ABSTRACT

Indonesia is an agrarian country where agriculture plays a pivotal role in national development. However, rice yields often decline due to challenges such as suboptimal detection and treatment of plant diseases. To address this issue, a technology-based solution is required to modernize the agricultural sector. This study aims to develop a model for detecting diseases in rice leaves using the EfficientNet architecture, implemented on mobile devices. The model development process involves collecting a rice leaf disease dataset from Mendeley Data, followed by dataset splitting, augmentation, and preprocessing using the Keras library. The training process includes hyperparameter tuning, model evaluation, and fine-tuning. The final model is converted to TensorFlow Lite format to support deployment on a mobile application developed using Flutter. The results demonstrate that EfficientNet is an effective architecture for detecting rice plant diseases. Fine-tuning EfficientNet-B0, B1, and B2 significantly improves accuracy, with EfficientNet-B2 achieving the best performance (accuracy, precision, recall, and F1-score of 0.99). Although EfficientNet-B2 has a higher runtime (478 ms), it is suitable for scenarios requiring high accuracy, while EfficientNet-B0 and B1 provide a better trade-off between runtime and accuracy for real-time applications. These findings suggest that the proposed solution can enable early detection of rice diseases, enhance crop yields, and accelerate agricultural modernization in Indonesia.

Keywords : EfficientNet, rice disease detection, mobile application, transfer learning, TensorFlow Lite.