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## Leaf Disease Detection Using Soft Computing

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**ABSTRACT:** We develop that system for detection of leaf disease by using automatic detection and by using of image processing detect the infected part of disease . Farmers in rural India have mainly depend there income to production of crop (i.e wheat, rice, cotton, sugar cane ). Delayed expert responses to queries often reach farmers too late. This paper can mainly denote that addresses with the objective of developing image processing algorithms that can recognize problems in crops from images, based on colour, texture and shape to automatically detect diseases or other conditions that might affect crops and give the fast and accurate solutions. The design and implementation of these technologies will greatly aid in selective chemical application, reducing costs and thus leading to improved productivity, as well as improved produce. In this paper we use soft computing technique for detection of leaf disease.

**KEYWORDS:** Image Segmentation, Soft Computing

### I. INTRODUCTION

India is an agricultural country; there are 70% of the population are depends on agriculture. Farmers have wide range of diversity to select suitable crops for their farm. However, the cultivation of these crops for optimum yield and quality produce is highly technical. It can be improved by the aid of technological support. The management of perennial crops requires close monitoring especially for the management of diseases that can affect production significantly and subsequently the post-harvest life. The image processing can be used in agricultural applications for following purposes. Predict plant disease from image of plants, Predict pest's attacks from image of plants. In case of plant the disease is defined as any impairment of normal physiological function of plants, producing characteristic symptoms. A symptom is a phenomenon accompanying something and is regarded as evidence of its existence. Disease is caused by pathogen which is any agent causing disease. In most of the cases pests or diseases are seen on the leaves or stems of the plant. Therefore identification of plants, leaves and finding out the pest or diseases, symptoms of the pest or disease attack, plays a key role in successful cultivation of crops. This document is a template.

The organization of this paper is as follows. In Section 2 Methods, I'll give detail of any description leaf disease detection literature survey . In Section 3 **Methods**, Discussed in Section 4 **Result**. 5 section be **Conclusion** is shows that accuracy of that technique.

### II. LITERATURE SURVEY

Sachin D. Khirade & et al. [1] Identification of the plant diseases is the key to preventing the losses in the yield and quantity of the agricultural product. It requires tremendous amount of work, expertize in the plant diseases, and also require the excessive processing time. Hence, image processing is used for the detection of plant diseases. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification. This paper discussed the methods used for the detection of plant diseases using their leaves images.

Prof. Sanjay, B. Dhaygude & et al [2] The application of texture statistics for detecting the plant leaf disease has been explained Firstly by color transformation structure RGB is converted into HSV space because HSV is a good color descriptor. Masking and removing of green pixels with pre-computed threshold level.

Malvika Ranjan, Manasi Rajiv Weginwar & et al [3] Describes a diagnosis process that is mostly visual and requires precise judgment and also scientific methods. Image of diseased leaf is captured .As the result of segmentation Color



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HSV features are extracted. Artificial neural network (ANN) is then trained to distinguish the healthy and diseased samples. ANN classification performance is 80% better in accuracy.

Y.Sanjana, AshwathSivasamy& et al [4] In this it describes the uploaded pictures captured by the mobile phones are processed in the remote server and presented to an expert group for their opinion. Computer vision techniques are used for detection of affected spots from the image and their classification. A simple color difference based approach is followed for segmentation of the disease-affected lesions. The system allows the expert to evaluate the analysis results and provide feedbacks to the farmers through a notification to their mobile phones.

Bhumika S.Prajapati, Vipul K.Dabhi& et al [5]In this detection and classification of cotton leaf disease using image processing and machine learning techniques was carried out. Also the survey on background removal and segmentation techniques was discussed. Through this survey, we concluded that for background removal color space conversion from RGB to HSV is useful. We also found that thresholding technique gives good result compared to other background removal techniques. We performed color segmentation by masking green pixels in the background removed image and then applying thresholding on the obtained masked image to get binary image.

P.Revathi, M.Hemalatha& et al [6] This proposed work is based on Image Edge detection Segmentation techniques in which, the captured images are processed for enrichment first. Then R, G, B color Feature image segmentation is carried out to get target regions (disease spots). Later, image features such as boundary, shape, color and texture are extracted for the disease spots to recognize diseases and control the pest recommendation. In this Research work consist three parts of the cotton leaf spot, cotton leaf color segmentation, Edge detection based Image segmentation, analysis and classification of disease.

