Automated Damaged Ginkgo Leaf Detection

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Abstract: The cram of plant disease refers to the studies of visually observable patterns of a particular plant. Nowadays produces face many traits/diseases. Damage of the insect is one of the most important trait/disease. Insecticides are not always proved efficient because insecticides may be toxic to some kind of birds. This paper introduces defect identification on Ginkgo leaves during production. This frame work introduces an active learning strategy through a set of passively trained leaf parameters. Under the supervision the trained parameters and input image are compared to know the characteristics of the leaves This algorithm is been used for identification of defective leaves using image processing techniques and for the removal of defective leaves through real time techniques.

Keywords: Ginkgo leaf, Stairs, Stem, Sobel, Canny.

I. INTRODUCTION

Ginkgo is an herb. The leaves are generally used to compose "extracts" that are used as medicine. However, a few medicines are made from the seed, but these are not well studied. Ginkgo is often used for memory disorders including Alzheimer's disease. It is also used for conditions that seem to be due to reduced blood flow in the brain, especially in older people. These conditions include memory loss, headache, ringing in the ears, vertigo, difficulty concentrating, mood disturbances, and hearing disorders. Some people use it for other problems related to poor blood flow in the body, including leg pain when walking (claudication), and Raynaud's syndrome (a painful response to cold, especially in the fingers and toes).

The quality of the Ginkgo Leaf has been based on the nature of the leaves. The character of the leaves is obtained under different events. The defects of the Ginkgo leaves are usually noticed through its colour, irregular shape and other diseases. These are the following ones that cause the quality of Ginkgo Leaf to be bad so these are the following factors that has to be inspected during production.

While on the human work administration sometimes these parameters are failed to be observed. So, to avoid that, we are using image processing techniques and real time techniques.

Image processing has been launched to recognize whether the Ginkgo Leaf is a defective one or a good one. Real time techniques are been used for removal of defective leaf. However, in image processing techniques usual identification do not have good accuracy. Hence, we must prepare the processor about the leaf characteristics. To observe that we train the Ginkgo leaves through image processing algorithm then for the removal of leaf we are transferring message of the characteristics of the leaf in the processor itself, to remove the leaf using the real time techniques.

II. METHODOLOGY

a) Image Acquisition

The acquisition of Digital Image is the process to capture the digital image of a physical object by a digital camera or by a digital scanner.

The Image Acquisition Toolbox of MATLAB provides us an application, a set of functions and a programmatic interface. The acquisition process can be customized to include the integrating image processing functionality to identify the objects, enhance imagery or construct mosaics and panoramic view as the data is acquired. The toolbox can also detect compatible image and video acquisition devices. We can create multiple connection objects for simultaneous acquisition from many devices as the PC and image hardware support.

Figure 1: The Scientific Camera captured images are acquired using Image Acquisition Toolbox and analyzed using Image Processing Toolbox

Using the image acquisition we can acquire image data in different modes like background acquisition, continuous

acquisition etc. The Toolbox buffers the acquired data into memory and the acquisition engine acquires imagery data from camera by enabling analysis and processing of high speed imaging application. The data can be acquired in various data types like signed or unsigned 8 Bit, 16 Bit or 32 Bit integers and single or double precision floating point. It can also support varieties of color space as supported by image acquisition device including RGB, YUV or Grayscale. Any other format of data can also be customized into RGB format.

B)   Image Pre-processing

The procedure done before processing by correcting image from different image is called Image Pre-processing. This has to be done before image enhancement. In MATLAB the Image Processing Toolbox provides reference standard algorithm pre-processing and post processing tasks that solve frequent system problems, such as noise, low dynamic range, out of focus optics and the different color representation between input and output devices.
Pre-processing methods use a small neighbourhood of a pixel in an input image to get a new brightness value in the output image. Such pre-processing operations are also called filtration.

The aim of gradient operators is to indicate such locations in the image. Gradient operators suppress low frequencies in the frequency domain (i.e. they act as high-pass filters). There is normal phenomenon to have a high frequency noise in a captured image and if the Gradient operator is applied to a captured image the noise of it becomes higher simultaneously.

