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Cotton Plant Disease Prediction Using Deep Learning

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Abstract: ***The use of deep learning models to identify lessions on cotton leaves on the basis of images of the crop in the field is proposed in this article. Its cultivation in tropical regions has made it the target of a wide spectrum of agricultural pests and diseases, and efficient solutions are required. Moreover, the symptoms of the main pests and diseases cannot be differentiated in the initial stages, and the correct identification of a lesion can be difficult for the producer. To help resolve the problem, the present research provides a solution based on deep learning in the screening of cotton leaves which makes it possible to monitor the health of the cotton crop and make better decisions for its management. For this approach, Automatic classifierCNN will be used for classification based on learningwith some training samples of that twocategories. Finally the simulated result shows that used network classifier provides minimum error during training and better accuracy in classification.***
Keywords: Plant disease, deep learning, CNN, Classification.

I. INTRODUCTION

This work presents cotton plant disease detection using image processing technique for automated vision system used at agricultural field. In agriculture research of automatic plant disease detection is essential one in monitoring large fields of crops and thus automatically detects symptoms of disease as soon as they appear on plant leaves. It is very difficult for a farmer to identified various disease in plants. The estimated annual crop losses due to plant disease at the worldwide is $60 Billions. The traditional tools and techniques are not very useful since it takes lots of time and manual work.

A plant disease is a physiological abnormality. Once a plant suffers from any disease. Once a plant suffers from any disease it shows certain symptoms. Symptoms are the outwardchanges in the physical appearance of the eyes. Illustrations ofsymptoms are wilt leaf spots, rots, cankers and many more.

The main goal of this model is to detect the disease of acotton plant and provide the cure of the disease. Here the CNNmodel is used to predict the plant is diseased or not based on spot on the leaves. The proposed research work applies the concept of ensemble learning, that is implemented through deep learning algorithm. After implementation the result is compared to get the model that has the highest accuracy.

II. LITERATURE REVIEW

Before doing this work, we tend to scan and check out to know some source paper work in order that we are able to do our work accurately. The paper which we tend to scan before beginning this work is introduced here as literature review. Throughout reviewing these papers it is clear that for malady detecting, classifying and measurement different types of authentic model is introduced by researcher.For plant disease detection, classification and measurement properly innumerable innovative techniques are established by researcher and their work aestival is enclosed during this section.

Esker published a conference paper for detection Stewarts disease on corn whose scientific name is Panto eastewartii subsp in 2006.They used three predictor model for establish the stewartia corn disease and these three model name are Stevens-boewe and lowa state.Among these three models stevens-boewe finds the Stewarts disorder leaf blight section.[1].

Umair Ayub published an international conference paper in Pakistan for finding crop disorder dealing with Data Mining,2018[2]. In this research work they principally introduced losses which arefaced by Pakistani farmer and theses losses appear due to crops diseases which is occurred by the attack of insects. For analyzing the disorder properly they used many data mining model for instance Neural Network, Supporting Vector Machine, Decision Tree and K Nearest Neighbors etc. James rethinks feature of Transgenic crops in 2002 and therefore the demand of maize over the world [3]

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Here introduced that the corn approximate requirement id 852million at 2020. The financial losses is caused by the heavy uses of pesticides in corn is given by the Craig Osteen within the Economic Threshold Concepts [4].

Ravi introduced a clear transparent thought of the origination of peach, its biological action and Morphology using Medical Phytochemicals [5].

Here they principally centered on the use of peach fruits accordingto medicine and therefore the use of various betterment of human being. Naeem identify and manages fungal post-harvest pathogens of peach using morphological model [6].

In 2018 International conference on Design Innovations for 3Cs Compute communicate control(ICDI3C) published paper on "cotton plant disease detection using Machine learning". Emergence of correct techniques within the field of leaf-based image classification has shown spectacular results. This paper makes use of Random forest in characteristic between healthy and diseased leaf from the data sets created. This paper includes numerous phases of implementation namely dataset creation, feature extraction, training the classifier and classification. The created datasets of diseased and healthy leaves are collectively trained under random forest to classify the diseased and healthy images. For extracting features of an image they used Histogram of an Oriented Gradient (HOG).Overall using machine learning to train the large datasets available publicly offers us a transparent thought to detect the disease present in plants in a colossal scale.[7]

Muhammad Hammad Saleem, Johan Potgieter and Khalid Mahmood Arif published their paper on 'Plant disease detection using deep learning". Plant diseases have an effect on the expansion of their various species, therefore their early identification is extremely vital.

Several Machine Learning (ML) models are used for the detection and classification of plant diseases but, after the advancements in a subset of ML, that is, Deep Learning (DL), this area of research appears to have great potential in terms of increased accuracy. Many developed/modified DL architectures are implemented along with several visualization techniques to detect and classify the symptoms of plant diseases. Moreover, several performance metrics are used for the evaluation of these architectures/techniques. This review provides a comprehensive explanation of DL models used to visualize various plant diseases. In addition, some research gaps are identified from which to obtain greater transparency for detecting diseases in plants, even before their symptoms appear clearly.[8]

Agricultural productivity depends heavily on the economy. This is one of the reasons why plant disease detection plays a major role in agriculture. As plant disease is sort of natural and if proper care is not taken in this area, it has serious effects onplants and affects the quality, quantity or productivity of the respective products. Detection of plant disease using some automatic technique is beneficial because it reduces a large monitoring work in large crop farms and detects thesymptoms of diseases at a very early stage, i.e. when they appear on plant leaves. This paper covers survey on different methodologies to detect plant leaf and fruit diseases using neural network.[9].

