

DESIGN OF IOT (INTERNET OF THINGS) BASED AUTOMATIC NUTRITION MONITORING AND CONTROL TOOLS FOR HYDROPONIC PLANT SYSTEMS

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ABSTRACT

Rapid population growth in Indonesia causes agricultural land to decrease due to conversion to residential land and other things. In facing this problem, hydroponic plant cultivation has become an attractive alternative. Hydroponics is a method of growing crops without soil, using water containing nutrients as a substitute for media. Even though it has the advantage of using limited land and simplicity in cultivation, hydroponics still faces challenges such as manual nutrient regulation and difficult monitoring of temperature and water level. This research aims to design and develop an automation tool to regulate the nutrients and water level needed by hydroponic plants as well as automatically monitor environmental temperature and nutrient levels in the water. This tool uses a TDS (Total Dissolved Solids) sensor and an ultrasonic sensor to detect the level of water in hydroponic plant containers. Based on the data collected, the tool will adjust the water pump and nutrient valve to provide nutrients according to the plant's needs. Apart from that, this tool is also equipped with a temperature sensor to monitor temperature changes around hydroponic plants. Monitoring results can be accessed in real time via the Blynk application, so plant owners can monitor plant conditions easily via smartphone. The test results show that the success rate for ultrasonic sensor readings is 88.87% and Ppm readings with an average sensor error of 0.29%. Testing also produced a temperature reading error rate of 0.12% with a sensor reading success rate in some scenarios reaching 90%.

Keywords: *Hydroponics, chili, TDS sensor, Ultrasonic sensor, temperature monitoring, Blynk*