

Abstract

Grape farming is one of the agricultural sectors with high economic value in many regions around the world, to achieve optimal yield and high quality of grapes, it is important for farmers to monitor and control the availability of plant nutrients, especially nitrogen, phosphorous, and potassium (NPK) in the soil. This research designs an internet of things (IoT)-based soil NPK monitoring and control system using a wireless sensor network (WSN) in the greenhouse of Telkom University Surabaya Campus. This system uses soil NPK sensors on two polybags connected to a microcontroller and WSN network. Sensor data is processed using fuzzy logic to produce the right soil control decision. The decision will be the input of the actuator that will control the watering of NPK fertilizer automatically, so that the soil NPK level will be maintained and maximize the growth of grape vines. The results show that the system is effective in controlling soil NPK, helping farmers optimize vine growth and increase crop yields. The system is expected to deliver fertilizer on time, avoid over-fertilization, reduce fertilizer costs, improve farmers' welfare, and national food production.

Keywords: Fuzzy, IoT, Soil NPK, Grape Vines, WSN.
