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Pomegranate Leaf Disease Detection Using Support Vector Machine

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Abstract: Identification of the plant diseases is the key to preventing the losses in the yield and quantity of the agricultural product. The studies of the pomegranate plant diseases mean the studies of visually observable patterns seen on the plant. It is very difficult to monitor the pomegranate plant diseases manually. Hence, image processing is used for the detection of pomegranate plant diseases. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, statistical feature extraction and classification. K-means clustering algorithm is used for segmentation and support vector machine is used for classification of disease.

Keywords: Statistical features, k-means clustering, SVM.

1. Introduction

"Image processing is a form of signal processing for which input is an image, video frame or photograph". The image processing output may be an image or characteristics of the images. "An image is an array, or matrix, of square pixels arranged in columns and rows". The image processing techniques can be used in the pomegranate plant disease detection. In most of the cases disease symptoms are seen on the leaves, stem and fruit. The plant leaf for the detection of disease is considered which shows the disease symptoms. This paper gives the introduction to image processing technique used for plant disease detection. The pomegranate having botanical name Punica Grantumis a fruit- bearing deciduous shrub or small tree growing between 5-8 meters or 16-26 feet tall. The pomegranate is widely considered to have originated in Iran and today, it is cultivated throughout the world.

The diseases of pomegranate leaf features are described as,

- **Alternaria**: small reddish brown circular spots appear on the leaves.
- **Anthracnose:** Appears as small regular or irregular dull violet or black leaf spots with yellowish halos. Leaves turn yellow and fall out.

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- **Bacterial blight:** Appearance of one to several small water soaked, dark colored irregular spots on leaves.
- **Cercospora:** Leaf spots are minute, brown with yellow halo. Spots are scattered, circular or irregular and become dark brown with age.

2. Methodology

The methodology of the proposed work contains the five stages, which are shown in the block diagram of proposed work.

- **Image Acquisition**

In the proposed method collected the images from the dataset like pomegranate leaf Image Database Consortium. The dataset contains two types of images such as disease affected leaf images and healthy leaf images.

- **Enhancement**

Enhancement technique enhances the contrast of images. The contrast enhancement can be helpful to remove the noise, which is present in the image.

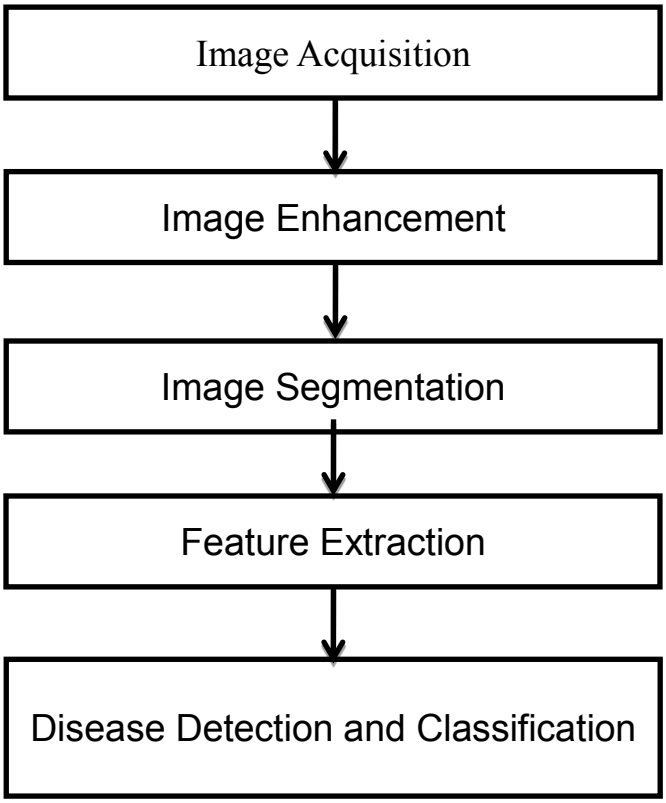

Figure 1 Block diagram of proposed work

- **Segmentation**

Segmentation means it subdivides the image region into small regions. In our proposed method we have used k-means clustering algorithm for the segmentation. The K-means clustering is used for classification of object based on a set of features into K number of classes.

Algorithm : Segmentation by k-means clustering operation

Input: Pomegranate leaf image.

Output: Segmented clusters of pomegranate leaf image.

Start

Step 1. Read input image.

Step 2. Input images is converted to grayscale image.

Step 3. Apply enhancement.

Step 4. Resize the image.

Step 5. Apply k-means clustering operation.

Step 6. Find the centroid of the pixels.

Step 7. Divide the pixels into cluster.

Step 8. Represent the clustered image.

Step 9. Segmented output.

Stop

The below figures shows the segmentation of diseased leaf images.

