Original Article

CHARACTERIZATION OF PLANT DISEASE PREDICTION USING CONVOLUTIONAL NEURAL NETWORK

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Abstract

Agriculture is one of the main factors determining the growth of a country. In India itself, about 65% of the population lives from agriculture. Due to different seasonal conditions, plants can be infected with different diseases, which can affect the leaves. First the tree is infected, then the whole plant, thereby affecting the quality and quantity of growth of the tree. Because there are many plants in the yard, it is difficult for the human eye to recognize and classify diseases of each plant in the field. Since these diseases can be transmitted, it is important to diagnose each plant type. Therefore, in this paper, we introduce the automatic detection and classification of leaf diseases based on artificial intelligence to quickly identify, classify and perform the required tasks and easy. Medicines to treat this disease. This is one way to achieve our goal of increasing agricultural crop yields. In this method, we have followed several steps i. Image acquisition, pre-processing, segmentation and image classification

Keywords: Predicting Plant Diseases, Tree Care, Potted Plants, Tree Care.

INTRODUCTION

Agriculture plays a very important role in the economic growth of a country. This is the sector that has the biggest impact on the country's GDP. Agriculture accounts for about 16% of India's GDP. Many factors affect quality and quantity. Crops Due to differences in climate and local conditions, these crops are susceptible to various diseases. These diseases, if left unnoticed, can cause serious harm. In India alone, about 1.525% of crops are lost due to diseases, pests and weeds. We can cite a crop disease in Georgia, USA in 2007 that caused about US$540 in losses. Due to the large area of arable land and many types of trees, it is difficult for the human eye to recognize and classify accurately. Every tree is important, because even an infected tree can spread the disease. In addition, most farmers do not fully understand these diseases and their actual treatments, hiring professionals can be expensive and using pesticides inadvertently harm the soil. Smart decision making and speed are two key factors determining the success of automated foliar disease detection and classification models. The proposed model would help farmers accurately identify and classify diseases by scanning a piece of paper and alerting farmers to the disease before it spreads. The model is basically divided into four steps or phases. First, we collected data sets from different healthy and infected leaves. All of these photos will be in color. The second step is to remove the noise in the image, then we create a color transition structure for the image. In the third step, we use the available clustering techniques to segment the images. This step is done for foreground, d and CNN. It considers the basis of accuracy and the most suitable algorithm for training and testing.

LITERATURE SURVEY

Plant Disease Detection and its Solutions Using Image Classification

Farming plays an important role in agriculture. Currently, food loss is mainly related to contaminated crops, which are indicative of reduced yields. Rapid detection of plant diseases has not been studied. The main challenge is to reduce the use of pesticides. In the agricultural sector, improve quality and quantity Our article is used to check the prognosis of early action leaf disease. We propose an improved kmean clustering algorithm to predict the infected leaf area. A color based segmentation model is defined to segment infected areas and classify them into appropriate categories. Analysis. The sample image was performed on the required time and the area of the infected area. Diseases and provide solutions to cure diseases. Display the affected part of the worksheet as a percentage. We plan to develop our project with a voice navigation system so that even people with less experience with software can operate it without any problems.

Plant Leaf Disease Detection and Classification based on CNN with LVQ Algorithm

In agriculture, early detection of diseases is important to increase crop yields. Bacterial stains, late blight, Septoria leaf rot and yellow leaf disease affect the quality of tomato crops. Automatic methods of plant disease classification also help to take action after detection. This article introduces a convolutional neural network (CNN) model and training vector quantization algorithm (LVQ) for tomato leaf disease detection and classification. The dataset contains 500 tomato leaf images showing four disease symptoms. CNN model family for automatic classification and feature extraction. Color information is actively used in the study of leaf diseases. In our model, filters are applied to three channels based on RGB components. The convolutional vector of the output characteristic is fed into the LVQ. Part of online learning. The experimental results confirmed that the proposed method effectively detects four different types of tomato leaf diseases.

A review on plant disease detection using image processing India is an agricultural country, accounting for 7.68% of the total world agricultural production. In India, the agricultural sector accounts for about 17% of India's gross domestic product (GDP). Efficient growth and improved asset productivity are key to boosting India's bottom line and economy. To do this, farmers need technical experts to manually monitor the plants. However, manual monitoring does not always give satisfactory results. Furthermore, experts in this field are not available in all regions and they are very expensive as farmers have to pay. Therefore, it is necessary to develop efficient smart crop technology to increase production and growth with less labor. An overview of plant disease detection methods developed by various researchers in the field of imaging, including research for the detection of plant diseases such as apples, grapes, peppers, pomegranates and tomatoes.

