

LEAF DISEASE DETECTION USING IMAGE PROCESSING

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Abstract

Agriculture is the mainstay of the Indian economy. Almost 70% people depend on it & shares major part of the GDP. Diseases in crops mostly on the leaves affects on the reduction of both quality and quantity of agricultural products. Perception of human eye is not so much stronger so as to observe minute variation in the infected part of leaf. In this paper, we are providing software solution to automatically detect and classify plant leaf diseases. In this we are using image processing techniques to classify diseases & quickly diagnosis can be carried out as per disease. This approach will enhance productivity of crops. It includes several steps viz. image acquisition, image pre-processing, segmentation, features extraction and neural network based classification.

Keyword : - Image processing ,HSV model, histo graph, leaf disease, matlab.

1. Introduction

1.1 INTRODUCTION OF PROJECT

Major role in economic development of India Agriculture is the largest economic sector. The manual classification and identification methods which are being used to distinguish between different types of leaf diseases that are trusting on human resource. They are subjected to some kind of errors since these techniques are focused by human involvement. Since humans are subjected to tiredness and the automated system also helps to reduce the time consumed by manual techniques. The deficiency of labors, automatic system needs to be incorporated to minimize the work and Many new farming computerization tools are being established by university investigators that pose questions about the Effectiveness with which we succeed current farming practices.

1.2 MOTIVATION OF PROJECT

The agronomic requirements though in radically different ways to those currently used this has given rise to many new chances to service. So they should be tested via non-destructive techniques Leaves are delicate part of plant, The evaluation of agricultural harvest Classification is dynamic. The most important visual property is leafs texture and color. Hence, classification of leaf disease is necessary in evaluating agricultural produce, increasing market value and meeting quality standards. Identifying and taking further dealings for further diffusion of the diseases it is also helpful.

The process will be too slow, If the identification and categorization is done through physical techniques, we need the experts help sometimes it will be error prone and who are less available. The labor's classify based on color, size etc. if these quality methods are recorded into automatic system by using appropriate program design language then the effort will be error free and faster.

There are two main characteristics of plant disease detection machine-learning methods that must be achieved, they are: speed and accuracy. There is need for developing technique such as automatic plant disease detection and classification using leaf image processing techniques. This will prove useful technique for farmers and will alert them at the right time before spreading of the disease over large area. Solution is composed of four main phases; in the first phase we create a color transformation structure for the RGB leaf image and then, we apply color space transformation for the color transformation structure. Then image is segmented using the K-means clustering technique. In the second phase, unnecessary part (green area) within leaf area is removed. In third phase we calculate the texture features for the segmented infected object. Finally, in the fourth phase the extracted features are passed through a pre-trained neural network

2. Literature Survey:

2.1 LEAF DISEASE SEVERITY MEASUREMENT USING IMAGE PROCESSING

Sanjay B. Patil, Dr. Shrikant K. Bodhe, Leaf Disease Severity Measurement Using Image Processing” mentioned in their research that Fungi-caused diseases in sugarcane are the most predominant diseases which appear as spots on the leaves. If not treated on time, causes the severe loss. Excessive use of pesticide for plant diseases treatment increases the cost and environmental pollution so their use must be minimized. This can be achieved by targeting the diseases places, with the appropriate quantity and concentration of pesticide by estimating disease severity using image processing technique. Simple threshold and Triangle thresh holding methods are used to segment the leaf area and lesion region area respectively. Finally diseases are categories by calculating the quotient of lesion area and leaf area. The accuracy of the experiment is found to be 98.60 %. Research indicates that this method to calculate leaf disease severity is fast and accurate.

Disease symptoms of the plant vary significantly under the different stages of the disease so to the accuracy with which the severity of the disease measured is depends upon segmentation of the image. Simple threshold segmentation is used to calculate the leaf area but this method is not suitable to calculate the area of the lesion region because of varying characteristics of the lesion region. Triangle method of the thresh holding used here to segment the lesion region. The average accuracy of the experiment is 98.60 %. Thus image processing technology to measure plant disease severity is convenient and accurate. This eliminates subjectivity of traditional methods and human induced errors. It will helps to farmers to decide the specific quantity for pesticide application which reduces the cost and environmental pollution.

