ABSTRACT

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Mobile Application Development for Plant Leaf Disease Classification Using Deep Learning Convolutional Neural Network (CNN)

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Keywords: Android, Convolutional Neural Network, Deep Learning, EfficientNetB0, Plant Leaf Diseases Classification, Transfer Learning.

(xv + 145 + Appendix)

Indonesia, as an agrarian country, faces significant challenges in the agricultural sector, particularly related to plant diseases that often attack the leaves. Early detection of leaf diseases is crucial to prevent further spread and reduce the risk of crop failure. This study aims to develop a plant leaf disease classification model using Convolutional Neural Network (CNN) and implement it into an Android-based application to assist farmers in quickly and independently detecting diseases. The model was built using the EfficientNetB0 architecture and optimized with the Stochastic Gradient Descent (SGD) algorithm, trained for 30 epochs and fine-tuned for an additional 10 epochs. The dataset used consists of secondary data obtained from online sources such as Kaggle and Mendeley Data, comprising a total of 44,108 leaf images from 11 plant types and 60 disease classes. The model was trained using four different data splitting scenarios: 75:15:10, 70:20:10, 65:25:10, and 60:30:10 to identify the best proportion. The evaluation was conducted using classification reports and confusion matrices. The best performance was achieved with a 70:20:10 split ratio, resulting in 92.03% accuracy, 91.12% precision, 89.89% recall, and an F1-score of 89.96%. The final model was integrated into an Android application called Leaf Lives, featuring image classification via camera or gallery input, and a history feature for offline result storage. This application offers an AI-based solution that is lightweight, user-friendly, and accessible to farmers in various regions. The study demonstrates that combining CNN with mobile platforms can effectively enhance the speed and practicality of disease identification in agricultural settings.

Bibliography (2013-2025)