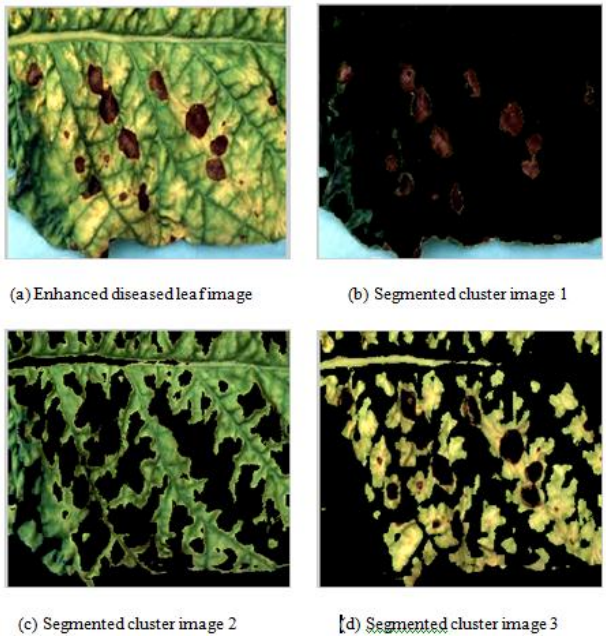

Figure 2 Segmentation operations of diseased leaf images

- **Feature Extraction**

Feature extraction is very important and essential step to extract region of interest. In our proposed method the basic features are mean, standard deviation, entropy, IDM, RMS, variance, smoothness, skewness, kurtosis, contrast, correlation, energy and homogeneity are calculated and considered as feature values. Then we have created the feature vector for these values. The segmented method shows different values for images.

3. Classification

The SVM classifier is used to identify the classes, which are closely connected to the known classes. The Support vector machine creates the optimal separating hyper plane between the classes using the training data. The optimal hyper plane increases the margin of the closed data points. If hyper plane is having the largest distance to the nearest training features of any class is considered as good separation. Margins and Maximum margin hyper plane for SVM classifier with from different samples present in two classes. The SVM samples present on the margin are called as support vector. SVM divides the given data into decision surface. Decision surface is further divided the data into hyper plane of two classes. Training points defines the supporting vector which defines the hyper plane. The basic idea of SVM is used to increase the margins between the hyper plane of two classes. Basically, SVM can only resolve problems which are related to binary classification. Now they have been enlarged to process multi class problem. It uses the one after one method to fit all binary sub classifiers and also to find the correct class by electing mechanism to grant the multi class classification.

4. Conclusion

A computer aided segmentation and classification method is proposed. K-means clustering algorithm is used for segmentation and classification is done by the support vector machine. The statistical parameters are used as features for classification. The work can be used to identify the condition of the pomegranate leaf and the work can also be extended for the identification of the diseased leaf or healthy leaf of the pomegranate plant. And it can classify the different diseases.

References

[1] Wenjiang Huang, Qingsong Guan, Juhua Luo, Jingcheng Zhang, Jinling Zhao, Dong Liang, Linsheng Huang, and Dongyan Zhang, "New Optimized Spectral Indices for Identifying and Monitoring Winter Wheat Diseases", IEEE journal of selected topics in applied earth observation and remote sensing,Vol. 7, No. 6, June 2014

[2] Dr.K.Thangadurai, K.Padmavathi, "Computer Visionimage Enhancement For Plant Leaves Disease Detection", 2014 World Congress on Computing and Communication Technologies.

[3] Monica Jhuria, Ashwani Kumar, and Rushikesh Borse, "Image Processing For Smart Farming: Detection Of Disease And Fruit Grading", Proceedings of the 2013 IEEE Second International Conference on Image Information Processing (ICIIP-2013

[4] Zulkifli Bin Husin, Abdul Hallis Bin Abdul Aziz, Ali Yeon Bin Md Shakaff Rohani Binti S Mohamed Farook, "Feasibility Study on Plant Chili Disease Detection Using Image Processing Techniques", 2012 Third International Conference on Intelligent Systems Modelling and Simulation.

[5] Mrunalini R. Badnakhe, Prashant R. Deshmukh, "Infected Leaf Analysis and Comparison by Otsu Threshold and k-Means Clustering", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 3, March 2012.

[6] H. Al-Hiary, S. Bani-Ahmad, M. Reyalat, M. Braik and Z. ALRahamneh, "Fast and Accurate Detection and Classification of Plant Diseases", International Journal of Computer Applications (0975 – 8887)Volume 17– No.1, March 2011

[7] Chunxia Zhang, Xiuqing Wang, Xudong Li, "Design of Monitoring and Control Plant Disease System Based on DSP&FPGA", 2010 Second International Conference on Networks Security, Wireless Communications and Trusted Computing.

[8] A. Meunkaewjinda, P. Kumsawat, K. Attakitmongcol and A. Srikaew, "Grape leaf disease detection from color imagery using hybrid intelligent system", Proceedings of ECTI-CON 2008.

[9] Santanu Phadikar and Jaya Sil, "Rice Disease Identification using Pattern Recognition", Proceedings of 11th International Conference on Computer and Information Technology (ICCIT 2008) 25-27 December, 2008, Khulna, Bangladesh.