Literature Survey

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PREVIOUS RESEARCH: Leaf Disease Identification and Remedy Recommendation System

Health of human beings depends on the type of food they consume. If the food is unhealthy, it certainly leads to poor nutrition and emergence of several types of health issues. Thus, having good crop productivity depends on healthy plants. Any type of disease in plants yields unhealthy crops. Hence, detection of plant disease forms basic and most important step in yielding good crops. However, manual mode of such detection is not accurate and is time consuming. Hence, it is now possible to conduct such a detection using advanced technological support. Deep Learning technology can accurately detect presence of pests and disease in the farms. Upon this Machine learning algorithm can even predict accurately the chance of any disease and pest attacks in future.

FERTILIZERS RECOMMENDATION SYSTEM FOR DISEASE PREDICTION

The authors in this paper**[1]** have used Convolution neural network to detect and classify plant diseases. The Network is trained using the images taken in the natural environment and achieved 99.32% classification ability. This shows the ability of CNN to extract important features in the natural environment which is required for plant disease classification. Image classification, Image Categories, Feature Extraction, and Training Data is carried out. The whole development of algorithm is done in Python tool. Using several toolboxes like Statistics and Machine Learning toolbox, Neural Network Toolbox and Image Processing Toolbox the outputs as of now are the training data in form of image categories, image classification using K-Means clustering and moisture content along with predicting of withstanding is implemented with training data and classification of given image dataset. The test input image is compared with the trained data for detection and prediction analysis. From the results, it is clear that model provides reliable results.

In this paper the authors**[2]** have addressed the fine-grained classification problems in the crop leaf disease image recognition. They proposed a method based on bilinear residual networks (named DIR-BiRN). It integrated two 18-layer residual networks feature extractors by a bilinear way. It can extract features more accurately and completely than the single residual networks model, while deploying and applying the model in an end-to-end way. So it has the advantages of both global model and local model. This experimental result approved that our bilinear residual networks can extract more fine-grained crop disease features in the images, making our method able to realize more accurate disease recognition.

The authors**[3]** of this paper have devised a method for detection and classification of leaf diseases. The segmentation of the diseased part is done using K-Means segmentation. Then, GLCM texture features are extracted and classification is done using SVM. The method is tested for detection of diseases in citrus leaves. Future work is to be carried out for classification of diseases in different plant species and to improve the classification accuracy.The proposed framework consists of four parts. They are (1) Image preprocessing (2) Segmentation of the leaf using K-means clustering to determine the diseased areas (3) feature extraction & (4) Classification of diseases. Texture features are extracted using statistical Gray-Level Co-Occurrence Matrix (GLCM) features and classification is done using Support Vector Machine (SVM).

In this paper**[4]** a study is performed for Soybean using leaf images. A rule based semi-automatic system using concepts of *k*-means is designed and implemented to distinguish healthy leaves from diseased leaves. In addition, a diseased leaf is classified into one of the three categories (*downy mildew*, *frog eye*, and *Septoria leaf blight*). Experiments are performed by separately utilising colour features, texture features, and their combinations to train three models based on support vector machine classifier. Results are generated using thousands of images collected from PlantVillage dataset. Acceptable average accuracy values are reported for all the considered combinations which are also found to be better than existing ones. This study also attempts to discover the best performing feature set for leaf disease detection in Soybean. The system is shown to efficiently compute the disease severity as well. Visual examination of leaf samples further proves the suitability of the proposed system for detection, classification, and severity calculation.

The author **[5]** 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. The advantages are that 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.The disadvantages are that, Due to the changing climatic conditions, accurate results cannot be predicted by this system.

The authors**[6]** have here, proposed a new approach for the soil based fertilizer prediction system. The proposed system was able to analyze the soil nutrient type efficiently, kind of leaf disease present in the crop and predict the fertilizer in a proficient manner. The approach was flexible, and can be extended to the needs of the users in a better manner. The proposed method was carried out with five different crops. As a future work, the

method can be extended to include diverse varieties of crops to be cultivated and to analyze its performance.

In this survey the methods proposed by the authors**[7]** of the literature so far focus on a specific problem and are usually bounded by tight constraints regarding image capture conditions. This research explores a new automatic method for segmenting disease symptoms on plant leaves that was designed to be applicable in a wide range of situations. The proposed technique employs only color channel manipulations and Boolean operations applied on binary masks, thus being simpler and more robust compared to many previously described automatic methods. Its effectiveness is demonstrated by tests performed over a large database containing images of 77 different diseases of 11 plant species. A comparison with manual segmentation is also presented, further reinforcing the advantages of the proposed approach. . The results from the paper indicate that the algorithm is capable of detecting a wide variety of symptoms, being faster and almost as accurate as manual segmentation techniques. The main shortcoming of the algorithm is its inability to effectively deal with specular reflections and leaf veins with a color substantially different to other healthy areas of the leaf.

In this paper, the authors**[8]** proposed a deep-learning-based approach to detect leaf diseases in many different plants using images of plant leaves. Our goal is to find and develop the more suitable deep- learning methodologies for our task. Therefore, we consider three main families of detectors: Faster Region-based Convolutional Neural Network (Faster R-CNN), Region-based Fully Convolutional Network (R-FCN), and Single Shot Multibox Detector (SSD), which was used for the purpose of this work. The proposed system can effectively identified different types of diseases with the ability to deal with complex scenarios from a plants area.The experimental results and comparisons between various deep-architectures with feature extractors demonstrated how our deep-learning-based detector is able to successfully recognize different categories of diseases in various plants and also give solution for concern diseases. Pests/diseases are generally not a significant problem in organic systems, since healthy plants living in good soil with balanced nutrition are better able to resist pest/disease attack.

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