ABSTACT

Coffee is one of the leading commodities in Indonesia, contributing significantly to the national economy through both exports and domestic consumption. However, coffee productivity is often threatened by leaf diseases such as leaf rust (Hemileia vastatrix), leaf spot (Phoma Costaricensis), and leafminer (Leucoptera Coffeella), which can cause significant declines in quality and yield. Manual identification of leaf diseases by farmers or agricultural experts often requires time and specialized expertise, making it prone to errors. This study aims to develop an automated classification system for coffee leaf diseases using a Convolutional Neural Network (CNN) with the MobileNet architecture.

The MobileNet architecture was chosen for its efficiency in handling data with limited computational resources, such as mobile devices. The classification process begins with data collection from the Kaggle dataset, which includes images of healthy leaves and those infected with diseases. This data undergoes preprocessing, including adjusting the image size to 224x224 pixels. The model is trained using key parameters such as optimizer, learning rate, batch size, and epochs to produce optimal classification.

The research was conducted using 1664 datasets, with a distribution of 400 healthy leaf data, 460 leaf rust data, 484 leaf spot data, and 320 leafminer data. A total of 333 data were used for testing. Through a series of tests with four different scenarios, the optimal model configuration was obtained, achieving an accuracy of 99.549%, loss of 0.058, precision of 95%, recall of 95%, and F1-score of 95%. The best parameters used were the RMSprop optimizer, a learning rate of 0.0001, 125 epochs, and a batch size of 16.

Keywords: Coffee Leaf, Convolutional Neural Network (CNN), MobileNet, Leaf Disease, Coffee Plant Leaf Image.