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Crop Disease Analysis Using Android Application

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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 plant leaf disease detection. Image segmentation, which is an important aspect for disease detection in plant leaf disease, is done by using Discrete & Convolution algorithm.*

Key Word: *Crop disease; android application; segmentation; convolution & discrete algorithms; classification of disease.*

I.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. Its impact is found in Alabama, Georgia parts of Southern US. In such scenarios early detection could have been fruitful. The existing method for plant disease detection is simply naked eye observation by experts through which identification and detection of plant diseases is done. For doing so, a large team of experts as well as continuous monitoring of plant is required, which costs very high when we do with large farms. At the same time, in some countries, farmers do not have proper facilities or even idea that they can contact to experts. Due to which consulting experts even cost high as well as time consuming too. In such conditions, the suggested technique proves to be beneficial in monitoring large fields of crops.

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.

II. LITERATURE SURVEY

The concept of Internet of Things (IOT) have been put into practice widely. This paper puts forward the idea of embedding crop growth models (CGMs) into the IOT application system in facility agriculture to make the system more intelligent and adaptive. Besides, this paper shares our practical experience and proposes engineering challenges in further practical deployment. Xiangyu Hu; Songrong Qian [1].

We study the problem of augmenting battery-powered sensornet trees with energy-harvesting leaf nodes. Our results show that leaf nodes that are smaller in size than today's typical battery- powered sensors can harvest enough energy from ambient sources to acquire and transmit sensor readings every minute, even under poor lighting conditions. However, achieving this functionality, especially as leaf nodes scale in size, requires new platforms, protocols, and programming. Platforms must be designed around low-leakage operation, offer a richer power supply control interface for system software, and employ an unconventional energy storage hierarchy. Protocols must not only be low-power, but they must also become low-energy, which affects initial and ongoing synchronization, and periodic communications. Systems programming, and especially bootup and communications, must become low- latency, by eliminating conservative timeouts and startup dependencies, and embracing high-concurrency. Applying these principles, we show that robust, indoor, perpetual sensing is viable using off-the-shelf technology. Lohit Yerva, Bradford Campbell, Apoorva Bansal [2].

Low altitude hyper spectral observation systems provide us with leaf scale optical properties which are not affected by atmospheric absorption and spectral mixing due to the long distance between the sensors and objects. However, it is difficult to acquire Lambert coefficients as inherent leaf properties because of the shading distribution of leaf scale hyper spectral image. In this paper, we propose an estimation method of Lambert coefficients by making good use of the shading distribution. The surface reflection of a set of leaves is modeled by a combination of dichromatic reflection under direct sunlight and reflection under the shadow of leaves. Lambert coefficient is derived from the first eigenvector of diffuse cluster. Experimental results show that chlorophyll indices based on the estimated Lambert coefficients are consistent with the growth stages of paddy fields. Kuniaki Uto; Yukio Kosugi [3].

Quite often a hyper spectral sensor must be confined to a lab environment to measure leaves when collecting data for ground truth. In such a situation it may be advantageous to collect samples and bring them back to the lab to measure hyper spectral signatures. This paper explores the feasibility of such a data collection procedure for precision agriculture or other applications where the research involves collecting plant hyper spectral signatures, and attempts to discover whether it is best to store these plant samples in a cooler or not during transport to the lab. The results show the optimum storage method depends on the amount of time that elapses between collecting the samples and measuring their reflectance. If this time is less than about 1 hour and 30 minutes, then it is best not to use a cooler to store leaf samples. Matthew A. Lee, Yanbo Huang; Haibo Yao, Lori Bruce [4].

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. Tao Cheng, Xia Yao, Yongchao Tian, Yan Zhu, Weixing Cao [5].

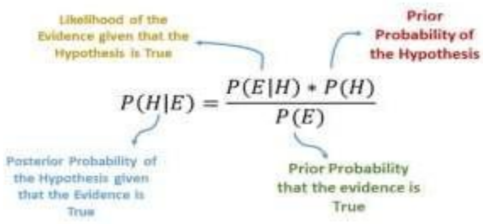
III.PROPOSED SYSTEM

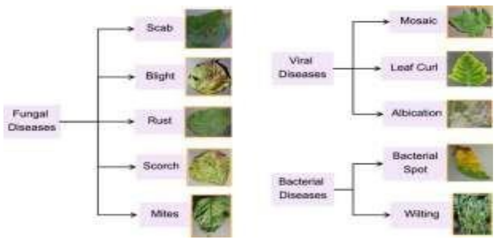
In this proposed system, the diseases are diagnosed using Naïve Bayes algorithm. Along with that, we analyze the growth time period required for the plant with and without the particular disease. The percentage of affected area is shown and according to that, the list of fertilizers as well as organic methods for treatment of the disease is recommended as part of the result. The list of diseases we concentrate in the proposed system are Black horse riding, Bacterial leaf steak and Brown spot.

IV.EXISTING SYSTEM

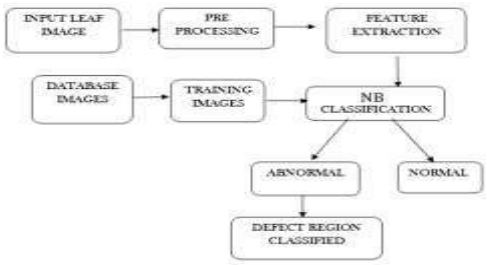
The leaf optical model PROSPECT is widely used to retrieve leaf biochemical parameters, such as leaf chlorophyll content (Chl), carotenoid content (Car), leaf mass per area (LMA) and equivalent water thickness (EWT). Most methods for retrieving leaf pigment content are based on reflectance spectra and 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.

V. RESULT & DISCUSSION





Data Flow Diagram



VI.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 reliable analysis.

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