EXISTING STATUS

In developing countries, agricultural areas may be larger and farmers may not be able to observe every single tree every day. Farmers are not aware of local epidemics. Hazardous to natural resources like water, soil, air, food chain, etc., less pesticide contamination is expected in food.

Defect: Farmers can't afford to spend too much money to visit those who predict crop diseases. Slow speed and accuracy of results Due to the large field and many plants, it is complicated for the human eye to see and truthfully organize each plant.

REPORTED PROBLEMS

Agriculture is one of the most important sectors of the Indian economy. India's agricultural sector employs nearly 50% of the country's workforce. India is known as the largest producer of beans, rice, wheat, spices and herbs in the world. Growth depends on the quality of the product produced, on the growth of the crop and on the

yield achieved. Therefore, the detection of plant diseases plays a fundamental role in the field of agriculture. Plant growth affects the ecology of farmers. For early detection of plant diseases, it is reasonable to use automated disease detection methods. Symptoms of plant disease appear in different parts of the plant, such as the leaves. Manual detection of plant diseases by foliar photography is tedious and computational methods need to be developed to detect and classify diseases by automated foliar imaging.

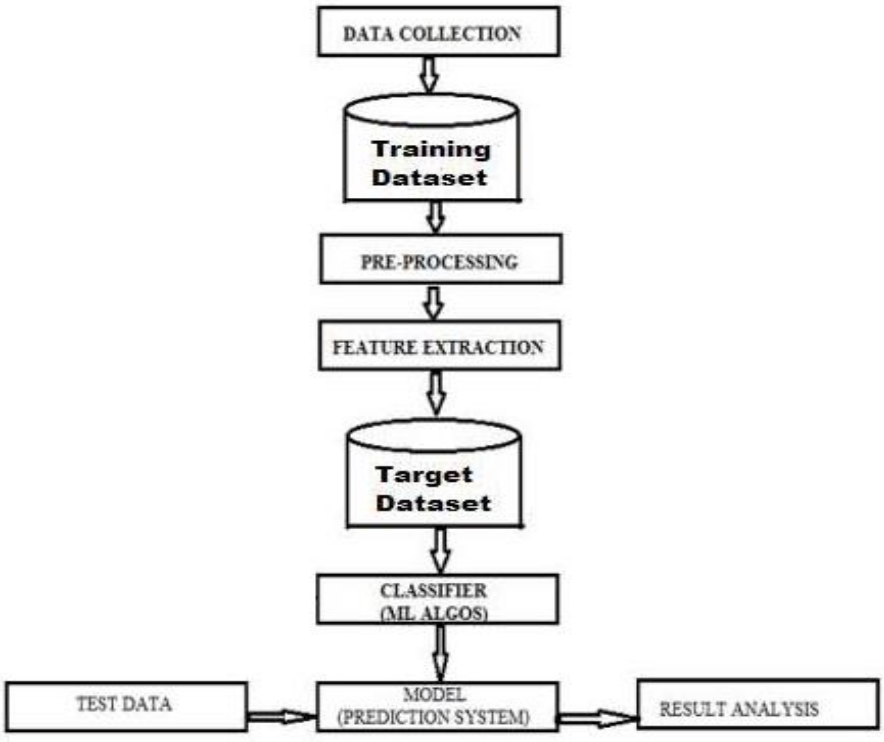
1. Set of Tuples

Initially, the drawing images were obtained from online sources such as virus mosaic disease affecting crops such as apples, potatoes, tomatoes, grapes, strawberries, maize.

2. Image Pre-processing

At this point, the image is reduced to a smaller pixel size to speed up the computation. There is noise in the generated image. Use some filtering technique (such as Gaussian blur) to remove this noise. The image is then presented in RGB format, which is not suitable for most works because the RGB format cannot separate the intensity of the image. Therefore, it is converted to a color space other than HSV, which separates color from intensity. Also, the RGB color space is stronger than HSV.

