Fertilizer Recommendation System

for Disease Prediction

Introduction

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques.

An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.

Literature Review

[1] This method used datasets to find diseased and healthy plant leaves**.** we introduced a deep convolutional neural network to identify crop series and diseases that may not be present in the plant tissue. The model trained on the test set has an accuracy of 99.35%. This process is enabled by deep learning, machine learning and digital epidemiologyA neural network associates images of diseased plants and crops as a pair. A neural network node is a

mathematical function that receives numerical inputs from input edges and provides numerical outputs as output edges. We analyze 54,306 images of plant leaves that have been assigned a variance of 38 class labels. We resize the images to 256x256 pixels and perform both model optimization and prediction on these reduced images.

Adavantages: this system identifies the diseases that may not be present in the plant issue.

Disadvantages: analysing all the images of plant might be difficult and time consuming.

Algorithm used: deep convolutional neural network

Technologies Used: deep learning, machine learning and digital epidemiology

[2] This system explains about Plant identification system developed by computer vision researchers to know plant diseases. In this article, A network (CNN) can be used to gain an intuition of selected features based on a deconvolution network (DN) approach. Different order of veins is the best representative feature. We observe a multi-level representation of leaf data compared to that of contour shapes, showing hierarchical transformation of features. From a lower abstraction to a higher abstraction corresponding to the seed class. These insights gave us insight into the design of new hybrid feature extraction models that can continue to improve. The uniqueness of the plant classification system.

Advantages: Features learned using deep learning can improve plant recognition performance

Disadvantages: defining features parts or patterns of an object in an image that help to identify.

Keywords: Plant recognition, deep learning, feature visualisation.

[3] This explains about the several ways to recognize plant medical condition. Some diseases have no visible symptoms, or takes effect too late to act, and Advanced analytics require Changes in symptoms exhibited by diseased plants. Evaluate the performance of the detection algorithm. To distinguish between diseased and healthy leaves, another class was added to the dataset.The source was removed using a developed Python script comparison procedure. Script will remove duplicates and Compare image metadata (name, size, date).

Advantages: datasets were introduced to detect each area of the leaf (size,veins,thickness).

Diadavantages: resolving image size less than 500px is not considered.

[4] This proposed system explains about the water needs of plants vary from place to place due to changes in soil content, texture, climatic factors, and more. In addition to water requirements, plant diseases can also cause plants not to grow properly. In this article, we proposed a new intelligent irrigation system that can automatically control irrigation using an Android mobile application. In addition, photos of plant leaves are captured and sent to the cloud server. This is further processed and compared with images of diseased plant leaves in the cloud database. Based on the comparison, a list of suspected plant diseases is displayed to the user via an Android mobile application.

[5] The proposed method makes use of soil and PH samples as input and helps predict plants that can be recommended for soil and fertilizer that can be suitable. Information on the ground is collected by sensors and the data is transmitted from the Arduino via Zigbee and WSN (Wireless Sensor Network) to MATLAB. Analysis and processing of soil data are performed using ANN (Artificial Neural Neural Networks) and crop recommendations are carried out using SVMs (Support Vector Machines).

Advantage: It helps to improve production at field and income rates, improved crop prediction.

Disadvantages: Crop sicknesses cannot be detected and prevented at earlier stage.

Algorithms used: ANN (Artificial Neural Network), SVM (Support Vector Machine) .

Hardware and Software: Arduino, Zigbee, MATLAB, WSN.

[6] This paper presents a methodology for classifying three major leaf diseases of banana using local textural characteristics. Disease-affected regions are identified using image enhancement and color segmentation. The segmented image is transformed into one transform domain using three Image transforms (DWT, DTCWT, and ranklet transforms). Feature vectors are extracted from transform-domain images using LBP and its variants (ELBP, MeanELBP, and MedianELBP). Experimental results showed the best classification performance of ELBP features extracted from the DTCWT domain (accuracy 95.4%, accuracy 93.2%, sensitivity 93.0%, Fscore 93.0%, and specificity 96.4%).

Advantage: Compared with conventional methods of trait extraction, this new method of merging DTCWT with ELBP traits achieved a high level of accuracy in accurately detecting and classifying banana fungal diseases at an early stage.

Disadvantage: The plants which are at specific Euclidean distance can only be classified.

Algorithms used: DWT (Discrete wavelet transform), LBP (Linear Binary Pattern)

[7] In this paper, the disease classification was initially performed by the International Center for Tropical Agriculture (CIAT) with banana images as input, which was transferred to the primary processing technique. A hybrid segmentation called the generalized variation fuzzy mean sum (TGVFCMS) was used to segment the affected leaf area. After segmentation, the data is passed to CNN for final review classification. It has a database of more than 18,000 real photos of bananas in the CIAT image gallery. The dataset includes dry/aged leaves (DOL), HP and 700 balanced images of 5 major diseases such as banana Fusarium wilt of Banana (FWB), Black Sigatoka (BS), Xanthoma wilt or bacterial banana wilt (BBW) , Yellow Sigatoka (YS) and banana pustulosis.

Advantage: It provides high accuracy and for disease diagnosis, these technologies reduce and eliminates the amount of time and money required to complete the project.

Disadvantage: There is no improved algorithm for an early warning by collecting the climatic changes.

Algorithm used: Convolutional Neural Network (CNN).

[8] The purpose of the paper is to raise awareness among farmers about cutting-edge technology that can prevent plant leaf disease. The approaches of machine learning and image processing with an accurate algorithm are identified to detect the leaf illnesses in the tomato plant as tomato is only a readily available vegetable. The K-means Clustering is introduced to divide the data space into Voronoi cells. Leaf sample borders are extracted with contour tracking. Multiple descriptors i.e., Discrete Wavelet Transform, Principal Component Analysis A gray-level co-occurrence matrix is used to extract informative features of leaf samples. finally, the extracted features are classified using machine learning approaches such as support vector machines (SVM), Convolutional Neural Networks (CNN) and K-Nearest Neighbors (KNN). The accuracy of the proposed model is It was tested using SVM (88%), K-NN (97%) and CNN (99.6%) on disordered tomato samples.

Advantage: It provide better accuracy and automatically detects the leaf disease.
Disadvantage: There is no huge amount of datasets for other leaf samples and the disease is not predicted at the early stage of operation.

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