They mainly characterize the fungal by morphological model and verified motive of postharvest rot of peach. During this work main focus was on the detection of plant diseases and provides acceptable cure instantly. For doing this work here used image processing and authentic technologies like CNNso that the illiterate farmer can get immediate result with high accuracy.

III. CONCLUSION

Neural Networks provided us the primary step towards AI by generating a model based on how our own human body learns. Through mimicking neuron interaction within the body, researchers about 20 years ago were truly able to conquer something that had never been done before. Before neural nets, there have been only a few, if at all, models that were actually trained on how our body learned.

During this paper we tend to gift a review of the utilization of neural network models within the field of plant disease detection. The literature shows that color, texture and morphological characteristics are best suited to the identification and classification of diseases in plants.

Artificial neural networks (ANN) and Convolutional neural network (CNN) are the most commonly used neural network models. Automatic detection of plant diseases would solve thematter of pricey domain professional.

Detection of plant diseases in early stage would facilitate farmers to boost thecrop yield, that successfully improves country's gross domestic product.

Future analysis can embrace an evaluation of the capability of the algorithm rule to diagnose the cause of the lesion (what pest or disease). Moreover, the planned algorithm are going to be enforced with the utilization of a software which can be utilized throughout actual field visits to facilitate the creation of maps of the extent of infestation by pests and diseases.

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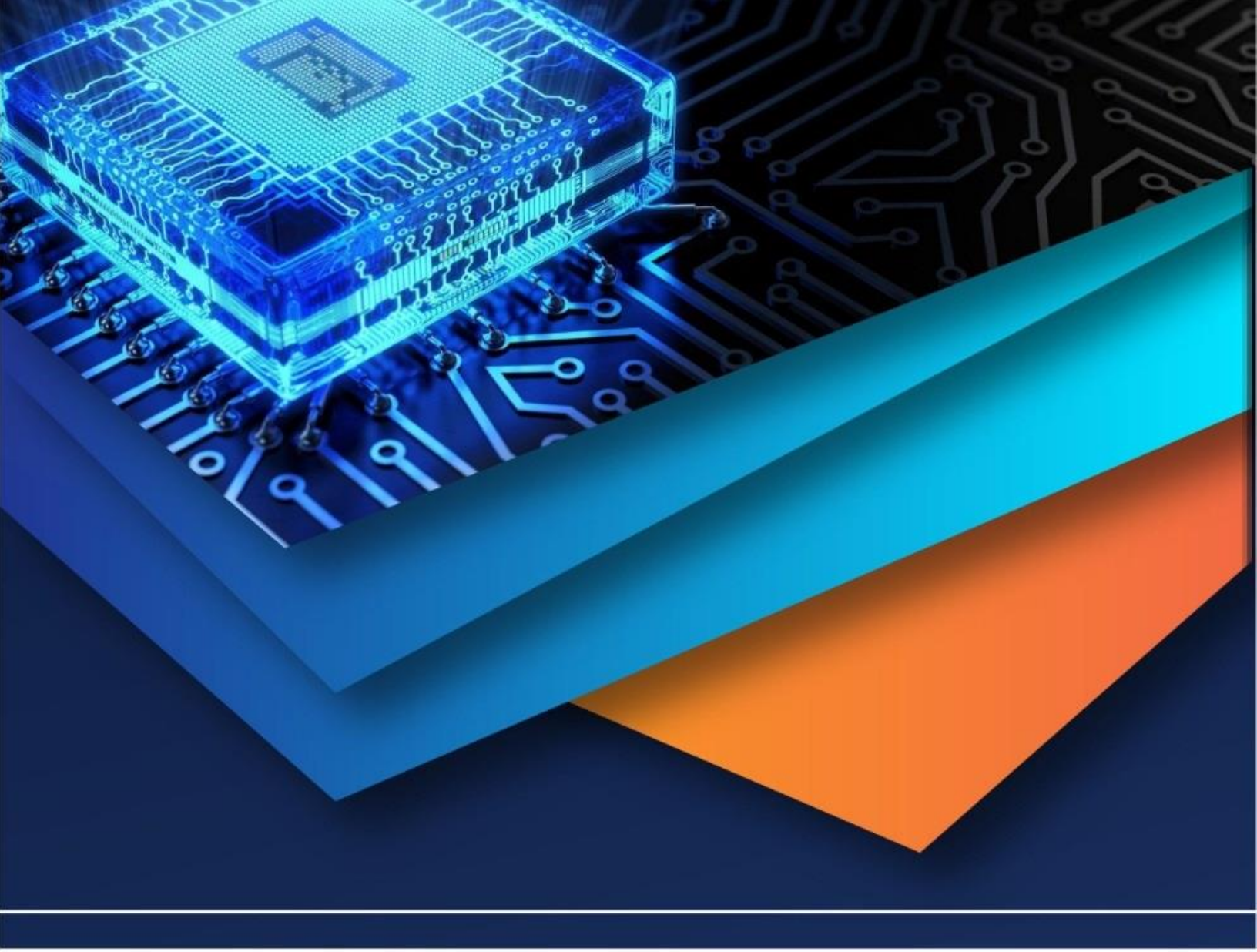
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