C)   Edge Detection

The main goal of edge detection of a image is to identify sudden changes in it. The Edges of an object are caused by a variety of factors as follows: surface normal discontinuity, depth discontinuity, surface color discontinuity, illumination discontinuity etc. The following picture represents all these factors. The edge is a place of rapid change in the image intensity function. The detection of Edge refers to the process of identifying and locating sharp discontinuities in an image.
The operator uses two 3×3 kernels which are convolved with the original image to calculate approximations of the derivatives - one for horizontal changes, and one for vertical. If we define A as the source image, and Gx and Gy are two images which at each point contain the horizontal and vertical derivative approximations, the computations are as follows:

$$G_x = \begin{bmatrix} +1 & 0 & -1 \\ +2 & 0 & -2 \\ +1 & 0 & -1 \end{bmatrix} * A \quad \text{and} \quad G_y = \begin{bmatrix} +1 & +2 & +1 \\ 0 & 0 & 0 \\ -1 & -2 & -1 \end{bmatrix} * A$$

where $*$ here denotes
the 2 dimensional convolution operation.

III. ALGORITHM

Basic steps has been described the proposed algorithm.
1. Collect RGB Original Image Data
2. Transfer in to Gray Image
3. Calculate the Plot of Image
4. Create the Bar of Image
5. Calculate Stairs of Image
6. Create the Stem of Image
7. Evaluate the Edge using Sobel and using Canny
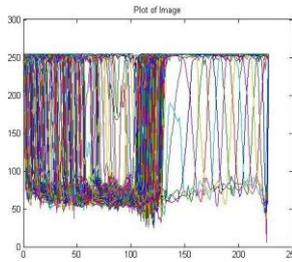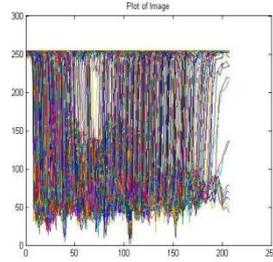8. Grading with types of diseases

IV. FLOW OF WORK
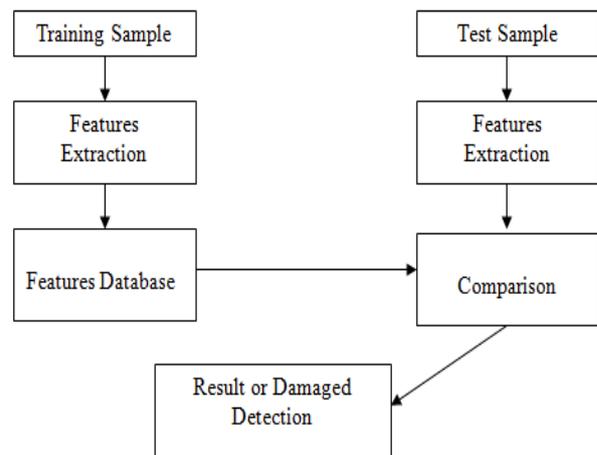
V. RESULTS

The Ginkgo Leaf disease dataset was collected from south china. In this study dataset captured and collected by camera in the above said areas.

Good Ginkgo Leaf   **Damaged Ginkgo Leaf**
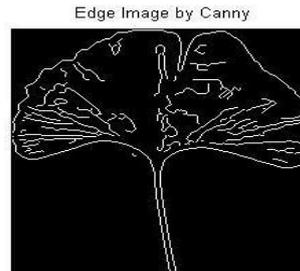

