IOT-BASED SMART GREENHOUSE MONITORING ON TOMATO SEEDLINGS

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ABSTRACT

Greenhouse is a type of agriculture that uses a greenhouse system to help the growth of plant seedlings, one of which is tomato seedlings. Greenhouses still have shortcomings, including room temperature control, soil moisture, and light intensity that cannot be controlled properly, in addition, the lack of sunlight intensity in cloudy conditions or at night can inhibit the growth of tomato seedlings. In this study, researchers will build a smart greenhouse monitoring tool for tomato seedlings based on IoT. The smart greenhouse monitor working system is when the DHT11 sensor detects a room temperature of ≤ 27°C, the DC fan does not turn on, when the room temperature is ≥ 28°C, the DC fan turns on, the soil moisture sensor will detect soil moisture ≤ 40% then the water pump will turn on, if soil moisture ≥ 60% then the water pump will not turn on, the lux sensor detects light intensity ≤ 300lx then the growlight lamp will turn on, if the light intensity ≥ 1300lx the growlight lamp does not turn on, the ultrasonic sensor detects plants at a distance of ≤ 23cm then the LED lamp turns on, when the distance is ≥ 24 cm the LED lamp does not turn on, at 18.10 WIB the DC fan turns on for 2 minutes and stops at 18.12. WIB. Based on the test results, the DHT11 sensor shows room temperature readings with an error of 1.96% with an accuracy of 98.04%, the soil moisture sensor shows soil moisture readings with an error of 8.41 with an accuracy of 91.59%, the lux sensor shows light intensity readings with an error of 8.87 with an accuracy of 91.31%, the ultrasonic sensor shows distance readings with an error of 1.43% with an accuracy of 98.57%. Meanwhile, the growth of tomato seedlings using growlight lamps reaches 6.41 cm at plant height, number of leaves 4-5 strands, leaf width 1.34 cm, leaf length 2.34 cm, length of stalk to leaf tip 3.41, and lower stem diameter reaches 0.023 cm and not using growlight lamps reaches 4.89 cm at plant height, number of leaves 4 strands, leaf width 1.23 cm, leaf length 1.86 cm, length of stalk to leaf tip 2.94, and lower stem diameter reaches 0.02 cm during the 21-day growth period starting from the initial seed nursery.

Keywords*: Greenhouse, Blynk Application, MIT App Inventor Application, Growlight Lamp*