

## ABSTRACT

Tomatoes (*Lycopersicon esculentum*), as one of the agricultural products in Indonesia with high economic value, are used not only for direct consumption, but also can be processed into various products. Tomato plants can be infected with diseases caused by pest organisms (OPT), which can decrease their economic value or even cause crop failure for farmers. They can suffer from various diseases such as leaf blight, mosaic virus, bacterial spot, etc.

The purpose of this study is to classify diseases on tomato leaves using a Convolutional Neural Network (CNN) by comparing CNN models on DenseNet121, MobileNet2, and NasNetMobile. This research focuses on exploring advanced transfer learning methods such as fine-tuning, custom layers, and data augmentation to improve the performance of the CNN model in classifying images of diseases on tomato leaves.

In this study, the evaluation metrics that will be analyzed are accuracy, loss, precision, recall, and F1-Score. From the tests that have been conducted, it was found that DenseNet121 is the best CNN architecture model among the three architecture models tested. This model uses the application of fine-tuning, augmentation and upsampling data, and the addition of custom special layers to the model. With hyperparameters input size 224×224, ADAM optimizer, learning rate 1e-4, and Batch size 64. Based on the results of these tests, the obtained test accuracy was 99.26% with a testing loss of 0.0284.

**Key Word:** *Deep Learning, Tomato Disease, CNN, Python, Fine Tune.*