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AUTOMATED DAMAGED FLOWER DETECTION USING IMAGE PROCESSING

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Abstract: Floriculture is the growing of cut flowers, potted flowering and foliage plants, and bedding plants in greenhouses and/or in fields. In this paper proposes image processing methodology to detect flower disease of different flowers. In this paper first, the captured images are collected from different field and are processed for enhancement. Then image segmentation is carried out to get target regions (disease spots). Finally, analysis of the target regions (disease spots) based on histogram approach to finding the phase of the disease with the help of stem value and then the treatment consultative module can be prepared by on the lookout for agricultural experts, so plateful the farmers.

INTRODUCTION

Floriculture is the growing of cut flowers, potted flowering and foliage plants, and bedding plants in greenhouses and/or in fields. There are several thousand different species of flowers and plants that are grown as commercial crops. Cut flowers include such crops as roses, freesia, alstromeria and snapdragons. Flower Plants exist all over the place; we live, as well as places without us. Research in agriculture is designed to increase the efficiency and quality of agricultural product. Flower plant pathology is the scientific research of plant caused by contagious diseases. Diseases detection application is implemented to upgrade the agricultural sector .Disease management make available accurate treatment advices. The machine vision system now a day is normally consists of computer, digital camera and application software. Various kinds of algorithms are integrated in the application software. Scab symptoms are quite variable. Usually roughly circular, raised, tan to brown, corky lesions of varying size develop randomly across tuber surfaces. Russet scab occurs as a rather superficial layer of corky tissues covering large areas of the tuber surface. Pitted scab occurs where lesions develop up to 1/2 inch deep; these deep lesions are dark brown to black, and the tissues underneath are often straw-colored and somewhat translucent. More than one of these lesion types may be present on a single tuber. Although scab symptoms are usually noticed late in the growing season or at harvest, tubers are susceptible to infection as soon as they are formed. Small brown, water-soaked, circular lesions are visible on tubers within a few weeks after infection.

SYMPTOMS

Powdery Mildew:

Powdery mildew, as the name suggests, resembles a white, powdery coating on leaf surfaces. If severe, it also might appear on stems and the flowers themselves. Affected leaves eventually turn yellow, then brown. Dead foliage typically falls off the stem, though it will sometimes remain in place. Although not fatal to plants, powdery mildew makes the foliage unattractive and repeated bouts of the disease will gradually weaken the plant. Annual flowers that are particularly susceptible to powdery mildew include zinnias, snapdragons and verbena. Perennials that are commonly infected include delphiniums, lungwort, bee balm and garden phlox.

Gray Mold:

Gray mold is perhaps the most common disease of flowers. It is especially problematic during periods of high rainfall and cool temperatures. Like powdery mildew, gray mold is well named. It appears as a gray mold, primarily on old and dying leaves and flowers. It begins as water-soaked spots and eventually develops into the characteristic gray, fuzzy coating.

Black Spot:

Black spot is another common fungal disease. It is a big problem with roses. The disease typically begins as black spots on the foliage. These spots are most prevalent on upper leaf surfaces, and may be up to ½″ across. Leaves eventually begin to yellow around the spots, then become all yellow and fall off. The spots may also appear on rose canes, first being purple and then turning black.

PROPOSED METHODOLOGY

The proposed methodology aims to model a promising disease grading system for flower. For the experimentation purpose, pomegranate flower is considered. The flow chart of the methodology is presented in the annexure 1 in the appendix. The system is divided into the following steps: (1) Image enhancement (2) Image Pre-processing (3) Color image segmentation (4) Histogram draw with stem value (5) Disease detection by picks value.

The proposed system is an efficient module that identifies various diseases of that plant and also determines the stage in which the disease is. The system employs various image processing and machine learning techniques.

Image Enhancement:

Image enhancement is the improvement of digital image quality (wanted e.g. for visual inspection or for machine analysis), without knowledge about the source of degradation. The aim of image enhancement is to improve the interpretability or perception of information in images for human viewers, or to provide `better' input for other automated image processing techniques.

Image Pre-Processing:

Pre-processing methods use a small neighborhood 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.

Image Segmentation:

Image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as superpixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. More precisely, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain visual characteristics.