Mr. Pramod S. landge, Sushil A. Patil& et al [7] In this propose and experimentally evaluate a software solution for automatic detection and classification of plant diseases through Image Processing. Farmers in rural India have minimal access to agricultural experts, who can inspect crop images and render advice. Delayed expert responses to queries often reach farmers too late. This paper addresses this problem with the objective of developing image processing algorithms that can recognize problems in crops from images, based on colour, texture and shape to automatically detect diseases or other conditions that might affect crops and give the fast and accurate solutions to the farmer with the help of SMS.

### III. METHODS

The test algorithm illustrated give an insight about the algorithm to be used for each stage. The process is given below.

- 1) Image Acquisition
- 2) Segmentation
- 3) Feature Extraction
- 4) Classification of Disease

Algorithm for proposed Soft Computing technique for leaf disease detection.

1. RGB image acquisition.
2. Create colour transformation structure.
3. Convert colour image to the RGB image.
4. Apply the filtering for leaf part.
5. Remove the unwanted part of leaf by using thresholding technique.
6. Calculate the disease part by using feature extraction method.
7. By using of soft computing method to calculate accuracy of disease.



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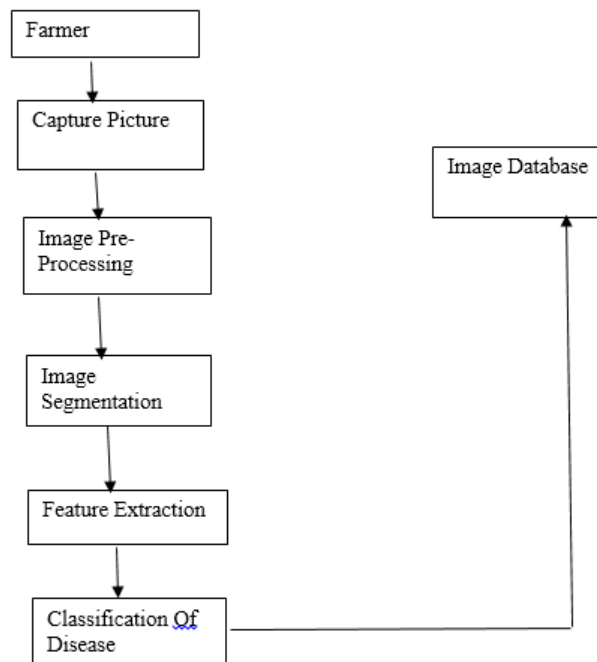


Fig. 1 Propose system for leaf disease .

## 1) Image Acquisition

This step can include the physical transformation of the RGB image and the gray scale image. Image pre-processing is mainly known as conversion of source image to new image. There are many Pre-Processing Techniques such as Filtering, Noise Removing etc. can be applied.

## 2) Segmentation

Image segmentation contains for image enhancement and colour conversion firstly digital image enhance by filter. Leaf filtered form digital image is enhanced by filter. Then filtered image RGB are converted into colour parameter of that image. In there segmentation method use thresholding.

## 3) Feature extraction

Feature extraction is the process done after that segmentation. According to the segmented image and dataset some features, images can be extracted. Feature extraction can depend on statically, structure, shape, size, colour. There are various methods are used for detection of leaf disease are GLCM method, SGDM method, Gabor filter are some methods for feature extraction.

## 4) Classification of Disease

To classify the disease by using soft computing technique. Soft Computing is a technique where an infected leaf can be separated into the first infected objects and then background colour of that leaf.

$$J_m = \sum_{i=1}^D \sum_{j=1}^N \mu_{ij}^m \|x_i - c_j\|^2$$

D: number of data points.

N: number of infected part of leaf .

$\mu_{ij}$ : degree of membership of  $x_i$  in the  $j$ th infected part of leaf.

m: fuzzy partition matrix exponent for regulating the degree of how fuzzy the boundaries between clusters are, with  $m > 1$ .



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Xi: ith data point.

cj: center of the jth infected part of leaf.

## IV.RESULTS AND DISCUSSION

Table 1. Shows accuracy for different algorithm

Method	Soft Computing	Neural Network	KNN
Accuracy	85%	72%	78%

## V.CONCLUSION

This project focused on image processing techniques that have been used for detection of plant diseases because the Plants are the best approach to live. The system uses the Soft computing for the leaf disease detection. The system shows more accuracy than the previous techniques.

