

Classification of Cassava Leaf Diseases using Deep Gaussian Transfer Learning Model

Ahishakiye Emmanuel¹, Ronald Mwangi², Petronilla Murithi², Kanobe Fredrick¹, and Taremwa Danison¹

¹Kyambogo University

²Jomo Kenyatta University of Agriculture and Technology

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Abstract

In Sub-Saharan Africa, Professionals visually analyse the plants by looking for disease markers on the leaves to diagnose cassava infections, however, this method is extremely subjective. Automating the identification and classification of crop diseases may improve the accuracy of professional disease diagnosis and enable farmers in remote areas to monitor their crops without the assistance of experts. Algorithms for machine learning have been used in the early detection and classification of crop diseases. Motivated by the current developments in the field of Gaussian Processes, this study proposes to integrate the transfer learning approach with a deep Gaussian convolutional neural network model (DGCNN) for the detection and classification of cassava diseases. During this study, we used MobileNet V2 and VGG16 pre-trained transfer learning models and a hybrid kernel. Experiments with MobileNet V2 and a hybrid kernel revealed an accuracy of 90.11%. Also, experiments with VGG16 and a hybrid kernel revealed an accuracy of 88.63%. The major limitation of this study was computing resources since we used an ordinary computer in all our experiments. In our future work, we will experiment with the three kernel functions used in this study with kernel algorithms such as support vector machines and compare the results with those obtained during this study.

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