

**PERANCANGAN MODEL PREDIKSI PERTUMBUHAN TANAMAN
PADA *PLANT FACTORY* DENGAN METODE JARINGAN SARAF
TIRUAN**

INTISARI

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Aplikasi pertanian presisi pada *plant factory* dilakukan dengan pengamatan tumbuh kembang tanaman secara intensif guna mengamati perilaku dan memprediksi kapan waktu dan perkiraan hasil. Tujuan dari penelitian ini adalah merancang model prediksi pertumbuhan tanaman dengan metode jaringan saraf tiruan resilient backpropagation dengan input parameter lingkungan pada *plant factory*, dan mengevaluasi kinerjanya pada tanaman selada. Model prediksi pertumbuhan tanaman diuji coba dengan menggunakan jumlah neuron pada lapisan tersembunyi sebanyak 1-7 neuron dengan input suhu rata-rata harian, rata-rata kelembaban harian, EC, dan intensitas cahaya yang kemudian menghasilkan output pertambahan tinggi selada selama 45 hari. Hasil perancangan model dengan jaringan saraf tiruan yang terbaik menggunakan arsitektur jaringan 4-7-1 dengan hasil interpretasi R^2 pada data latih sebesar 0,987 dan R^2 data uji sebesar 0,728, dari hasil perancangan model dengan JST diketahui bahwa yang paling berpengaruh terhadap pertumbuhan tanaman selada yaitu kadar EC pada nutrisi. Hasil validasi model RMSE sebesar 0,032 sehingga model dapat diaplikasikan untuk memprediksi pertambahan tinggi tanaman selada.

Kata kunci: Jaringan saraf tiruan, prediksi pertumbuhan tanaman, prediksi tanaman selada

DESIGN OF PLANT GROWTH PREDICTION MODEL IN PLANT FACTORY USING ARTIFICIAL NEURAL NETWORK

ABSTRACT

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One of the applications of precision agriculture is the monitoring of plant growth in a plant factory production to observe the behavior and predict the estimated yield of plant production. Plant growth is unique and is affected by an internal and external factor, such as environmental condition and nutrition's supply. The estimation of plant growth considering the environmental conditions as well as initial plant height is necessary for plant management during the production cycle. Therefore, to answer the challenge, the purpose of this study was to develop a model of plant growth prediction using the resilient backpropagation Artificial Neural Network (ANN) method with environmental parameter input at the plant factory and evaluate the model. The ANN model was tested using a different number of nodes at the hidden layer, which are 1 to 7 nodes with the input of daily average temperature, average daily humidity, EC, and light intensity and then produces high lettuce increase output for 45 days. The model was developed and tested using the lettuce (*Lactuca sativa*.) in plant factory production. As a result of the evaluation, the best prediction model with ANN is using the network architecture 4-7-1 with the results of the interpretation of R^2 on the training data, and testing data are 0.987 and 0.728. From the verification test of the developed model, it can be found that the most affecting way to optimize the lettuce growth is the rate of EC in nutrition. The results of the RMSE model validation is 0.032. Accordingly, the developed model can be used to predict the height increase of Lettuce (*Lactuca sativa*.) plants in a plant factory.

Keyword: Artificial neural network, plant growth prediction, lettuce growth prediction