Novel Detection of Unhealthy Plant Leaves Using Image Processing Technique

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Abstract: Disease Detection of plants plays an important role in the farm related field on which we need to focus more. If proper care is not taken in this area, it may lead to serious effects on plants and negatively affects the productivity and quality. Here a project is proposed with an idea of detecting plant disease using image processing. Image processing is used for find out affected area of disease. The decision-making ability of an expert also depends on his/her physical condition, such as tiredness eye sight, work pressure, climate and experience. So, this method is time consuming and less producing a lot with very little waste.

Keywords: Image acquisition, image pre-processing, feature extraction, classification, classifier

I. Introduction

Plant disease identification by visual way is more difficult job and at the same time less accurate and can be done only in limited areas. Whereas if automatic detection way of doing things is used it will take less efforts, less time and more perfect. In plants, some general sickness are brown and yellow spots, or early and late burn, and other are fungal, viral and bacterial diseases. Image processing is the way of doing things which is used for measuring affected area of disease, and to figure out the difference in the color of the affected area. There will be great importance for the green production safety through using the computer image processing technology to watch leaf, in order to gain artificial intelligence prevention. Usually farmers identify the diseases by naked eye observation method. In this method disease is visually detected by the experts, who have the ability to detect small changes in leaf color. Some researchers have used image processing techniques for fast and accurate detection of leaf sicknesses. The steps followed in detection of leaf diseases are image acquisition, image Pre-processing, disease spot segmentation, feature extraction and disease classification. The quality of being very close to the truth value of result depends on methods used for disease spot detection. Image segmentation is the process of dividing an image into different parts. This is used to identify related information in digital images. In order to carefully study the plant leaf diseases, there is a need to fetch the features of these images, which include division of something into smaller parts.

II. Literature Survey

In this section describes various approaches for detecting the disease in plant leaf using image processing technique

Pro. Sanjay B. Dhaygude & Mr. Nitin P Kumbhar … [1] The detection of agricultural plant leaf diseases using Image Processing was proposed by and Mr. Nitin P.Kumbhar. There are four steps in the system architecture, first is create a color transformation structure for a captured RGB image, HSI (Hue Saturation Intensity) is used for color descriptor. The second Step is, green pixels are masked and remove by using threshold value. In the third step by using threshold value, useful segments are obtained, while image segmentation is done. And in last step segmentation is done.

Vijayi Singh, **Prof. A K Misra & et… [2]** Detection of unhealthy region of plant leaves using Image Processing and Genetic algorithm was proposed by Vijai Singh, varsha, Prof. A K Misra. Image segmentation is done by using genetic algorithm. Separating or grouping an image into different parts is Image Segmentation. Solution for optimization problems are created by genetic algorithms which belongs to evolutionary algorithms. The algorithm begins with set of solution called a population. Using very less computational efforts the optimum results were obtained, which also shows the efficiency of genetic algorithm in recognition and classification of leaf disease. The plant disease can be identified at early stage or initial stage, another advantage of using this method. This type of classifier algorithm is less complex to understand and easy implementation.

Rajneet kaur & et.[3] A Brief Review on Plant Disease Detection using in Image Processing proposed by Rajneet Kaur et al, International Journal of Computer Science & Mobile computing. Use computer algorithm to perform image processing on digital pictures using this computer algorithm. It might avoid issues like build-up of noise signal distortion throughout process there are

fungal, bacterial diseases caused by insects and nematodes on plant. Fuzzy classifier, Color analysis, Feature based rule,KNN these techniques are used for overall system of detection of plant disease.

Sujatha Rt. [4] Leaf disease detection using image processing, Journal of Chemical and Pharmaceutical Sciences describes that feature extraction is done in RGB, HSV and YIQ .The diseases of different plant has mention. Classification is done for few diseases k-Means clustering is used for segmentation. It will divide leaf pixels into different clusters. This approach can significantly support an accurate detection of leaf disease

Sushil R. Kamlapurkar … [5] Detection of Plant Leaf Disease Using Image Processing Approach proposed by Sushil R. Kamlapurkar. They provide survey on plant leaf disease detection using image processing techniques. Disease in crops causes significant reduction in quantity and quality of the agricultural product. Identification of symptoms of disease by naked eye is difficult for farmer. Crop protection especially in large farms is done by using computerized image processing technique that can detect diseased leaf using color information of leaves. Depending on the applications, many image processing techniques has been introduced to solve the problems by pattern recognition and some automatic classification tools. In the next section this paper presents a survey of those proposed systems for meaningful way. There are many methods in automated or computer vision for disease detection and classification but still there is lack in this research topic. All the disease cannot be identified using single method.

