

A Review: Rose Plant Disease Detection Using Image Processing

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Abstract: In this paper the identification of the rose plant diseases is the key for preventing the losses in the yield and quantity of the agricultural product. Diseases decrease the productivity of plant and it also restricts the growth of plant, and both quality and quantity of plant gets reduced. Disease detection on plant is very critical for sustainable agriculture. It is very hard to monitor the plant diseases done with the hands. It has need of very great amount of work, expert knowledge in the plant diseases, and also have need of the more than enough processing time. Hence, digital image processing is used for the detection of rose plant diseases. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, feature extraction and its classification. In this study it has been going to explore how save the rose plant from many diseases.

Keywords: RGB Image, Image acquisition, Pre-processing, Feature extraction, Segmentation, neural network etc.

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I. Introduction

The classification and recognition of rose plant diseases is the technical and economic importance in the plants species. Rose is an ornamental plant of choice for home gardening, landscaping & commercial growing. Due to admiration of delightful properties on roses from throughout the world, roses have been classified as the King of flowers. Unfortunately this plant is prone to infection by several plant pathogens which cause diseases and gradually destroy its health, aesthetic value and marketability. For automating the activities, like texture, color and shape, disease recognition system is feasible. Research in Rose plants is directed to increase the amount produced and quality at a lower cost, less making use of land with increased profit. Management of diseases is a challenging task. Huge numbers of diseases are seen on leaves of rose plant like black spot, bacterial diseases, viruses etc. Recently there was quite a bit of 'chatter' about rose rosette. [1] Etiological study of black spot disease on rose leaves. [2] There are many diseases found on rose leaves and in today's wired world information is available at the click of the button, courtesy the internet. And through mobile phones diseases will identify through the image processing. Below images show some diseased leaf.



Above images show the Leaf affected by diseases (a) Black spot (b) Powdery mildew (c) Anthracnose

Anthracnose develops during cool, moist conditions, which are common in Southern California during the spring. As soon as the weather warms up, anthracnose disappears. Black spot is the most serious disease of roses. It is caused by a fungus, *Diplocarpon rosae*, which infects the leaves and greatly reduces plant vigour. Expect to see leaf markings from spring, which will persist as long as the leaves remain on

the plant. One of the most common and easily identifiable rose diseases is Powdery mildew. It's caused by one of nine species of the phragmidium fungus which, in the spring, forms powdery. In figure.2 shows the disease detection processing.

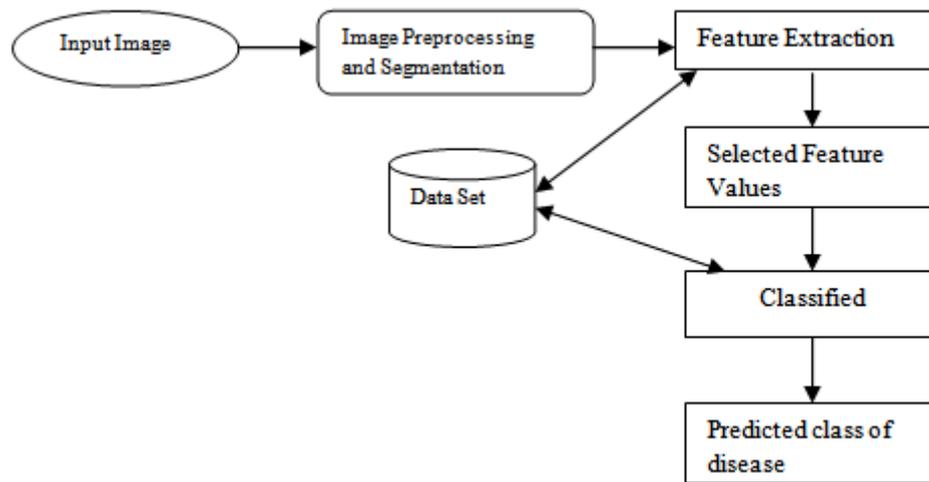


Fig 2: Basic Steps in Image processing to detect plant disease

II. Techniques on Image Processing

Neural Networks

This is the way to segmentation of images into leaf and background within variety of size and color options are extracted from each the RGB and HIS representation of the image [1]. These parameters finally fed to neural network and applied mathematics classifiers that are accustomed confirm the plant condition.

SVM

At the time of execution the methods uses many color representations. The separation between leaves and background is performed by an MLP neural network, that is including a color library designed a priori by suggests that of an unsupervised self-organizing map (SOM) [13]. The colors gift on the leaves are then clustered by suggests that of an unsupervised and undisciplined self-organizing map. A genetic algorithmic program determines the quantity of clusters to be adopted in every case. A Support Vector Machine (SVM) then separates morbid and healthy regions[3].

Fuzzy classifier

The method tries to spot four totally different organic process deficiencies in plants. The images are segmental consistent with the color similarities, rather authors didn't offer any detail about its done. If the segment parts, variety of texture and color features are extracted and submitted to a fuzzy classifier, then outputting the deficiencies themselves, which it reveals the amounts of fertilizers that ought to be accustomed correct that deficiencies [10].

Color analysis

The tests were performed victimization on some plants. Before the color analysis, the images are make-again to the HSI and $L^*a^*b^*$ color areas. The color differentiation between unhealthy and healthy leaves and the leaves underneath take a look at then confirm the presence or disburse of the deficiencies. Geometer distances measured in each color areas quantify those variations [6, 8].

