

IMPLEMENTING CONVOLUTIONAL NEURAL NETWORK METHOD ON APPLE PLANT DISEASE CLASSIFICATION BASED ON LEAF IMAGE

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ABSTRACT

Apple leaf diseases can lead to significant reductions in crop yields, adversely affecting the livelihoods of farmers and the agricultural industry as a whole. Given the increasing demand for high-quality apples, it is essential to develop practical solutions for the early detection of apple plant diseases. This study aims to create an automated system capable of identifying apple plant diseases through leaf image analysis, utilizing a Convolutional Neural Network (CNN) model. The CNN model is designed with the ResNet50V2 architecture to classify four leaf conditions, which include three common diseases and one healthy state. The research process employs the Waterfall development method, commencing with a needs analysis and the collection of data for the CNN model. This setup is followed by the design of the classification system interface, the implementation of the program code, and the testing of functionality through black-box testing. The CNN model was developed by collecting 150 images from apple plantations in Malang and 3,071 images from public datasets on Kaggle, followed by initial processing and model training. The results demonstrated that the system for apple plant disease classification developed using the CNN model exhibited a classification accuracy of 99.01%, and the system functionality operated effectively.

Keywords: *Convolutional Neural Network, Classification, Apple Plants, Digital Image.*