Color Spaces Conversion:

The gray image based segmentation will lead to incomplete segmentation, which also result the loosing of the edge. Thence, in this study, a segmentation method based on color image was presented. However, the RGB image is constituted by the three monochrome images(R, G and B), in which the color and grayscale cannot be separated out.

Feature Extraction:

Because of the direction of flower the image is neither vertical nor horizontal; we need to rotate the binary image with the intersection angle, which is between the principal axis and the horizontal axis.

Histogram Draw:

Generally, in image processing expressions area of a binary image is the total number of on pixels in the image. The original resized image is converted to binary image such that the pixels corresponding to the flower image are on. Then we plot the histogram for calculate the change the pick value.

Disease Grading By Stem Value:

A two-dimensional stem plot displays data as lines extending from a baseline along the *x*-axis. A circle (the default) or other marker whose *y*-position represents the data value terminates each stem.

Stem(Y) plots the data sequence Y as stems that extend from equally spaced and automatically generated values along the *x*-axis. When Y is a matrix, stem plots all elements in a row against the same *x* value.

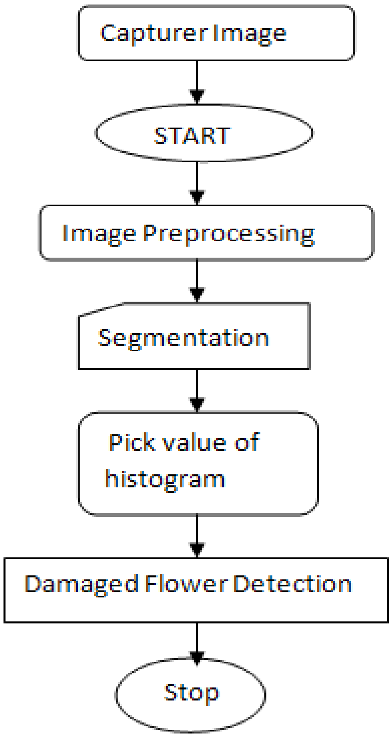
Stem(X,Y) plots X versus the columns of Y. X and Y are vectors or matrices of the same size. Additionally, X can be a row or a column vector and Y a matrix with length (X) rows.
stem(...,'fill') specifies whether to color the circle at the end of the stem.

Stem(...,LineSpec) specifies the line style, marker symbol, and color for the stem and top marker (the base line is not affected). See Line Spec for more information.

h = stem(...) returns handles to three line graphics objects:

a. h(1) - the marker symbol at the top of each stem
b. h(2) - the stem line
c. h(3) - the base line

PROPOSED WORK FLOW DIAGRM



RESULT AND DISCUSSION

Now, flower images are used to test proposed algorithm. First we get the Original flower (Fig1) and another disease flower (Fig2).Then we calculate the gray value of each flower (Fig3 & Fig4).Finally we segmented the each image using K-Mean clustering ,i.e., background removed image and we get picks values from each histogram with stem value (Fig5 & Fig6) and define the damaged detection .

Test 1:

Figure 1: Original disease free

Figure 2: Original affected

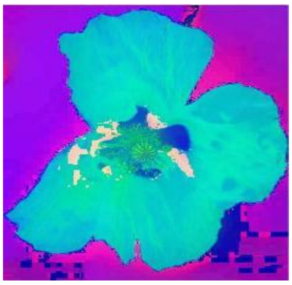


Figure 1a: Unit8 of Original disease free

Figure 2a: Unit8 Original affected

Figure 3: Gray Image

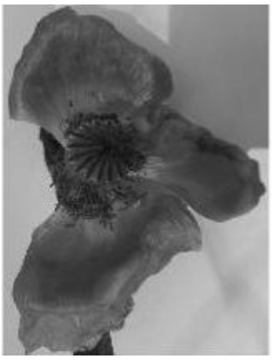


Figure 4: Gray Image

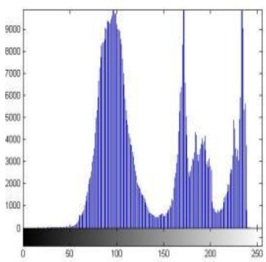


Figure 5: Histogram

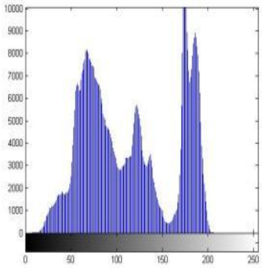


Figure 6: Histogram

Test 2:

