Deep Learning based Apple Fruit Disease Detection using Dense Net Recursive Convolutional Neural Network (DNRCNN)

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Abstract:. *Every year, fruit diseases cost the apple industry a lot of money. It can be challenging for growers to identify various apple infections because the symptoms of various illnesses are often similar and may overlap. In this study, we suggest a deep learning-based method for identifying and categorizing apple diseases. Dataset generation, which includes data collection and data labelling, is the first stage of the investigation. On the prepared dataset, we then trained a deep learning-based Dense Net Recurrent Convolutional Neural Network (DNRCNN) model for automatically classifying apple diseases. The end-to-end learning algorithm DNRCNN is appropriate for a range of tasks including image classification, object detection, and segmentation because it automatically extracts complex features from source images and learns them directly. Initialize the parameters of the proposed deep model using transfer learning. To avoid over-fitting, data augmentation techniques like rotation, translation, reflection, and scaling are also used. On the prepared dataset, the proposed Dense Net Recursive Convolutional Neural Network (DNRCNN) model achieves promising results, with an accuracy of about 96%. Some of the intricate and helpful image characteristics for detection are captured by the suggested model for classification. The model can learn the higher-order features of two adjacent layers that are not in the same channel but have a high correlation more effectively than existing techniques. High training and validation accuracy have been achieved when training and validating the suggested model. The findings support the method's usefulness in categorizing different apple diseases and show that it can be useful for farmers*

Keywords: Diseases, apple, farmers, image, transfer learning, Dense Net Recursive Convolutional Neural Network (DNRCNN), accuracy, classification