2.2 PLANT DISEASE DETECTION AND ITS TREATMENT USING IMAGE PROCESSING

Jundare Manisha, Jundare Pallavi, Jundare Pragati, Prof. C.S.Aryan, “*Plant Disease Detection and its Treatment using Image Processing*” mentioned in their research that India is farming nation, Approx. 20 % of harvest yield is missing universal due to pest attack every year which is valued around Rs. 90,000 million. Saving 5 Rs. is like earning 5 Rs. farmers have been using a pesticide, which increases the crop yield to avoid loss. Remains problems in environment due to large use of pesticides harms to soil, sharp toxicity to humans and natural world, change in insect type in agro ecosystems, high cost of control practices etc. Fungus are very known dangerous insects there on grass of plant, send out steamy honeydew, reason loss of leaves and harm the harvest surrender. The visual judgment of farmers is counting of whiteflies has been mostly relied. The illustration decision by farmers for bulk of whiteflies has been less accurate Because of the identification skills has different levels. In laboratory also detection of present whiteflies on leaves, it takes extended time for detection of whiteflies at early on stages has become important because off inimical importance of harvests and strong impacts of damage levels. In

proposed solution, using web application, whiteflies on leaves of plant at early stages we are calculating no. of eggs also. farmers to use pesticide as early as possible It will give correct idea . They can avoid damage and control whiteflies, By this technique, farmers are capable of improve 80 % of lost that will cause due to pest occurrence.

Thus, is important to correctly diagnose a disease before proffering management options. Diagnosis, being the process of determining the cause of a problem requires the attention of an expert. extract the features of infected leaf and the classification of plant diseases From these methods, we can accurately identify and classify various plant diseases and provide suitable treatment using image processing techniques.

2.3 LEAF DISEASE DETECTION AND CLASSIFICATION USING IMAGE PROCESSING

Prakash M. Mainkar, Shreekant Ghorpade, Mayur Adawadkar, "Plant "Plant Disease Detection and its Treatment using Image Processing Leaf Disease Detection and Classification Using Image Processing Techniques", mentioned in their research that Agriculture is the mainstay of the Indian economy. Almost 70% people depend on it & shares major part of the GDP. Diseases in crops mostly on the leaves affects on the reduction of both quality and quantity of agricultural products. Perception of human eye is not so much stronger so as to observe minute variation in the infected part of leaf. In this paper, we are providing software solution to automatically detect and classify plant leaf diseases. In this we are using image processing techniques to classify diseases & quickly diagnosis can be carried out as per disease. This approach will enhance productivity of crops. It includes several steps viz. image acquisition, image pre-processing, segmentation, features extraction and neural network based classification.

The study reviews and summarizes image processing techniques for several plant species that have been used for recognizing plant diseases. The major techniques used are K-means clustering, GLCM and BPNN. Some of the challenges in these techniques are optimization of the technique for a specific plant, effect of the background noise in the acquired image and automation technique for a continuous automated monitoring of plant leaf diseases under real world field conditions. The proposed approach is a valuable approach, which can significantly support an accurate detection of leaf diseases in a little computational effort. Further future work can be extended by developing better segmentation technique; selecting better feature extraction and classification algorithms and NNs in order to increase the recognition rate of final classification process. Also by computing severity and amount of disease present on the crop, only necessary and sufficient amount of pesticides can be used making agriculture production system economically efficient. So there is a scope of improvement.

