IMAGE PROCESSING APPLICATIONS IN THE FIELD OF AGRICULTURE FOR DETECTION AND CLASSIFICATION OF CITRUS FAMILY'S PLANT LEAF DISEASES

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ABSTRACT

Citrus disease is a polycyclic bacteriological disease. The Xanthomonas axonopodis pv. citri bacterium repeats by binary schism in canker lacerations in citrus leaves, stems and fruit. When humidity comes into connection with these lacerations, the microbes ooze out onto the outward of the plant nerves and can be single by shower suck or wind-driven rain. The principal diffusion agent is wind-driven rain. Airstream speeds must be at least 18 mph to create precipitation overcrowding of plant tissues, which supports the inoculum enter through the stomates, citrus hosts are record disposed during the later phases of leaf increase progress, after the apertures are open, but before a solidified cuticle forms, and within 70-90 days of petal drop for fruit. However, if there are lesions in the plant tissues, from thorns, pruning, other machine-driven damage, leaf miner feeding galleries, etc., the microbes can protect plant tissues at much minor wind speeds. As few as 1 to 2 infectious cells obligatory complete stomatallead-ins or wounds can lead to poison and lesion foundation, and the taint cycle activates again.

Keywords : *image procecing application, leaf disease*

INTRODUCTION

The system will be designed to process am image based on HSV color work. The program was programmed to read the images mechanically which allowed the examination of all image in one time. Firstly, each image was indistinct by Gaussian smoothed filter with an estimated discrete value. The image was then slanted from RGB color space to HSV. The *H* image of HSV color work was used in separation. After segmentation, the chocolate colored dots and spots on an image would standout obviously, though, there might exist some holes on each spot if the impairment is Spartan. The effect of these dumps was rejected by filling the void area of the holes using imfill function of the Image Processing Toolbox of MATLAB. In totaling, the separated image repeatedly contain noise, the noise reduction process was consequently accomplished. This was done by primary operation using round dish shaped structuring element with a radius of some pixels. Additional, the size of a spot was quantified ranging from some number of pixels of our interested area. Consequently, an object of size slighter or greater than the range would be renowned as non-diseased item. Further, in order to eradicate non-spot objects such as stem, the shape factor defined by aspect ratio between major and minor axis of every spot was observed. The ratio of greater will decide to keep or remove the part. After noise drop, each spot was collective by pixel connectivity in 2-D binary image which is an eight-connected object procedure. The edge detection was performed on every diseased spot and drawn on original image with the green line. The number of spot perceived and the number of authentic spots were calculated and equated.

METHODOLOGY

In this procedure, selection of region of interest (ROI) will be done. From the original RGB color images with the some fixed measurement area of interest image will be extracted manually. The area of interest selection was started physically by influential a point on the inventive image, and then was ended by a Matlab program for extracting a square portion.

