

Comparison of Deep Convolutional Neural Networks Models for Plant Disease Identification

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Abstract : Identification of plant diseases has been performed using machine learning and deep learning models on the datasets containing images of healthy and diseased plant leaves. The current study carries out an evaluation of some of the deep learning models based on convolutional neural network (CNN) architectures for identification of plant diseases. For this purpose, the publicly available New Plant Diseases Dataset, an augmented version of PlantVillage dataset, available on Kaggle platform, containing 87,900 images has been used. The dataset contained images of 26 diseases of 14 different plants and images of 12 healthy plants. The CNN models selected for the study presented in this paper are AlexNet, ZFNet, VGGNet (four models), GoogLeNet, and ResNet (three models). The selected models are trained using PyTorch, an open-source machine learning library, on Google Colaboratory. A comparative study has been carried out to analyze the high degree of accuracy achieved using these models. The highest test accuracy and F1-score of 99.59% and 0.996, respectively, were achieved by using GoogLeNet with Mini-batch momentum based gradient descent learning algorithm.

Keywords : comparative analysis, convolutional neural networks, deep learning, plant disease identification

Conference Title : ICIASF 2021 : International Conference on Intelligent Agriculture and Smart Farming

Conference Location : Tokyo, Japan

Conference Dates : September 09-10, 2021