"A Review Of Plant Leaf Disease Detection And Classification Based On Digital Image Processing Techniques"

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ABSTRACT: The conventional method for leaf disease detection consists of calling an expert person who can identify the diseases based on his experience and that costs too much for an average farmer in a developing country such as India as mentioned above. The conventional system depends on human vision and tends to human error in some cases even with an expertise. Hence an alternative is required for a country like India where a low cost but technology dependent system is required. The best alternative is nothing but Image processing as it provides promising results than any other sensor based techniques

1 INTRODUCTION

India is an agricultural and developing country. To choose a convenient crop farmers have a huge number of varieties in agro field. Due to disease on a leaf of plant causes decrease in quantity and quality of agro products. A swarm of insects that attacks plant as well as bacteria , fungi etc. are affected on leaf of plant and they damage the plant. With the more efficiency these disease have to recognize again and again. Normal Human vision can't detect the disease more accurately so, alternative system is used with the help of image processing to detect the disease on plants [1].
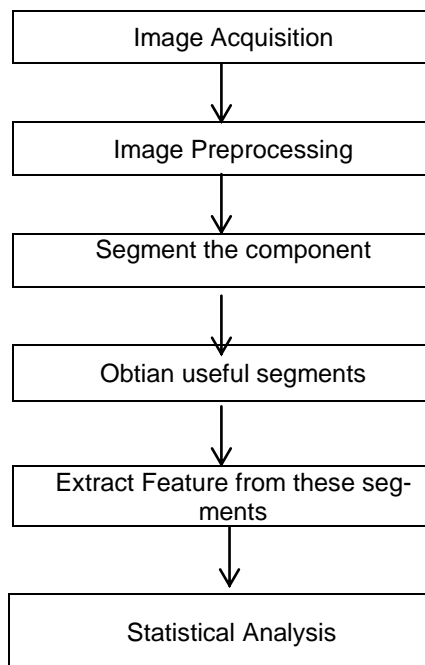
2 LITERATURE SURVEY

Some papers are describing approaches to detect leaf disease detection using various methods. In this paper, The author Anand Kulkarni and Ashwin Patel [2] proposes a methodology by applying image processing techniques to identifying plant disease using diverse image processing techniques along with artificial neural network. In the proposed approach segmentation is done by using CIELAB space colour and feature extraction is done by using Gabor filter. For pattern recognition or classification Artificial Neural Network is used. The author Dheeb Al Bashish, Malik Braik, and Sulieman Bani-Ahmad [3] describes a model for plant and stem diseases classification the model uses K=Means clustering method for image segmentation and the images are passed through a pretrained neural network and it was found that precision was around 93%.The Author Hrushikesh Marathe and Prerna Kothe [4] describe a method for disease detection by calculating leaf area through pixel number statistics. This method is used to obtain high precision & accuracy whether leaf with the maximum dimensions. Kshitij Fulsoundar, Tushar Kadlag, Sanman Bhadale, Pratik Bharvirkar, Prof S.P.Godse [5] in their 'detection and classification of plant leaf diseases' paper they describes the android application it gives user to detect the plant leaf disease. For this application proposed system uses algorithm from morphological features of leafs. The author Yinmao Song, Zhihua Diao, Yunpeng Wang, Huan [6] Wang named as 'Image Feature Extraction of Plant Disease' proposed a crop disease based on computer image processing technology. The system based on colour, texture and feature extraction three aspects features. The author S. Arivazhagan, R. Newlin

Shebiah, S. Ananthi, S. Vishnu Varthini[7] have proposed a model with an image preprocessing and classifier filtering the unhealthy region of plant leaves. support vector machine are used for classification and regression and it was found that the efficiency of an algorithm around 94%. The author Sabah Bashir, Navdeep Sharma[8] stated that it is possible to detect remote area plant disease detectionusing image processing by combination of K-Means clustering and texture analysis. The algorithm being used for texture analysis is co-occurrence method. K-Means clustering has been used for texture analysis. The author Sachin D. Khirade A. B. Patil [9] have discussed the various methods of plant leaves disease detection .In this paper they also discussed the some feature extraction and segmentation algorithm. After feature extaction from learning database image are classified using artificial neural network. As the implementation of different image processing and computer algorithms gives sufficient amount of accuracy yet it is required to check the feasibility of each image processing technique. The study is done by Zulkifli Bin Husin , bdul Hallis Bin Abdul Aziz, Ali Yeon Bin Md Shakaff, Rohani Binti S Mohamed Farook preventing unnecessary chemical application to the plants which are not affected by the diseases[10]. A review of all the techniques is done by Savita Ghaiwat and Parul Arora. The study involves techniques such as K-nearest neighbour classifier probabilistic neural networks, genetic algorithms, support vector machine, principle component analysis, artificial neural networks and fuzzy logic [11]. The image processing implementation was done to increase the speed of disease detection and to get it done with proper accuracy, hence some strategy is proposed by H. Al-Hiary, S. Bani-Ahmad, M. Reyalat, M. Braik and Z. ALRahmneh to accelerate the process along with good accuracy [12]. An increase in throughput and reduction in subjectiveness arising from human experts in detecting plant diseases some advances are proposed by Jayamala K. Patil, Raj Kumar, in their paper named 'Advances In Image Processing For Detection Of Plant Diseases' [13]. Orchid disease detection is a requirement for a farmer hence there are many method to achieve this goal, one method contains image processing along with fuzzy logic is proposed by Muhammad Thaqif bin MohamadAzmi Naimah Mat Isa [14]. And another method is proposed by Wan Mohd Fadzil W.M.N, Shah Rizam M.S.B, R. Jailani, Nooritawati M.T. which uses border segmentation techniques

with the help of MATLAB [15]. There were many application of Edge Detection algorithm proposed by different people. One of the applications is useful in agricultural field as edge detection is an essential parameter in the overall image processing framework. Cotton leaf spot disease detection can be done using only edge detection techniques and the diseases can be categorised with the help of HPCCDD algorithm. This work is proposed by P. Revathi, M. Hemalatha [16]. Rice being staple food in many areas of India it is very important to keep the rice protected from disease or to provide proper chemical therapy to already diseased rice. To provide chemical therapy, it is essential to know what disease the rice crop is having and hence pattern recognition techniques is used as proposed in research paper by Santanu Phadikar, Jaya Sil [17].

3 BASIC STEPS OF ALGORITHM

Image Acquisition

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Image Preprocessing

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Segment the component

↓

Obtian useful segments

↓

Extract Feature from these segments

↓

Statistical Analysis

The method consists of taking digital images of the leaves with a high resolution digital camera so that it can be processed quite easily. All the taken images are usually in RGB form where each pixel is represented by Red Green and Blue intensity values. To do the feature extraction and texture identification properly it is necessary that we should do some image pre-processing on that image. The image will be converted into HSV image components. Each component will have their unique features that are useful for different application as we are only interested in the texture recognition we will therefore only use Hue image. A Spatial Gray-level Dependence Matrices method is used for calculating the parameters that will represent the whole image in some other but minimum hyper dimensions and by comparing the range of values of those dimensions for test images it is possible to differ images based on different texture. The whole parameter calculation method is known as statistical analysis of the image.

4 CONCLUSION

Considering the need of farmers the system focuses on the detection of the diseases of the plants and that too in less time compared to conventional method and in systematic manner so that any person who wants to use the system should be able to use it easily with proper interactions with the system

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