ABSTRACT

Watering and fertilizing chili plants are activities that are carried out so that the plants are healthy. The parameter that affects the growth of chili or other plants is soil moisture. Chili plants require adequate irrigation and if the soil pH is too acidic, chili growth tends to be affected by disease. The normal soil pH for chili is 6-6.5. The automatic fertilization and watering system uses an ESP32 microcontroller as the central controller that controls the system and is connected to moisture, pH, NPK sensors that send data to the Android application. The sensor sends information on soil conditions, and sends commands to the water pump and fertilizer servo to perform watering and fertilization. The collected data is processed using the Machine Learning Decission Tree algorithm to predict soil conditions. The moisture sensor achieved an accuracy rate of 95.45%. the pH sensor had an accuracy value of 94.69%. N sensor has an accuracy of 98.26%, P sensor 98.22%, K sensor 98.44%. Fertilizer is adjusted to the hole and dispenses a minimum of 1 gram of fertilizer. Each sowing of 1 gram of fertilizer will add 2 ppm to the nutrients. Machine Learning tests that MAE and MSE are low and show that the model has a small prediction error rate. For the R-Square value of 0.98, the model is very good at capturing the information needed to predict the target well. The overall test results show that the system performs well and meets the set objectives. From its automatic fertilization and watering, android application for monitoring and control of chili plants, machine learning with the algorithm used is good for predicting targets. From soil moisture, pH, and nutrients can be detected properly by the sensors used and have been compared with calibrated tools.

Keywords : NPK, ESP32, Android, Machine Learning, Decission Tree, Fertilization, Watering