Feature-based rules

Three totally different types of plant diseases which have to methods to spot and label on it. In the many different strategies, the healthy plant leaf segmentation and morbid regions is performed and on that suggestions thresholding is applied. The authors tested two types of threshold first is native entropy and second is Otsu's method, with the help of these methods which one is obtaining good results latter is in use. Afterwards, variety of color and form options are extracted. For using these options the premise for a collection of rules that confirm the sickness the most closely fits the characteristics of the chosen region [7].

KNN

K-Nearest Neighbor is a one of easy classifier within the machine learning technique wherever the category identification is achieved by distinctive the closest neighbors to question|a question |a question} examples and so build use of these neighbors for determination of the class of the query. In KNN the classification that has been categorized the given purpose is belongs relies on the measurement of minimum distance from the given purpose and different points. The distance between the take a look at coaching samples and samples is calculated for the leaf of plant classification [5]. At time of processing the method it finds out similar measures and consequently the category for capture a look at samples.

III. Literature Review

Many researchers had done research in this field. Following is the related literature review of proposed work:

In paper [4] authors used image processing is the technique of exploring and detecting the various images available and providing the required output in the form of images or other detailed report. Initially, it processes the image, then an analysis is carried out and finally, the image is well understood and evaluated. This renders the required target of observing plants and their diseases. Author using with the help of sensors that use image processing techniques to broadcast the captured image to the cloud.

In paper [5] author does an enhancement in classifier SVM to improve plant disease detection. Author implemented SVM which contains two datasets; one is training dataset and train dataset. Firstly original image is captured and then it is being used for processing. Secondly it gives the black and background pixels of image segmented ad also separate the hue part and saturation part of image. Thirdly detection of disease and diseased part of image is detected and healthy part is segmented from it. And obtained work is implemented of the neural approach classifier named SVM with enhanced accuracy in plant disease detection.

In paper [6] author uses smart phone image processing application for plant disease diagnosis. Image processing is used and the system isolates the lesions that can appear on parts of detecting area of plant. It analyzes the color features of the spots in plant parts and evaluated with accuracy higher than 90% using a small training set.

In paper [7] author uses image processing techniques for disease detection of plant. Author used feature extraction and classification techniques to extract the features of infected leaf and the classification of plant diseases. The use of ANN methods for classification of disease in plants such as self-organizing feature map, back propagation algorithm, SVM can be efficiently used. From these methods author accurately identify and classify various plant diseases using image techniques.

Table

Sr. No.	Year	Name of Paper	Author	Technique/Methods	Remark
1.	June-2012	Detection of unhealthy region of plant leaves using image processing and genetic algorithm	Anand.H.Kulkarni	Gabor filter and Artificial Neural Network (ANN) is used.	Accuracy of 91%.
2.	Jan-2013	Agricultural plant Leaf Disease Detection Using Image Processing	Sanjay Dhaygude	SGDM is used to Extract statistical Texture features.	Presence of disease on plant leaf is evaluated.
3.	Feb-2017	A Brief Review on Plant Disease Detection using in Image Processing	Rajneet Kaur, Manjeet Kaur	By using the methods of SVM and KNN	SVM is very complex and KNN classifier obtain highest result as compared to SVM
4.	June-2017	Study of Rose plant diseases and its identification with modern automation techniques	Nitin Choubey, Prashant Udawant	With the help of automatic disease identification	A latest research on rose plant and helpful for disease identification
5.	Mar-2013	Detection of unhealthy region of plant leaves and classification of plant leaf diseases using texture features	S. Arivazhagan, R. Newlin Shebiah	The co-occurrence features like contrast energy, local homogeneity, shade & prominence are derived from the co-occurrence matrix	Author gives an application of texture analysis in detecting and classifying the plant leaf diseases has been explained in this paper
6.	Feb-2015	Plant Disease Detection using Raspberry PI by K-means Clustering Algorithm	Priyanka G. Shinde, Borate S. P.	For the image analysis k-means clustering algorithm is used	Through GSM module disease detection has been shown to users section

7.	2016	Disease Detection and Severity Estimation in cotton plant from Unconstrained Images	Aditya Parikh, Mehul S. Raval	The proposed work use two cascaded classifiers and using local statistical features disease is detected	In this paper, algorithm can be used for generalized disease detection if proper set of training images are available
8.	Dec-2016	Plant Leaf and Disease Detection by Using HSV Features and SVM Classifier	M. Ravindra Naik, Chandra Mohan	The recognition rate in classification process ANN, Bayes classifier, fuzzy logic and hybrid algorithm can also be used	This paper gives, an algorithm for image segmentation technique used for automatic detection as well as classification
9.	Feb-2017	Leaf Disease Detection using Image Processing	Aniket Gharat, Krupa Bhatt, Bhavesh Kanase	Identification of disease follows the steps like accepting the image from user, applying Hu's moment algorithm extracting of features and CNN	The obtained result show significant implementation with the accuracy of 79%
10.	Dec-2016	Expert System for Diagnosis of Diseases of plants : Prototype Design and Implementation	Hemanta Kalita, Shikhar Kr. Sarma, Ridip Choudhary	By using expert system, knowledge base inference engine, knowledge acquisition for suitable diagnosis of diseases	Authors can categorize and summarize approach of expert system and get results

Table: 1 Different Techniques in image processing

IV. Conclusion

Here workout on near about fifteen research papers. In this research related study mostly we note down that SVM based implementation and artificial neural network used for detecting the disease of rose plant and its outcome result that is finding mentioned in above literature review table. Most useful method i.e. SVM classifier we will try to use for more accurate result to save rose plants from bacterial diseases.

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