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| **Abstract:** |  |
| Abstract— To meet the increasing need for food from a growing global population, it is imperative to make progress in agricultural technology, namely in the area of disease detection. This will help reduce the need for pesticides and improve the overall health of crops. The issue at hand is the need for accurate and effective identification of plant diseases to enhance food production. This research tackles this problem by using cutting-edge computational neural networks (CNNs) on pre-existing agricultural datasets to assess and compare their effectiveness. Existing research does not show the precise and detailed performance of the latest CNN models in agricultural data sets. We addressed this issue by examining five Convolutional Neural Network (CNN) models: AlexNet, GoogLeNet, VGG19, ResNet50, and ResNet101. This approach involved meticulous training and assessment of these models to compare their precision, loss, duration of training, and complexity of the model. ResNet 101 outperformed all other models with an accuracy rate of approximately 97%. Nevertheless, the practical implementation of this technology is hindered by its intricate model complexity and demanding resource needs, which make it unsuitable for low-power applications. GoogLeNet demonstrated superior performance in terms of accuracy, model complexity, training time, and other evaluation measures. | |