ABSTRACT

The decline in rice productivity in Indonesia is largely attributed to drought and leaf diseases that are often detected too late, necessitating the development of early detection systems based on technology to support decision-making in rice cultivation. This study aims to develop a classification model based on color and texture feature extraction using the CSPDarknet architecture to automatically identify the condition of rice leaves. Addressing this issue is crucial as manual methods are still predominantly used by farmers, which are prone to subjective errors and time-consuming processes. The dataset consists of augmented images of rice leaves to enhance data diversity, followed by color and texture-based feature extraction before being fed into the classification model. The model architecture utilizes the CSPDarknet backbone integrated with C2f blocks, SPPF, Global Average Pooling, and dropout to improve generalization. Model training was carried out using a 5-Fold Cross-Validation scheme and three optimizer variations: SGD, Adam, and AdamW. Experimental results showed that the model using the AdamW optimizer achieved the best performance, with an average accuracy of 99.72%, precision of 99.73%, recall of 99.72%, and F1 score of 99.72%. These findings indicate that the CSPDarknet-based classification approach can accurately differentiate between healthy, diseased, and drought-affected rice leaves. For future development, this system can be further enhanced through the integration of Internet of Things (IoT) devices based on Raspberry Pi to enable real-time monitoring of plant conditions in agricultural fields.

***Keywords**: Rice Leaf Classification, CSPDarknet, Drought, Plant Disease, Color And Texture Feature Extraction.*