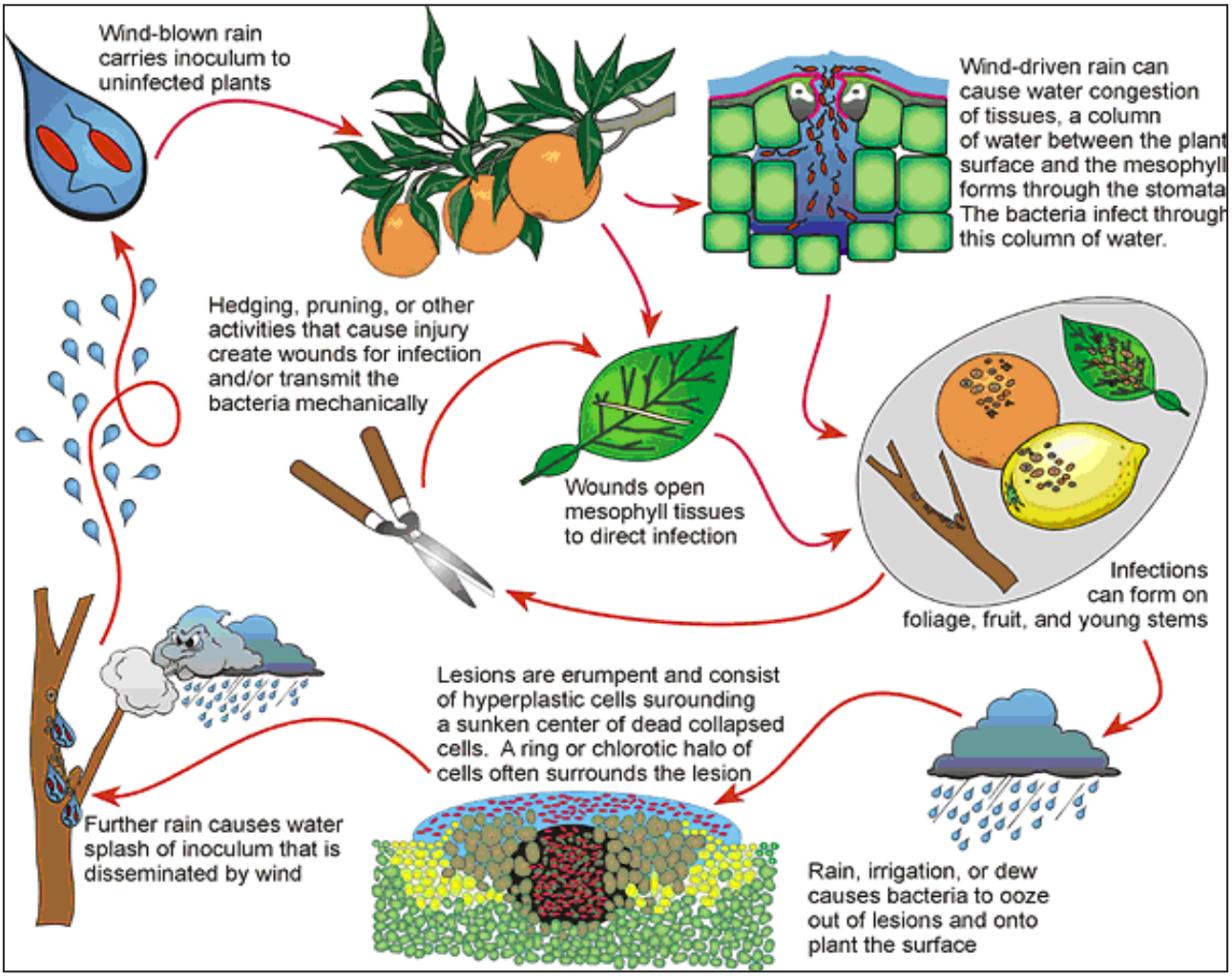


Fig. 1 : Disease Cycle of Citrus

Leaf scratches build up first on the inferior surface as small, somewhat raised, wound like spots; At first they are round in shape, then may become asymmetrical; As the scratches age increased, they happen to tan or brown with nimbus water-soaked raised limitations generally surrounded by a yellow or ring; At last the scratches change to be corky or springy and the centres may become crater-like, old scratches may fall out, making a shot-hole effect; Scratch's' sizes depend on the cultivar and the age of the crowd tissue at the time of infection. From the explanation, we can find that the scratches vary in outline, size and colour by the type of citrus cultivar and the disease time. Rule-based citrus canker disease explanation was infeasible as it is hard to interpret all the phytopathologist person information into digital image feature patterns. In its place, in this report, machine education algorithms were checked to choose the most important features of citrus canker disease. 2-level attributes are planned to describe citrus canker disease diseased parts: the first level features named universal features are separated for detecting citrus scratch regions from the image background; and the second level characters are separated from the scratch areas which are detected by universal features to additional identify canker disease scratches from other confusable citrus diseases areas.

RESULTS AND DISCUSSION

A whole canker disease scratch includes some rudiments such as crater-like areas, water-soaked margins etc. Canker disease scratches change with citrus types and the phase of the disease. Classifying canker disease scratches can be regarded as a multi-class classification problem. A new colour-texture feature and a feature combination method are proposed in order to describe canker disease scratches. This canker disease scratch description is based on the surface related structure of the canker disease scratch areas with several colour quantized zones. The images of the citrus disease area are initially distorted into HSI (Hue-Saturation-Intensity) colour space from RGB. HSV colour space is more related to person insight instrument than RGB color space. Besides, images collected in field are forever under dissimilar light circumstances, the hue component in HSV colour space helps to reduce the effect of dissimilar lights.