H. Sabrol & et al..[6] Tomato Plant Disease Classification in Digital Images using Classification Tree, International Conference on Communication on Signal Processing proposed by H. Sabrol. To achieve automatic plant disease identification and diagnosis based on image processing. The Otsu's segmentation applied on image database. Total 10 times the images are randomly used for training and testing purpose. Feature extraction is done with features of leaf like color, shape and texture features. The classification tree is non parametric supervised learning technique is used. In this paper supervised learning techniques is used for learning purpose to classify the tomato plant leaves into six classes healthy and unhealthy that is five types of disease due to fungal, bacteria and virus. The combine features included color, shape and texture features extracted both type of plant images. The classification result showed that classification tree is resulting good accuracy.

Savita N. Ghaiwat, Parul Arora & et al… [7] Detection and Classification of Plant Leaf Diseases Using Image Processing Techniques proposed by Savita N. Ghaiwat, Parul Arora. Developed an automated classification system based on the morphological changes caused by brown spot and the leaf blast diseases of rice plant. To classify the diseases Radial distribution of the hue from the center to the boundary of the spot images has been used as feature by using Bayes' and SVM Classifier.

H.AI-Hiary et al… [8]Fast and Accurate Detection And Classification Of Plant Diseases Proposed by H.AI Hiary,Z.A Lrahamneh.Defines the three methods of Leaf Disease detection Identify the affected part of leaf by using k-means clustering, solve the affected part of leaf by using color co-occurrence method for texture analysis, to classify the type of disease by neural Network.Coverted the RGB image to HSV for texture analysis use the SGDM matrix for image formation. At last execute the solution by Neural Network. The advantage of these System it tested upon the wide range of disease and give good results. Demerit is it could be improved to increase the recognition rate of classification.

P.Revathi, M.Hemalatha& et al… [9]This Proposed work is based on image edge detection the way of doing things in which, the clicked images are processed for making better first. Then R,G,B color Feature image segmentation is carried out to get targeted areas.later,image features such as edge-related,shape,color and texture are pulled out for the diseases spots to recognize sicknesses and control the pest recommendation. In this research work consist three parts of the cotton leaf spot, cotton leaf color divide into smaller parts, edge detection-based image segmentation, analysis and classification of disease.

Gautam Kaushal, Rajni Bala & et al… [10] In this paper they were doing image processing for plant disease detection, conversion of image into digital format, on this converted image they applied texture feature extraction segmentation, and classification texture feature extraction GLCM algorithm is applied. In existing algorithm they applied SVM classifier, according to their drawbacks of SVM, SVM is replaced by KNN,So that accuracy of disease detection is increased.

Khirade et.al…[11]In this Proposed System Segmentation and Feature extraction set of computer instructions are discussed that can be used for the detection of plant Sicknesses by using the image of leaves. It is very hard to detect the plant Diseases manually due to needed things of too much time, knowledge of plant Sicknesses and much amount of work. Author divided the all process of plant leaf sicknesses detection in five steps:Image Acquistion,segmentation,Feature Extraction and classification of leaf diseases. Segmentation is done for separating of image into different feature parts using K-means clustering, Otsu filter.

Rothe et al. [12] has proposed pattern recognition techniques for the detection and classification of cotton leaf diseases of Alternarnia, Myrothecium and Bacterial Blight. The dataset images are taken from the field of Central Institute of Cotton Research Nagpur. Active contour-based segmentation algorithm is used for the isolation of diseased spots. Author has also suggested some feature directions to the similar concept for the crops of wheat, orange, citrus and maize etc.

ABDOLVAHAB EHSANIRAD and SHARATH KUMAR Y. H. [13] has proposed a system to classify the plants by applying on the leaves images. To extract the leaves texture features, the (GLCM) and Principal Component Analysis (PCA) algorithms have been used. The classification of leaves is done by using Eigenspace. The Algorithms are trained by 390 leaves to classify 13 kinds of plants with 65 new or deformed leaves images. The result indicates that the accuracy for the GLCM method is 78% while

the accuracy for the PCA method is 98%.

