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# A Robust Dense Neural Network for Cotton Disease Detection

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**Abstract:** *One of the most significant crops in the world and a major source of revenue for many farmers is cotton. However, a number of illnesses that have the potential to significantly reduce yields frequently impede cotton production. The diseases Fusarium wilt, Verticillium wilt, and Cotton leaf curl virus all harm cotton leaves. The primary method chosen and used in practise to identify plant diseases is skilled naked eye inspection. Farmers can limit crop losses by taking preventative measures with the help of early identification and accurate prediction of these diseases. Deep network CNN models have several issues in the work that has already been done, including a large number of parameters, long training times, high storage costs, high computational costs, and low recognition accuracy of 89%. The DenseNet algorithm, a deep learning method, is used in the suggested system to attain state-of- the-art performance in picture identification tasks. On a dataset made up of pictures of healthy and ill cotton plants, we adjusted the pre-trained DenseNet model. the major criteria, including F1 score, recall, accuracy, and precision. Early diagnosis of the disease enables farmers to take the required precautions, such as using pesticides and fungicides or eradicating the infected plants, to stop it from spreading and from losing their entire harvest. The suggested methodology can help cotton growers detect and stop the appearance of plant diseases, boosting crop yields and profitability. A farmer can decrease the impact of illnesses on their cotton crops by taking the appropriate precautions with the aid of the prevention control strategy. The proposed model study emphasizes the importance of early disease detection and effective preventative measures for guaranteeing sustainable cotton output. Overall accuracy for the suggested model was 98.8%*

**Keywords:** Convocational Neural Network, Cotton Leaf Disease, Dense Neural Network, Keras, TensorFlow

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