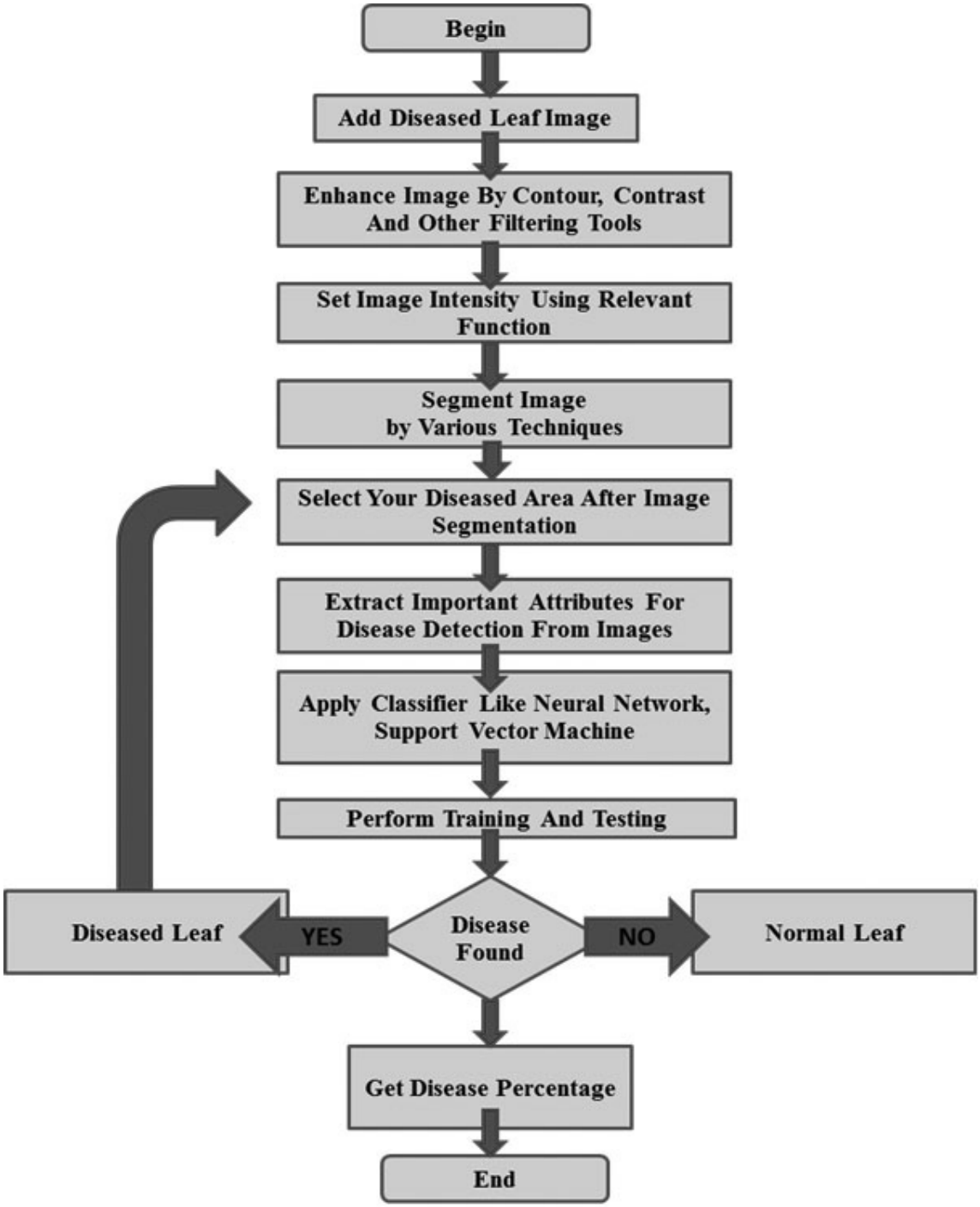


Fig. 2 : Procedure for Image Processing and Classification

The area of interest image then converted from the original eight bit per channel red, green, blue (RGB) color representation to a six bit per channel hue, saturation, and intensity (HSV) color. Other procedures such as, generation of some required arrays, calculation of quality topographies, selection of useful consistency features, and discriminant analysis for disease arrangement are same.