Niket amoda, bharat jadhav, smeeta naikwadi[14] In this research, plant diseased is detected and is also classified. The histogram matching is based on the color feature and the edge detection technique. The color features extraction is applied on samples that are contained the diseased leaf of the plant. The training process includes the training of these samples by using layers separation technique which separates the layers of RGB image into red, green, and blue layers and edge detection technique which detecting edges of the layered images.

Khot.S. T, Patil Supriya , Mule Gitanjali…[15]In this paper, a real time image processing based approach for the disease on pomegranate is proposed. First image acquisition is takes place then pre-processing, segmentation, feature extraction techniques are used for detection of diseases. This system is useful for farmers to earlier detection of diseases on pomegranate. It is also useful for increasing the yield.

Anant Bhardwaj1, Manpreet Kaur2 , and Anupam Kumar1[16] In this proposed System discussed an automated system for plant identification using shape features of their leaves. It has been found that four parameters that are area convexity, volume fraction, moment invariant, inverse difference moment, provide better results.It is a feasible alternative for classifying structurally complex images.They offer exceptional invariance features and

reveal enhanced performance than other moment-based solutions. The experimental results explained that the proposed method is effective. However, some other works will be explored to obtain better performance.

M. M. Mokji and S.A.R. Abu Bakar[17] In this proposed System to get better thresholding technique based on gray level co-occurrence matrix (GLCM) is used to handle images with fuzzy borders..The GLCM gives information on the distribution of gray level change frequency and edge information, the threshold value is calculated. In this Set of computer instructions is designed to have flexibility on the edge definition so that it can handle the fuzzy borders. By controlling information in the GLCM, a statistical feature is made from to act as the threshold value for image segmentation process.

Prof. R. N. kadu et al. Int. Journal of Engineering Research and Applications [18] In this Proposed System image processing technique is used to automatically detect the signs of the disease. There are some stages to find the disease like image acquisition, preprocessing on image, color transform using YCbCr, segmentation by Otsu method, feature extraction by Gabor filter method and classification using SVM, using those steps can surely detect the disease and classified it and also can take serving to stop something bad before it happens measures.

Jayaprakash Sethupathy"[19] In this Proposed System author examine the diseases of mango leaf.The K-means algorithm is used for the disease segmentation, and SVM classifier is used to identify Sicknesses of leaf.

(1) identification of disease using the OpenCV and (2) Leaf shape-based disease identification.

Mr. Hrishikesh P. Kanjalkar, Prof. S.S.Lokhande[20] Proposed a solution for leaf features uses for disease detection From the Hue image from HSI gives clear different treatment based on skin color,age etc. of diseased spots, and it is very useful for pulling out or taking from something else size, color and centroids. This proposed paper presents some important features of diseased leaves which will help to find exact disease of plant leaf.In paper total 10 features are taken in that 8 color features ,size diseased spot size, distances of diseased spots from each other.

Jing YI Tou, Yong Haur Tav, Phooi Yee Lau [21] Studied the methods of image processing. The Local Binary Pattern (LBP) is a texture extraction method that used for label the pixels of an image by thresholding the neighbourhood of each pixel and provides binary number. It is possible to Study images in challenging real-time settings due to its computational simplicity, it. LBP is mostly used for texture segmentation problems, it is also used to calculate local features.

M. Z. Rashad, B. S. el-Desouky,and Manal S. Khawasik,[22] In this proposed system Author describes a new,interesting approach for classification of plants which was based on the description of texture properties. They have used a combined classifier learning vector quantization along with related to lines coming out from the center of circle basis function. The proposed systems ability to classify and recognize a plant from a small part of the leaf is its advantage is giving thing. Without needing to depend either on the shape of the full leaf or its color features, one can classify a plant having only a portion available that is in itself enough as the proposed system needed only textural features. This system can be useful for the people who work to find information of study of plant who need to identify damaged plants, as it can now be done from a small available part. This system is mostly related as the combined classifier method produced high performance far superior to other tested methods as its correct recognition n rate was 98.7% which has been showed in the result.

Jyotismita Chaki and Ranjan Parekh [23] Studied the Colour image of leaf is converted to grayscale image because variety of changes in atmosphere and season cause the color feature having low reliability. This way it is better to work with grayscale image. Once image is converted to grayscale it is broken into parts from its background and then converted to binary and performs image smoothing over its image is pre-processed to improve the important features. This step added grayscale conversion, image segmentation, binary conversion and image smoothing. The aim of image pre-processing is to improve image data so that it can hold down and stop.