Original Image   Original Image
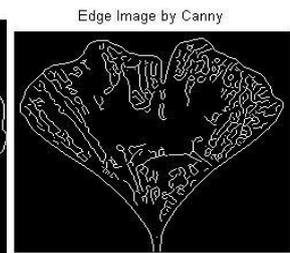

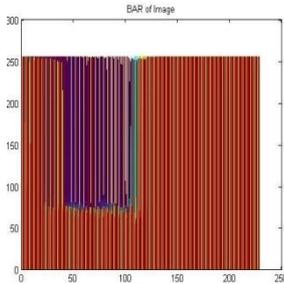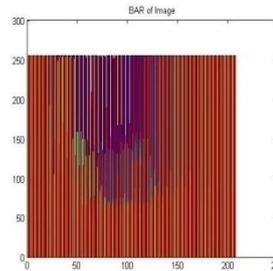Gray Image   Gray Image
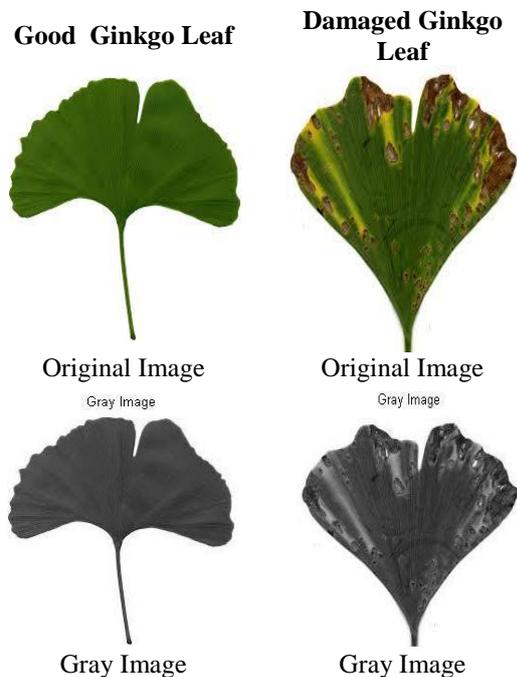
Plot of Image

Plot of Image

Edge using Canny
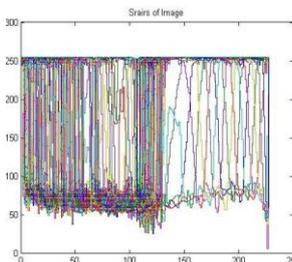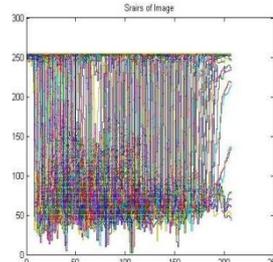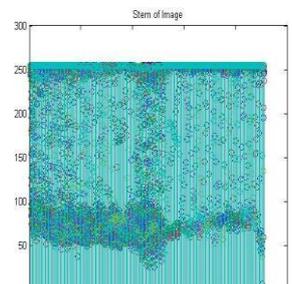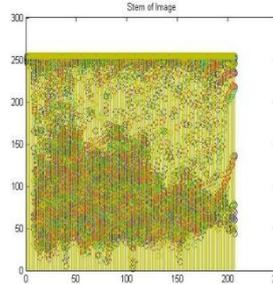

Edge using Canny

Bar of Image

Bar of Image

Table1. Experiment result of testing sample (Ginkgo Leaf)

VI. TABULATED COMPARISON

Table 2 given below shows comparison of techniques described above.

Stairs of Image

Stairs of Image

Properties		Methods	
		Visual Analysis	**Image Processing**
	Complexity	Very Low	Average
	Cost	Very Low	Average
	Accuracy	Average	Very High
	Scope of Research	Very Low	Very High
	Timing Constraints	Very High	Low
	Components Required	Not Required	Camera, Network Equipments
	Software Required	Not Required	Visual Analytics

Table2. Comparison of Techniques

VII. CONCLUSION AND FUTURE WORK

Stem of Image

Stem of Image

In this research, Ginkgo Leaf diseased is detected by using histogram matching. The histogram matching is based on the color feature and the edge detection technique. The color features extraction are applied on samples that are contained the healthy leaf of plant and the diseased Ginkgo Leaf of the plant. The training process includes the training of these samples by using layers separation technique which separate the layers of RGB image into red, green, and blue layers and edge detection technique which detecting edges of the layered images. Once the Plot, Bar, Stairs and Stem of leaf Image are generated for both samples and the testing image, immediately we applied the comparison technique. The comparison is firstly with the testing sample and the healthy sample if the testing sample is diseased, it compare testing sample with the diseased sample and these steps take few minute to display the comparison result that is the testing sample is diseased or not.

The future work mainly concerns with the large database and advance feature of color extraction that contains a better result of detection. Another work concerns with research work in a particular field with advance features and technology.

Edge using Sobel

Edge using Sobel

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BIOGRAPHIES

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