.00 (58.77%, 61.52 %, 60 0.02%) for 3 days out of 7 days testing with the soil pH value approaching the ideal value every day. From the results of testing the delay in sending data from the hardware to the firebase database, the average value of data transmission time is 0.15 seconds.

***Keywords**:* Bonsai, *Monitoring, Automatic watering,* IoT, *soil* pH.