

ABSTRACT

As the times progressed, the industrial sector in Indonesia grew more rapidly which then shifted agricultural land to narrow. This resulted in farmers needing to look for other land to continue to be able to produce food. Hydroponics is a farming technique using water media as a substitute for soil that utilizes narrow land. One of the plants that is often applied to hydroponic techniques is lettuce. However, there are still poor quality lettuce plants due to lack of attention to their maintenance resulting in a lack of nutrition in lettuce plants. If the lettuce plant lacks nutrients, the plant is not suitable for production and the plant will die.

Therefore, this Final Project created a system for classification of nutritional deficiencies in hydroponic lettuce through leaf images based on 2 comparison scenarios between 4 deficiency categories, namely: Complete Nutrition (FN), Nitrogen Deficiency (minN), Phosphorus Deficiency (minPH) and Potassium Deficiency (minPO) with 2 deficiency categories, namely: Healthy (H) and Unhealthy (NH). This classification is carried out to identify nutritional deficiency problems that occur in lettuce plants. The method used in this Final Project is a Convolutional Neural Network (CNN) based on the MobileNetV2 architecture with transfer learning techniques.

The test results from the classification of nutrient deficiencies in hydroponic lettuce yielded an accuracy value of 85% for 4 deficiency categories and 100% for 2 deficiency categories. In this test, 80% of the dataset is used for training data using the Adam optimizer and 20% for test data. The platform used is Google Colab with Python as the programming language used. The test results on the 2 deficiency categories showed higher accuracy results compared to the classification of nutritional deficiencies in the 4 deficiency categories.

Keywords: CNN, hydroponic, lettuce, MobileNetV2, nutrition