The samples for citrus canker disease should be chosen by taking the expertise of the citrus phytopathologist persons. Here some of the samples are given and then I have run my various comparison algorithms to have the segmentation and classification. Citrus canker disease has a region in an organ or tissue which has suffered damage through injury or disease, appearance can be described by the personnel phytopathologist who works on the disease management of crops.

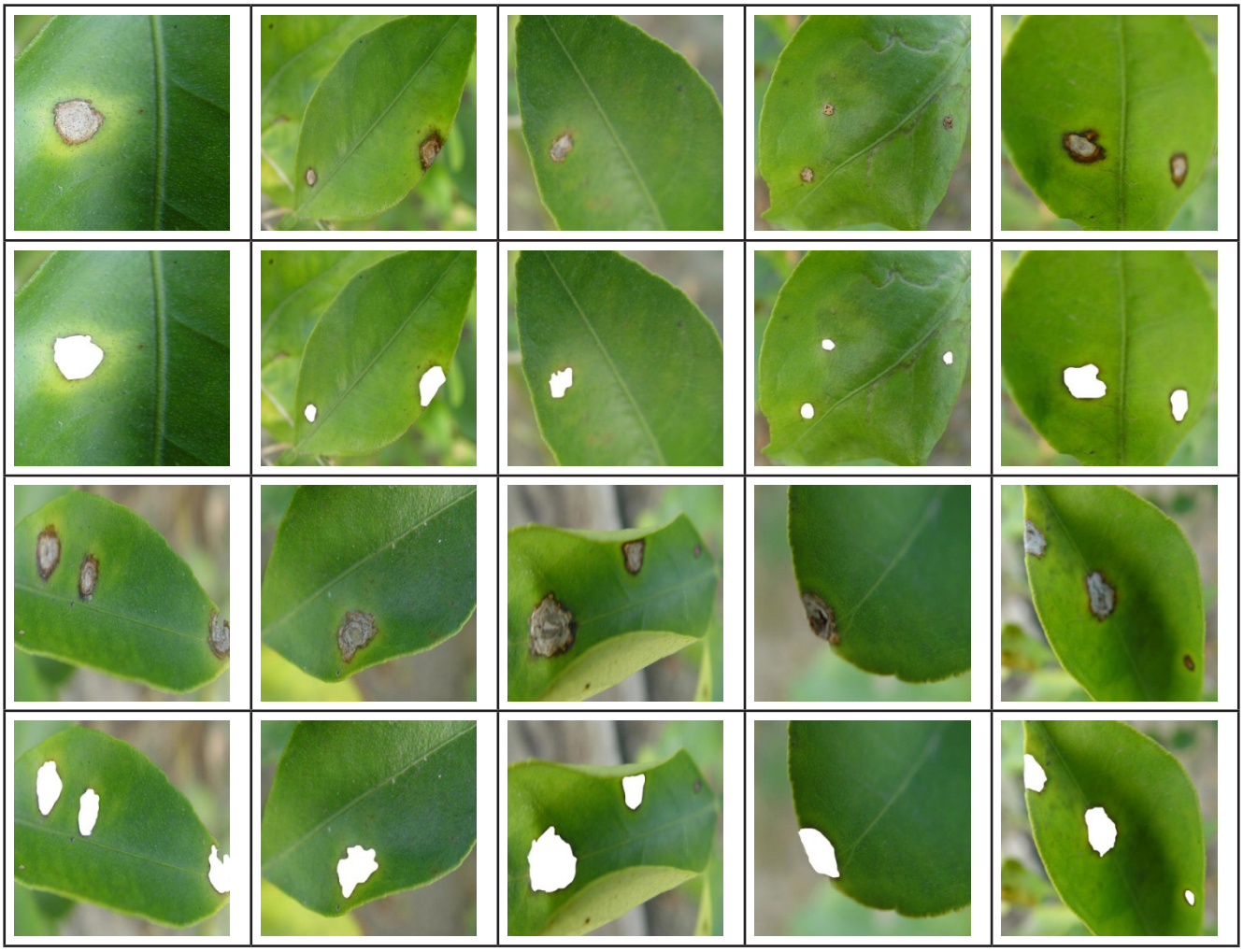
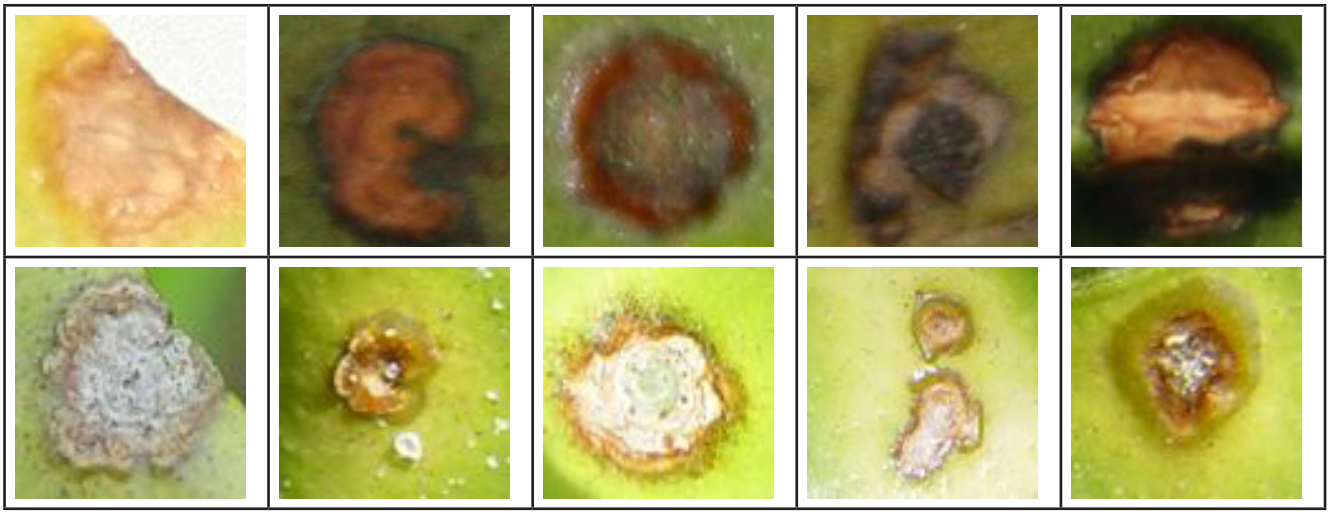


