Fertilizer Recommendation System For Disease Prediction

Introduction

India is an agricultural country and depends on agricultural products for their wellbeing. It is agriculture that promotes the economic growth and the development of our country. But recently many problems have been faced by the farmers due to certain natural calamities. Apart from these major calamities, they were also in lack of sufficient knowledge about the nutrients present in their soil. The characteristics of the soil type vary accordingly based on its nutritive value. Not only the soil type, the climatic condiion and the usage of fertilizer also play a major role. Certain varieties of crops can be cultivated based on the climatic condition in their locality and accordingly the fertilizers can be preferred. In certain situation the usage of fertilizers also affects the cultivation. Under a climatic condition the cultivation of a right crop, usage of right fertilizer to the soil gives better yield. Mostly, fertilizers were recommended based on the nutrients present in the soil. Hence while preferring fertilizer the farmer needs to consider the soil type, the crop and the pesticides. On using chemical fertilizer the quality or the nutrients present in the soil was degraded, that promotes a decrease in the nutritive value of the soil. Another major factor to be considered is the disease in the crop cultivated. Identifying the disease in the plants and preferring appropriate fertilizer by the agriculturist to the farmers plays a major role. In earlier days, all these process were carried out manually. But with the advancement of technology the entire system was digitalized. But even then there exist various problems that need careful attention. On considering all these the authors proposed a new framework that can be used in real life, which enables the farmers in solving certain problems.

Literature Review

[1] The proposed method uses SVM to classify tree leaves, identify the disease and suggest the fertilizer. The proposed method is compared with the existing CNN based leaf disease prediction. The proposed SVM technique gives a better result when compared to existing CNN. For the same set of images, F-Measure for CNN is 0.7and 0.8 for SVM, the accuracy of identification of leaf disease of CNN is 0.6 and SVM is 0.8.

Advantages : The prediction and diagnosing of leaf diseases are depending on the segmentation such as segmenting the healthy tissues from diseased tissues of leaves.

Disadvantages : This further research is implementing the proposed algorithm with the existing public datasets. Also, various segmentation algorithms can be implemented to improve accuracy. The proposed algorithm can be modified further to identify the disease that affects the various plant organs such as stems and fruits.

[2] Detection of Leaf Diseases and Classification using Digital Image Processing
International Conference on Innovations in Information, Embedded and Communication Systems(ICIIECS), IEEE, 2017.
Advantages: The system detects the diseases on citrus leaves with 90% accuracy.

Disadvantages: System only able to detect the disease from citrus leaves.

The main objective of this paper is image analysis & classification techniques for detection of leaf diseases and classification. The leaf image is firstly preprocessed and then does the further work. K-Means Clustering used for image segmentation and then system extract the GLCM features from disease detected images. The disease classification done through the SVM classifier.

Algorithm used: Gray-Level Co-Occurrence Matrix (GLCM) features, SVM, K-Means Clustering .

[3] Semi-automatic leaf disease detection and classification system for soybean culture IET Image Processing, 2018

Advantages: The system helps to compute the disease severity.

Disadvantages: The system uses leaf images taken from an online dataset, so cannot implement in real time. This paper mainly focuses on the detecting and classifying the leaf disease of soybean plant. Using SVM the proposed system classifies the leaf disease in 3 classes like i.e. downy mildew, frog eye, and septoria leaf blight etc. The proposed system gives maximum average classification accuracyreported is ~90% using a big dataset of 4775 images.

Algorithm used: SVM.

[4] The author proposes a method which helps us predict crop yield by suggesting the best crops. It also focuses on soil types in order to identify which crop should be planted in the field to increase productivity. In terms of crop yield, soil types are vital. By incorporating the weather details of the previous year into the equation, soil information can be obtained.

A**dvantages :**It allows us to predict which crops would be appropriate for a given climate. Using the weather and disease related data sets, the crop quality can also be improved. Prediction algorithms help us to classify the data based on the disease, and data extracted from the classifier is used to predict soil and crop.

Disadvantages : Due to the changing climatic conditions, accurate results cannot be predicted by this system.

[5]   The current work examines and describes image processing strategies for identifying plant diseases in numerous plant species. BPNN, SVM, K-means clustering, and SGDM are the most common approaches used to identify plant diseases.

Disadvantages : Some of the issues in these approaches include the impact of background data on the final picture, optimization of the methodology for a specific plant leaf disease, and automation of the technique for continuous automated monitoring of plant leaf diseases in real-world field circumstances.

[6]   The proposed method uses SVM to classify tree leaves, identify the disease and suggest the fertilizer. The proposed method is compared with the existing CNN based leaf disease prediction. The proposed SVM technique gives a better result when compared to existing CNN. For the same set of images, F-Measure for CNN is 0.7and 0.8 for SVM, the accuracy of identification of leaf disease of CNN is 0.6 and SVM is 0.8.

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References:

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