Sustainable Smart Agriculture: Plant disease detection with deep learning techniques in cotton cultivation

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ABSTRACT

To meet the needs of an ever-growing global population, the agricultural sector has the responsibility of increasing production, managing diseases and pests that attack crops, and implementing sustainable practices. Deep learning techniques used in sustainable smart agriculture have proven effective in this scientific field for their fast and reliable predictions and their contribution to accurate classifications, for reducing the reckless use of agrochemicals that impose a burden on crops. Early stage plant infestations detection is essential for rapid treatment achievement in order to reduce or eliminate its negative effects on the crops. In this work Convolutional Neural Networks (CNN) models were used, focused on the detection and recognition of pests and diseases. Specifically, using transfer learning from the pre-trained EfficientNet model, the model's accuracy and loss function were examined on a new data set with images of cotton plants from Greek crops, in order to identify healthy and aphid-infested plants.

KEYWORDS: Convolutional Neural Networks, Plant Disease Detection, Smart Sustainable Agriculture

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