## REFERENCES

- [1] Sachin D. Khirade, A.B Patil, 'Plant Disease Detection Using Image Pro-cessing', International Conference on Computing Communication Control and Automation, 2015.
- [2] Prof. Sanjay B. Dhaygude, Mr. NitinP.Kumbhar, 'Agricultural plant Leaf Disease Detection Using Image Processing, International Journal of Advanced' Research in Electrical, Electronics and Instrumentation En-gineering Vol. 2, Issue 1, January 2013.
- [3] Amandeep Singh ,ManinderLal Singh,' Automated Color Prediction of Paddy Crop Leaf using Image Processing', International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015), 2015.
- [4] M.Malathi, K.Anuli ,S.MohamedNizar, A.SagayaSelvaraj, 'A Sur-vey on Plant Leaf Disease Detection Using Image Processing Tech-niques',International Research Journal of Engineering and Technology (IRJET),Volume: 02 Issue: 09, Dec 2015.
- [5] Malvika Ranjan, Manasi Rajiv Weginwar, NehaJoshi, Prof.A.B. Ingole, 'detection and classification of leaf disease using artificial neural network', International Journal of Technical Research and Applications, 2015.
- [6] Y.Sanjana, AshwathSivasamy, SriJayanth, Plant 'Disease Detection Using Image Processing Techniques',International Journal of Innovative Re-search in Science, Engineering and Technology, Vol. 4, Special Issue 6, May 2015.
- [7] BhumikaS.Prajapati, VipulK.DabhiHarshadkumar, B.Prajapati, 'A Sur-vey on Detection and Classification of Cotton Leaf Diseases', Interna-tional Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) 2016.
- [8] P.Revathi, M.Hemalatha, 'Advance Computing Enrichment Evaluation of Cotton Leaf Spot Disease Detection U sing Image Edge detection', ICCCNT'12.
- [9] Mr. Pramod S. landge, Sushil A. Patil, Dhanashree S. Khot, 'Automatic Detection and Classification of Plant Disease through Image Processing', International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 7, 2013.
- [10] Heeb Al Bashish, Malik Braik, and SulieymanBani-Ahmad,' A Frame-work for Detection and Classification of Plant Leaf and Stem Diseases', IEEE 2010.
- [11] SatishMadhgoria, MarekSchikora, and Wolfgang KochPixelBasedClassificationMethodforDetectingUnhealthyRegionsinLeafImages, 2009
- [12] PawanP. Warne, Dr.S.R. Ganorkar Detection of Diseases on Cotton Leaves Using K-Mean Clustering Method, International Research Journal of Engineering and Technology(IRJET) Volume: 02 Issue: 04 — July-2015, 425-431.
- [13] JDaisy Shergill, AkashdeepRana, Harsimran Singh Extraction of rice disease using image processing,International Journal Of Engineering Sciences Research technology,June, 2015,135- 143.
- [14] Malvika Ranjan1, Manasi Rajiv Weginwar,NehaJoshi,Prof.A.B. Ingole, detection and classification of leaf disease using artificial neural net-work,International Journal of Technical Research and Applications e-ISSN: 2320-8163, Volume 3, Issue 3 (May-June 2015), PP. 331-333
- [15] RenukaRajendraKajale. Detection recognition of plant leaf diseases us-ing image processing and android o.s International Journal of Engineering Research and General Science Volume 3, Issue 2, Part 2, March-April, 2015.,ISSN 2091-2730
- [16] Prakash M. Mainkar, ShreekantGhorpade, MayurAdawadkar, Plant Leaf Disease Detection and Classification Using Image Processing Tech-niques,International Journal of Innovative and Emerging Research in Engineering Volume 2, Issue 4, 2015,139-144
- [17] Mr. Sachin B. Jagtap, Mr. Shailesh M. Hambarde, Agricultural Plant Leaf Disease Detection and Diagnosis Using Image Processing Based on Morphological Feature Extraction, IOSR Journal of VLSI and Signal Processing (IOSR-JVSP) Volume 4, Issue 5, Ver. I (Sep-Oct. 2014), PP 24-30.
- [18] NiketAmoda, Bharat Jadhav, SmeetaNaikwadi,Detection And Classifi-cation Of Plant Diseases By Image Processing,International Journal of Innovative Science, Engineering Technology, Vol. 1 Issue 2, April 2014