Fig. 1: System Architecture



3. Segmentation

At this stage, the photograph is segmented to split the leaves from the historical past. Segmentation is accomplished the usage of Kmeans clustering. Kmeans group is an unmonitored gaining knowledge of method used to divide statistics factors right into a predetermined number (k) of clusters or corporations primarily based totally on their similarity. After detecting clusters, one with historical past and the opposite with leaves, the grouped photograph is used to alternate the pixel cost of the leaf historical past to black. This gets rid of

needless facts from the photograph, thereby enhancing accuracy. 4. Selection of Classifier

This is a group of difficulty, due to the fact we want to categories the sorts of sicknesses in plant leaves. Therefore, we've got many gadget gaining knowledge of and deep gaining knowledge of algorithms that may be implemented to this statistics set. A complex algorithms and improved complexity to enhance the accuracy of the model.

TECHNIQUES TO BE USED

This work preferred 4 classifiers.

- Logistic Regression
- KNN
- SVM
- CNN

RESULTS AND CONCLUSION

In this article, we propose a very accurate artificial intelligence solution to detect and classify various plant leaf diseases.

Fig. 2: Home Page

Fig. 3: Choosing Leaf

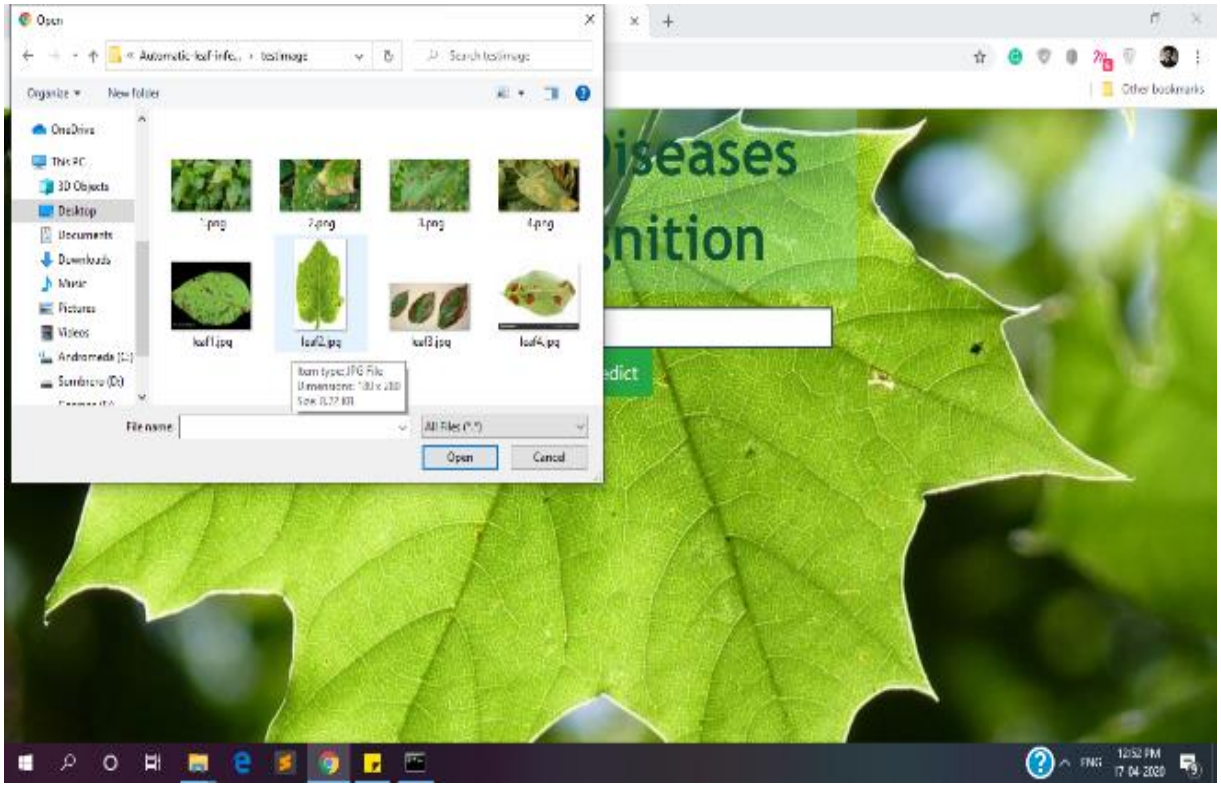


Fig. 4: Disesae Prediction

The solution uses convolutional neural networks for classification. The proposed model uses a data set of more than 20,000 images with a total of 41 categories. The next nm model can expand to more disease categories by using a larger data set, and it can also improve accuracy by optimizing hyperparameters. The model can also include means for treating classified diseases. You can implement it on Android and iOSn platforms to reach farmers who can actually use the suggestion system.

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