Classification of avocado fruit disease using wca based deep cnn model

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Abstract

Classification of diseases automatically reduces a large work of monitoring in big farms. Deep learning plays an important role in classification diseases from the fruits. This research work presents a WCA (Water Cycle Algorithm) based Deep Convolutional Neural Network (DCNN) model for classification of Avocado fruit diseases occurred in agricultural product. This research work considers Avocado fruit disease image databases as input to the proposed model. It is proposed to identify and classify the disease by taking high resolution images from FAOSTAT, **Database** (2019). The proposed WCA based deep convolutional neural network model obtained an accuracy of 98.82% in comparison to DCCN and LSTM (Long short-term memory) model and the comparison results are   presented.
 Keywords: convolutional neural network, Avocado, Deep CNN, LSTM   model,

Introduction

Crop and fruit do suffer from diseases and there are number of plant related diseases which affects the normal progress of a fruit. Suitable analysis of such diseases is required to for accurate identification and treatment of diseases. To detect a fruit disease in very initial stage, use of disease classification is beneficial. The existing method for fruit disease detection through naked eye observation by the agricultural experts and due to which consulting experts becomes even cost high as well as time consuming too through the conventional observations. The automatic detection and classification of fruit disease will help the agricultural experts. So the solutions to the above problems can be achieved by using image processing algorithms for automatic identification of affected areas of disease and determination of the difference in the color of the affected area. Classification of diseases in fruits is a relatively complex and a tedious task if considered manually due to varieties of shape and size of the fruit. Agricultural productivity of fruit highly depends on the economic growth. Automatic classification of Avocado disease is beneficial, since it reduces a large monitoring work in large crop farms. If proper attention is not emphasized in this area then it effects the fruit due to which product quality and productivity is affected. Some of the conventional classifiers are proposed by researchers for plant disease using ANN, SVM, and PNN, to increase the recognition rate of classification process. The remote area plant disease detection can be accomplished by using texture segmentation, K-means clustering technique, Bayes classifier and principal component classifier etc. The Avocado diseases identification and classification is focused in this research work. The fruit Avocado is highly appreciated not only because of its high nutritional value but also for its role in the cosmetic and health industries. Now a days the production rate of Ethiopia becomes 3,300 tons per year in the tropical and subcontinent areas. However the production is high, at the same time the fruit Avocado is threatened by diseases which affects economically which limit production and reduce fruit quality in the country like Ethiopia. In Avocado fruits, some general diseases seen are "brown and yellow spots, early and late scorch, and others are fungal, viral and bacterial diseases". Castro AI et al.(2015)[1] presented a study to evaluate the potential to discriminate "laurel wilt-affected avocado trees"