Kutty et al. [24] This System has used the neural network-based system to classify the watermelon leaf sicknesses of Downey Mildew and Anthracnose. This System has calculated the true positive rate, true negative rate and overall quality of being very close to the truth for the efficiency of the proposed idea This classification is based on the color feature extraction from RGB color model which is got from the identified pixels in the region of interest.. All performance is shown with ROC curve having AUC value of 0.5. The true classification result also shows the value of 75.9%.

Syed Thousif Hussain [5]-2012 [25] Author proposed the approach which is used to create a high number object class. This sort of questioning the object ask lots of questions all type of object and data connected with it. It gives the output based on the rerank of image and its object class. First it downloads all the related images and the web pages. Then on extracting features it tries to find out the truth about the downloaded page. and place it in the database and then ranking is done based on text surrounding and descriptive features.

Ashis Pradhan [26] This paper presents a related to ideas about how things work or why they happen .The aspect of SVM, its ideas and its applications summary. Support Vector Machine (SVM), is one of best machine learn algorithms, which was proposed in 1990's and used mostly for pattern recognition. This has also been applied to many pattern classification problems such as image recognition, speech recognition, text separation and labeling, face detection and not working correctly card detection, etc. Pattern recognition aims to classify data based on either a judgement before doing something knowledge or related to study information extracted from raw data, which is a powerful tool in data separation in many fields of studies. SVM is a supervised type of machine learning. algorithm in which, given a set of training examples, each marked as belonging to one of the many categories, an SVM training algorithm builds a model that describe a possible future event the category of the new example. SVM has the greater ability to generalize the problem, which is the aim of statistical learning.

Prof. Bhavana Patil1, Mr. Hemant Panchal2, Mr. Shubham Yadav3 , Mr. Arvind Singh4, Mr. Dinesh Patil[27]Author state that the image In this project, the detection as wells the fix for diseases for curing it is a gained with effort. This project uses GSM to send the message to every kind of mobile handset. This project uses different image processing ways of doing things which provide accurate results.

1 Priyanka G. Shinde, 2Ajay K. Shinde, 3Ajinkya A. Shinde, 4Borate S. P [28] — paper discussed a system using raspberry PI of plant disease detection. For the image analysis, the k-means clustering set of computer instruction was used. In drug-based research of leaf disease detection is necessary and important topic for research because it has advantages in supervising crops in field at the form and so it automatically detects signs of disease by image processing by k-means clustering algorithm. This paper provides the best method for detection of plant diseases using image processing and alerting about the disease caused by sending email, SMS and displaying the name of the disease on the monitor display of the owner of the system. To upgrade farming-based products, automatic detection of disease signs in sicknesses is useful. The design and use of these technologies which is totally automatic and it will significantly help in the chemical application. It will reduce the cost demanded for the bug killing chemicals and other products. This will lead to increase in working well and getting a lot of the farming.

Ana Carolina Quintao Siravenha & et..[29] This work presents a plants classification by using time-frequency decomposition of leaves contour. There are three main step 1. datasamples and dataset,2.Analysis Techniques and 3.Learning and Classification. In the first step Flavia database is used then in second step normalized Fourier transformed vector is used to making shape descriptor vector and in last Learning and Classification step the features are send to the learning process and classification is done on that using random forest, rotation forest and feedforward neural network.

Arti N. Rathod& et..[30] Here author represents that in farm fields research of automatic leaf sicknesses of detection is extremely important. Here the author describes that in farm related research of automatic leaf disease detection is extremely important & benefits in supervising large fields of crops, and so on automatically detect signs of disease as soon as they appear on plant leaves. The term disease is usually used only for destruction of live plants. Here, different methods studies are for increasing throughput and reduction.

Samuel E. Buttrey et...[31] Construct a hybrid classifier by combining the two classifiers in common 1 classification trees and 2 k nearest neighbour (KNN). Divide the feature by a a classification rule that performs better than either trees or the usual KNN in a number of well-known data set. measure the distance through test set item to each of the training set items, noting the k training set items that are nearest. The main characteristics of disease detection are working on the development of automatic, efficient, fast and accurate detecting of unhealthy leaf.

Gurpreet Kaur & et..[32]authors proposed system is made up of 4 modules, 1) image acquisition, 2) image preprocessing, 3) image recognition and 4) result. image acquisition of leaf image is captured by using digital camera.
Various image processing techniques are applied in image preprocessing this for preparing a leaf image for the feature's extraction process. features are extracted from image and classify it. In the display result recognition results is shown.

