Classification of Leaf Diseases in Rice Plants and Recommendations for Management Using the Convolutional Neural Network Method Based on Android.

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ABSTRACT

The rice leaf disease identification system is an important aspect of maintaining the quality of rice production. This study aims to develop an Android-based application, Harvest-Guard, which can help farmers identify rice leaf diseases and provide recommendations for appropriate treatment. This application uses image-based Deep Learning technology with the Convolutional Neural Network (CNN) algorithm. This method has been proven effective in classifying rice leaf diseases with a very high level of accuracy. During testing, removing duplication, balancing data, and utilizing data augmentation techniques to the training model successfully improved model performance, achieving 99% accuracy in each disease class. Model evaluation was carried out using the Confusion Matrix and Classification Report to ensure each class's precision, recall, and f1-score of each class. The test data used was 10% of the total 4328 image data for four classes of rice leaf diseases. In addition, the user satisfaction test showed excellent results, with an average percentage of 88% from five respondents. Testing using black box testing also produced results by the nine features of the Harvest-Guard application. With Harvest-Guard, farmers are expected to more easily detect and handle rice leaf diseases to improve the quality of the harvest and overall food security.

Keywords: Rice Leaf Disease, Harvest-Guard, Convolutional Neural Network (CNN), Deep Learning, Android Application, Disease Classification.