

ABSTRACT

Hydroponics is a future agricultural cultivation method that uses water as a growing medium. Therefore, there are several conditions that need to be maintained, for example the pH value, nutrient content and temperature of the water. If you control the water conditions manually, you will spend a lot of time and effort and are very susceptible to errors in the measurement. So we need a control system that can read water conditions especially the pH value, nutrient content and temperature of the water.

This control system uses several components to read water condition including the pH sensor, TDS sensor, temperature sensor, NodeMCU ESP32, 2 5V relays (4 channels and 2 channels), Peltier as a water cooler, 5V water pump, power supply, step down DC to DC, breadboard and 5V USB Charger. The data obtained after the sensor reads the water condition will be sent to the NodeMCU then displayed in the Blynk application, then if the data displayed does not match the criteria, the user can turn on the pump and water cooler to condition the water according to the desired criteria.

From the results of testing this system, it can be seen that all components function and work well. From the result of the pH sensor readings, PH-4502C compared to conventional pH meters has an error value of 0.4. The results of the RDD-AFE-007 TDS sensor readings compared to conventional TDS & EC meters have an error value of 143.56ppm. The results of the DS18B20 temperature sensor readings compared with digital thermometers have an error value of 0.175. The Blynk application can be connected to the microcontroller via WI-FI and data transmission can run well.

Keywords : Internet of Things, Hydroponics, NodeMCU, Blynk, pH sensor, TDS sensor, Temperature sensor, Peltier, Control system, Monitoring.