P. Mohanaiah , P. Sathyanar..[31]Feature Extraction is a used for capturing the visual content of images for retrieval.extraction of color, texture and shape or domain specific features. This paper presents gray level co occurrence matrix (GLCM) to extract second order statistical texture features of images. The features namely, Angular Second Moment, Correlation, Inverse Difference Moment, and Entropy are computed using Xilinx FPGA.

Md Nazrul Islam & et.[34] proposed a system for detecting diseases on tomato plant i.e. early scorch, late scorch and leaf spot on the tomato plant with the help of PNN i.e. Probabilistic Neural Network and the GLCM feature along with fuzzy logic. Which makes this system valuable, accurate and little computational effort. But the recognition rate varies for the dynamic image acquisition and also required more learning time need to maintain huge leaf.

Padao & et...[35] here research aims to study plant classification using Naive Bayes (NB) method. Leaf shape and texture serves as input features of the model classifier. The test result shows that the classification quality of being very close to the truth of the model is high that true positive rating is excellent and the weighted average of the false positive rating is 0.09%, which is carefully thought about very little acceptable

Ghulam Mustafa Choudhary& et..[36]Author represent the images of two category i.e. spot and scorch. For the training of the Feed forward neural network and Radial basis function neural network. classification extracted color, texture and geometric features is used. And for classification thee Classifier Feed Forward Neural Network is used.

III.Table

Sr.No.	Year	Authors	Techniques	Advantage	Disadvantage
1	2013	Prof.S.B.Dh ay gude, N.P.Kumbhar	HSV, Color Transforma tio n Structure, Segmentation	HSV good color descriptor	Recognition rate of classificati on is low
2	2015	Vijay Singh, Prof.A.K.M isr a	Genetic Algorithm	Disease can identify at initial stage optimum results	Only 10 species can be identified
3	2017	Rajneet Kuar	SVM ,KNN,Fuzzy Classifier	KNN classifier gives highest result	SVM is too complex for calculation
4	2017	Sujatha R, Y Sravan Kumar	K means clustering, SVM, Feature Extraction	Low in cost easy to rectify the disease	Accuracy can be improved
5	2016	Sushil R. Kamlapurkar	Gabor Filtering, ANN	Detecting the disease at early stage	Need to extract features according to the disease
6	2016	H.Sabrol,K. Sat ish	Greedy algorithm, supervised learning, classificati on tree	Classificati on tree is resulting good accuracy	Only focuses on Tomato plant
7	2014	Savita Ghaiwat,Par ul Arora	KNN, Fuzzy logic, ANN, SVM	Prediction accuracy of SVM is high	SVM involves long training time

8	2010	H.AI-Hairy,S.Bani- Ah Mad	K means, SDGM matrix, color cooccurrence method, HSI, Neural network	Accurate detection of disease in little computational efforts	Recognition of hybrid algorithm is less
9	2014	P.Revathi and M.Hemalatha	HPCCDD	Reduce the production loses	Accuracy can be improved
10	2017	GautamKaushal, RajniBala	GLCM, KNN, K means	SVM is slow so replace by KNN	Success ratio is low
11	2015	Sachin D. Khirade and A. B. Patil	K means, HIS, Otsu thresholding,	In ANN, for classification of disease self	Accuracy can be improved
			color concurrence method, ANN	organizing feature map back propagation algorithm is used	
12	2015	Rothe, P. R., and R. V. Kshirsagar	Active contour-based segmentation	Active contour-based segmentation gives disease spot	Only focuses on Cotton Leaf
13	2010	ABDOLVAHA B EHSANIRAD and SHARATH KUMAR Y. H	GLCM, PCA	PCA method has more accuracy 98.46 over the GLCM	GLCM has less accuracy 78.46 as compared as PCA
14	2014	Niket Amoda, Bharat Jadhav, Smeeta Naikwadi	K means, Color concurrence methodology	For training process various layers separation technique are used to separate the RGB image	Large database complex to handle

