ABSTRACT

This research successfully designed and implemented a system for detecting strawberry leaf diseases using the CNN VGG-16 and ResNet-50 models. The models demonstrated the capability to classify three conditions of strawberry leaves – healthy, tipburn, and leaf spot – achieving an accuracy of 98.39% on the training data and 99.54% on the testing data for the VGG-16 model. The ResNet-50 model achieved accuracies of 81.29% on the training data and 89.82% on the testing data. To enhance the training process and mitigate overfitting, the study employed the ImageGenerator module for real-time augmentation and labeling during the strawberry leaf disease classification. This approach improved data quality and diversity, accelerated model training, and reduced overfitting. Data preprocessing involved the removal of blurry, unclear, or low-quality images, resulting in a dataset comprising 2,421 images for training, 603 images for validation, and 100 images for testing. The research further demonstrated the suitability of the VGG16 model for the classification of tipburn and leaf spot diseases on strawberry leaves. Performance comparison between the VGG-16 and ResNet-50 models, using accuracy and loss metrics, revealed that the VGG-16 model outperformed the ResNet-50 model. The VGG-16 model exhibited a loss of 0.48% on the training data and 0.14% on the validation data, while the ResNet-50 model had a loss of 4.60% on the training data and 2.66% on the validation data. This study contributes valuable insights into the effective application of CNN models for strawberry leaf disease classification, highlighting the superiority of the VGG-16 model over ResNet-50 in this context. The use of real-time augmentation and careful dataset curation further enhances the practical utility of the proposed system for agricultural applications.

***Keywords**: Accuracy, Convolutional Neural Network, Deep learning, Image Classification, Strawberry Plant Disease*