3. System Architecture:

3.1 Block Diagram

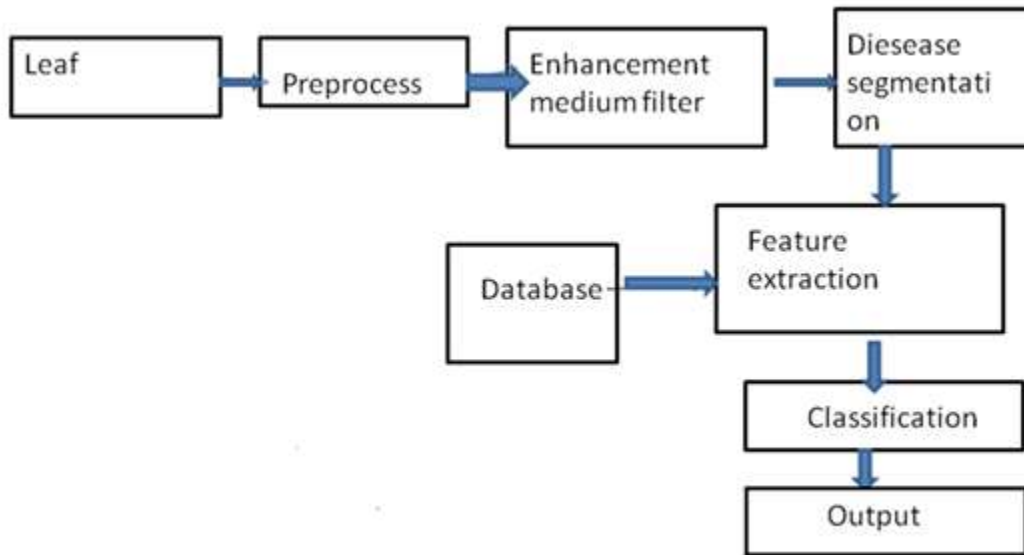


Fig: Block Diagram

3.2 FLOW OF THE SYSTEM

- 1) Input Leaf Image
- 2) Pre-processing
 - RGB Separation – we do AND operation with 0xff with each color value.
 - Image Blurring - Remove Noise From image)
 - Pre-processed Image
- 3) Apply Color Model Conversion (RGB TO HSV Conversion)
- 4) Histogram Plotting-(Obtain Frequency of color in image and map it in buckets called histogram)
- 5) Comparing current features with Database store features (All the above algorithms will be applied to database images at the time of storing)
- 6) Apply distance Measures Equations (Cosine, Jaccard etc.)
- 7) Sort Score Vector (Bring top matching values at the top)
- 8) Classify Image as Infected and Non infected (Threshold Checking)
- 9) Show Output

3.3 WORKING

A. Image Acquisition:

In Acquisition Process Diseases images of the plants are capture through the High Resolution camera. This image is in RGB(Red, Green and Blue) form. Color conversion structure for the RGB leaf image is created, and then, a device independent color space conversion for the color variation manufacture is applied such as HIS model

B. Image Pre-processing:

To remove noise in image or other object removal, Image clipping i.e. cropping of the leaf image to get the interested image region. Image smoothing is done using the smoothing filter. Image enhancement is carried out for increasing the Contrast

C. Image Segmentation:

Segmentation means partition of image into diverse part of same skin tone or having some likeness dissection means parceling of picture into different part of same elements or having some likeness. The division should be possible utilizing different.

D. Feature Extraction:

The input image is enhanced to protect information of the pretentious pixels before color from the background. The color space equally is used to reduce effect of illumination and distinguish between disease and non disease leaf color inventively the resulting color pixels are clustered to acquire groups of colors in the image.

E. Classification:

In plant leaf categorization leaf is classified based on its different morphological facial exterior. Some of the classification techniques used Component Analysis, k-Nearest national Classifier. Plant leaf infection classification has wide application in cultivation.

4. Software, Hardware & Test Data Requirements:

4.1 Hardware Requirement:

- 1.Hard disk: 40 GB
- 2.Ram:512 MB

4.2 Software Requirements:

- 1.Operating system: Windows XP/7
- 2.Matlab

5. Conclusion:

Disease different stages of the disease so to the accuracy with which the severity of the disease measured is depends upon segmentation of the image. Simple threshold segmentation is used to symptoms of the plant vary significantly under the calculate the leaf area but this method is not suitable to calculate the area of the lesion region because of varying characteristics of the lesion region. Triangle method of the thresh holding used here to segment the lesion region. The average accuracy of the experiment is 98.60 %. Thus image processing technology to measure

plant disease severity is convenient and accurate. This eliminates subjectivity of traditional methods and human induced errors. It will help to farmers to decide the specific quantity for pesticide application which reduces the cost and environmental pollution

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