15	2016	Khot.S. T1, Patil Supriya , Mule Gitanjali	Gabor filter, HSV, YCBbCr	Real time image processing-based approach is used	It is only used for crops
16	2013	Anant Bhardwaj1, Manpreet Kaur2, and Anupam Kumar1	PNN, PCA, Neural network	Area convexity, volume fraction, moment invariant, inverse difference moment provides better result	Less correct recognition rate
17	2007	M. M. Mokji and S.A.R. Abu Bakar	GLCM, fuzzy boundaries	Good segmentation result	Only one featured extracted i.e. entropy so accuracy is less
18	2015	Prof. R. N. kadu	Gray Scale, SVM, gabor filtering	SVM prediction accuracy is	SVM classifier involves long training data,
				high, SVM does not depend on input space dimensionality	Large number of support vector used to perform classification task
19	2014	Jayaprakash Sethupathy	SVM, HSI, K means	OpenCV implementation provide easy availability. Low cost	It has need to carry the robotic arm
20	2014	Mr.Hrishikesh P. Kanjalkar, Prof. S.S.Lokhande	Texture Classification, Computer Vision, Machine Learning	HSI gives clear discrimination in diseased spots	Accuracy can be improved

21	2009	Jing YI Tou, Yong HaurTav, Phooi Yee Lau	GLCM, local binary pattern, gabor filter, ANN, SVM	Trend of classificati on methods and filtering methods are explained	
22	2011	M. Z. Rashad, B. S. el-Desouky,and Ma nal S. Khawasik	Texture based feature, radial basis function Learning vector Quantization (LVQ),	Used texture features to obtained exact feature of image, recognition rate 98.7	Recognition rate can be improved
23	2012	JyotismitaCha ki and Ranjan Parekh	Moment invariant, centroid radii	Different shape modeling techniques are used, low complexity	
24	2013	Kutty, SuhailiBeer an, Noor Ezan Abdullah, HabibahHash im , and Aida Sulinda	Neural network	Total result is value 75.9	Focuses on only Watermelon leaf
25	2012	Syed thousifhussa in B.N.Kanya	Data mining	Provide sort of information	Inaccurate information
26	2012	Ashis Pradhan	SVM	Prediction accuracy of SVM is high	SVM involves long training time

27	2017	Prof. Bhavana Patil,Mr. Hemant Panchal, Mr. Shubham Yadav , Mr. Arvind Singh, Mr. Dinesh Pati	GLCM, GSM, formatting	User interactive, utilize GSM to send message	Raspberry Pi packages issue

28	2017	Priyanka G. shinde, Ajay K. Shinde, Ajinkya A. Shinde, Borate S. P	GSM, K means, SGDM, GLCM, KNN	Various types of leaf diseases can identify, Accurate, High speed, Save labor prize	
29	2015	Ana Carolina QuintaoSira ven ha	Shape Features, fourier transform, feature selection	Fourier transform for automatic plant identificati on and classificati on, Gives highest accuracy	correct recognition rate is low
30	2013	Arti N. Rathod, BhaveshTana wa l, VatsalShah	Image Processing	Image analysis	
31	2012	Samuel E. Buttrey	KNN, Classificati on tree	Performance of classifier is analyze using confusion matrix	Accuracy is not enough
32	2002	Gurpreet kaur	GLCM, Gray Level	Classificati on tree is used to divide the feature space	Not useful for large database
33	2013	P. Mohanaiah P Sathyanarayan a , L. GuruKumar	Pattern recognition, Features, Frames.	high discriminati on accuracy, requires less computation time	resources required a large set of data accurately
34	2004	M. N. Islam, M. Kashem, M. Akter, and M. J. Rahman	Genetic algorithm, neural network	Genetic algorithm is optimization technique use as a problem solving strategy	Dynamic Image acquisition, the recognition rate is low

35	2015	Francis Rey F. Padao and Elmer A. Maravillas	Naïve Bayesian, Probabilistic Classification, Supervised Learning.	Classification accuracy model is high	True positive rating and weight average for falls positive rating is 0.09
36	2015	Ghulam Mustafa Choudhary, Vikrant Gulati	Feed Forward Neural Network Radial Basis Function Neural Network	automatic, fast and accurate development us e of detection disease on unhealthy leaf.	require more data than traditional Machine

IV.Conclusion

The main approach is to recognize the diseases. Speed and accuracy are the important characteristics required for disease detection. Hence, the extension of this work will focus on developing the advance algorithms for fast and accurate detection of leaves with disease. Using very less computational efforts the optimum results will obtain which also shows the efficiency. To improve recognition rate in classification process, Artificial Neural Network, Bayes Classifier, Fuzzy Logic and Hybrid Algorithm can be used.

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