Figure 1: Original disease free

Figure 2: Original affected

Figure 1a: Unit8 of Original disease free

Figure 2a: Unit8 Original affected

Figure 3: Gray Image

Figure 4: Gray Image

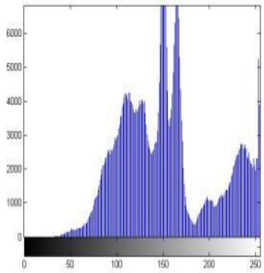


Figure 5: Histogram

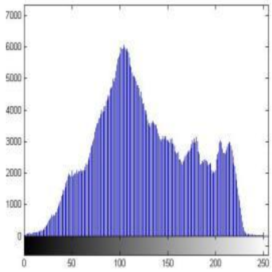


Figure 6: Histogram

Table 1: Testing table

Data Sample	Training Sample	Testing Sample	Classifier Accuracy
Field 1	215	67	87.6%
Field 1	220	65	94.2%
Field 1	230	55	95.78%
Field 1	215	54	97.5%
Field 1	220	50	89.8%
Field 1	245	55	95.3%

CONCLUSION

In this paper, we proposed a novel histogram based Scab Diseases Detection of Flower. Using, the histogram approach and colour image segmentation technique to exact intensity pattern to disease accordingly it is then possible to analyze the different flower diseases. Here there is more scope to reduce the various errors which will be occurred during the simulation, that can be minimize as the more no of input is provided accordingly. The consequence from the preliminary study indicated that the proposed strategy is effective to assess disease intensity by the plant pathologist more accurately.

REFERENCES

[1]. A. K. Jain, R. P. W. Duin, and M. Jianchang, "Statistical pattern recognition: a review," Pattern Analysis and Machine Intelligence, IEEE Transactions on, vol. 22, pp. 4-37, 2000.

[2]. C. Bishop, Pattern Recognition and Machine Learning (Information Science and Statistics): Springer, 2007.

[3]. J. A. Throop, D. J. Aneshansley, W. C. Anger, and D. L. Peterson, "Quality evaluation of apples based on surface defects: development of an automated inspection system," Postharvest Biology and Technology, vol. 36, pp. 281-290, 2005.

[4]. T. Brosnan and D.-W. Sun, "Improving quality inspection of food products by computer vision--a review," Journal of Food Engineering, vol. 61, pp. 3-16, 2004.

[5]. http://www.goepel.com/en/industrial-vision-solutions/tom-line/tom-line-software/image-pre-processing.html

[6]. R. Pydipati, T.F. Burks, W.S. Lee, “Identification of citrus disease using color texture features and discriminate analysis”, Computers and Electronics in Agriculture 52

[7]. K. C. Swain, Q. U. Zaman, A. W. Schumann, D. C. Percival, and D. D. Bochtis, "Computer vision system for wild blueberry fruit yield mapping," Biosystems Engineering, vol. 106, pp. 389-394, 2010.

[8]. Sanjeev S Sannakki1, Vijay S Rajpurohit, V B Nargund, Arun Kumar R, Prema S Yallur , “Leaf Disease Grading by Machine Vision and Fuzzy Logic”, Int. J. Comp. Tech. Appl., Vol 2 (5), 1709-1716, 2011.

[9]. Yan Li, Chunlei Xia and Jangmyung Lee, “Vision-based pest detection and automatic spray of greenhouse plant,” IEEE International Symposium on Industrial Electronics, July 5-8 2009.

[10]. C. J. Studman, "Computers and electronics in postharvest technology -- a review," Computers and Electronics in Agriculture, vol. 30, pp. 109-124, 2001.

[11]. Alhouse, Mark L.G. & Chein-I Chang. 2010. Image Segmentation by Local Entropy Methods. Proc. International Conference on Image Processing 3:61-64.

Short Bio Data for the Authors

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