ABSTRACT

IMPLEMENTATION OF MACHINE LEARNING FOR DISEASE DETECTION IN COFFEE PLANT LEAVES BASED ON ANDROID USING THE CONVOLUTIONAL NEURAL NETWORK (CNN) METHOD

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Coffee is one of the key commodities in many countries, including Indonesia. However, diseases affecting coffee plants, such as Leaf Rust, Red Spider Mite, Miner, and Phoma, can reduce both the quality and yield of the harvest. Coffee farmers often face difficulties in accurately identifying these diseases, which can lead to delays in appropriate treatment. Therefore, this study aimed to develop a disease detection system for coffee plant leaves using a Machine Learning approach with the Convolutional Neural Network (CNN) method, implemented within an Android-based application. The study utilized a dataset of coffee leaf images obtained from Kaggle and directly captured in the field. The data were processed through several stages, including preprocessing, data augmentation, labelling, and CNN model training using TensorFlow Lite to ensure compatibility with mobile devices. The developed CNN model consisted of four convolutional layers and one fully connected layer, achieving a training accuracy of 90%. The resulting application allowed users, particularly farmers, to detect diseases in coffee leaves in real time by simply capturing photos with a smartphone camera. The system provided classification results along with information and suggested treatments for each disease. Test results proved that the application could detect coffee leaf diseases with high accuracy, offering convenience and efficiency for farmers in identifying and managing plant diseases.

Keywords: Machine Learning, CNN, Disease Detection, Coffee Plants, Android