Fig. 3 : Sample of leaves with diseased area and separate diseased area

Various scientists suggested an automatic segmentation and arrangement method for outside images using neural networks. First, the images are segmented using created on texture and colour evidence of the objects. Then a set of some number of in my case 13 features is mined from each expanse. The features include: average colour, position, size, rotation, texture (Gabor filters) and, shape and many more depends on the situation. Classification is then performed using a Multi Layer Perceptron with some number of input nodes and with some output nodes. The training is performed on very large number of regions and testing is done on an independent set of some large samples. Mostly regions classified correctly using the Multi Layer Perceptron



CONCLUSION

This data obtainable an approach to mechanically detecting citrus canker from citrus leaf images collected. A stepwise detection strategy was generated to segment scratch leaf images collected with background. Then a citrus canker attribute descriptor was planned by mixing leaf image colour and consistency information to model citrus canker scratches. Local descriptors were used to expose the spatial characteristics of citrus canker in each scratch zone. Different attribute operators and categorization techniques were evaluated and compared based on citrus leaf samples in this research counting some kinds of citrus diseases and usual citrus leaves in dissimilar conditions. The investigational results established that the proposed approach will give higher classification accuracy than other traditional methods. In the meantime the practical will be analyzed the proposed approach with human rater classification, and the outcome showed that the categorization accuracy of the planned approach is similar to citrus plant's raters who checked the image of each citrus leaf on computer screen.Disease can be categorized by calculating sizes of disease spot. In this research work, veins consuming color alike the spot is not measured.

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