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IDENTIFICATION OF PLANTLEAF DISEASE USING IMAGE PROCESSING TECHNIQUE

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Abstract:

Agricultural productivity is something on which economy highly depends. This is the one of the reasons that disease detection in plants plays an important role in agriculture field, as having disease in plants are quite natural. If proper care is not taken in this area then it causes serious effects on plants and due to which respective product quality, quantity or productivity is affected. For instance a disease named little leaf disease is a hazardous disease found in pine trees in United States. Detection of plant disease through some automatic technique is beneficial as it reduces a large work of monitoring in big farms of crops, and at very early stage itself it detects the symptoms of diseases i.e. when they appear on plant leaves. This paper presents an algorithm for image segmentation technique which is used for automatic detection and classification of plant leaf diseases. It also covers survey on different diseases classification techniques that can be used for p-lant leaf disease detection.Image segmentation, which is an important aspect for disease detection in plant leaf disease, is done by using Discrete & Convolution algorithm.

Keywords – Machine Learning, Deep Learning.

Introduction

The agricultural land mass is more than just being a feeding sourcing in today's world.

Indian economy is highly dependent of agricultural productivity. Therefore, in field of agriculture, detection of disease in plants plays an important role.

To detect a plant disease in very initial stage, use of automatic disease detection technique is beneficial. For instance a disease named little leaf disease is a hazardous disease found in pine trees in United States. The affected tree has a stunted growth and dies within 6 years.

Automatic detection of the diseases by just seeing the symptoms on the plant leaves makes it easier as well as cheaper. This also supports machine vision to provide image based automatic process control, inspection, and robot guidance. Plant disease identification by visual way is more laborious task and at the same time, less accurate and can be done only in limited areas. Whereas if automatic detection technique is used it will take less efforts, less time and become more accurate. In plants, some general diseases seen are brown and yellow spots, early and late scorch, and others are fungal, viral and bacterial diseases. Image processing is used for measuring affected area of disease and to determine the difference in the color of the affected area. Image segmentation is the process of separating or grouping an image into different parts. There are currently many different ways of performing image segmentation, ranging from the simple there sholding method to advanced color image segmentation methods. These parts normally correspond to something that humans can easily separate and view as individual objects. Computers have no means of intelligently recognizing objects, and so many different methods have been developed in order to segment images. The segmentation process is based on various features found in the image. This might be color information, boundaries or segment of an image.

Existing Systems

The leaf optical model PROSPECT is widely used to retrieve leaf biochemical parameters, such as leaf chlorophyll content (Chl), carotenoid content (Car), leaf mass per area (LMA) and equivalent water thickness (EWT). Most methods for retrieving leaf pigment content are based on reflectance spectra and they may suffer from ill-posed problems in the inversion process. This study proposes a new inversion method by integrating the continuous wavelet analysis into the PROSPECT model inversion process. Instead of inputting reflectance directly to the inversion process as for most studies, this method uses the wavelet transformed spectra from various scales to construct the merit function for inversion. The performance of the new method was evaluated with data from small-plot experiments of wheat and rice crops. Our experimental results demonstrated that the wavelet-transformed spectra led to better inversion performance as compared to the reflectance spectra and vegetation indices (VIs). The optimal scales of wavelet decomposition are different for retrieving Chl and Car. This inversion method has great potential for predicting leaf pigment content of different crops without the need of calibration models.

Conclusion

In this research, segmentation method and classification based on area thresholding method are developed. Excess green gray transformation (ExG) and area thresholding algorithms are combined to obtain the exactly classified images. The system shows an effective and reliable classification of images captured by a camera. The image segmentation algorithm is very useful method in the image processing and it is very helpful for the subsequent processing. When the plants are separated from each other in the images, the results have been shown to be better. Also the lighting conditions are important to be able to make a reliableanalysis.

Future Enhancements

To improve recognition rate of final classification process hybrid algorithms like Artificial Neural Network, Bayes classifier, Fuzzy Logic can also be used.

- Mobile application can be developed which is handy and easy to use.
- An extension of this work will focus on automatically estimating the severity of the detected disease.
- As future enhancement of the project is to develop the open multimedia (Audio/Video) about the diseases and their solution automatically once the disease is detected.

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