ABSTRACT

Fruits are an essential commodity with high demand, especially in Indonesia. However, the manual classification of fresh and rotten fruits has limitations in terms of efficiency and cost. Deep learning technology, particularly Convolutional Neural Networks (CNN), has been proven to improve accuracy and efficiency in large-scale image processing, including the automatic detection of fruit freshness. This study aims to develop a classification model for fresh and rotten fruits using the ResNet50 architecture with transfer learning. The dataset used is the *Fresh and Rotten Fruits Dataset*, consisting of a total of 3,200 images, divided into 70% training data, 15% validation data, and 15% testing data. Augmentation techniques were applied to enhance dataset variation. The model was trained using grid search to find the best hyperparameter combination, namely a batch size of 64, 128 dense units, a dropout rate of 0, and a learning rate of 0.001. The model achieved the highest F1-score of 99.37%, with optimal performance across most classes. Additionally, this study explores the impact of hyperparameters on model stability for use with new and different datasets. The results demonstrate the effectiveness of ResNet50 in distinguishing fresh and rotten fruits, significantly contributing to improving efficiency and accuracy in fruit management within the agricultural industry.

Keywords : Fruits Classification, CNN, Hyperparameter, ResNet50, Transfer Learning