

Leaves Guard - Aplikasi Pendeteksi Malnutrisi Tanaman Selada Hidroponik Berdasarkan Kondisi Daun Dengan Metode Convolutional Neural Network

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Abstract

Many hydroponic farmers and beginners have difficulty in managing plant nutrition. This research aims to develop an application called "Leaves Guard" that utilizes the Machine Learning method of Convolutional Neural Network (CNN) model with ResNet-50 architecture, to detect malnutrition in hydroponic lettuce plants. ResNet-50 was chosen because this architecture is capable of extracting features from images with high precision, as well as overcoming the vanishing gradient problem, which often occurs in very deep neural networks, thus allowing the model to be trained more effectively and resulting in higher performance. This application analyzes leaf images to provide information on plant nutritional conditions, such as Nitrogen (N), Phosphorus (P), Potassium (K) deficiency, or healthy (S) condition. Using a dataset of classified lettuce leaf images, a CNN model is trained to recognize malnutrition patterns. The test results show that the model has the highest accuracy of 98%, which indicates that this application can provide accurate and fast malnutrition detection. The use of the "Leaves Guard" application can help hydroponic farmers improve cultivation efficiency, reduce losses due to malnutrition, and increase crop yields.

Keywords: Malnutrition, Convolutional Neural Network (CNN), ResNet-50, Hydroponics, Leaf Image.
