LEAF DISEASE DETECTION AND FERTILIZER SUGGESTION

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Abstract— The field of agriculture is in a great threat this includes the diseases that attack the plant leaf. Our system finds the area of leaf that has been affected and also the disease that attacked the leaf. This is achieved by using Image Processing; there are systems that predict the diseases in the leaf. Our system uses K-Medoid clustering and Random Forest algorithm to produce more accuracy in the detection of disease in the leaf. The image is first pre-processed and then the clustering method is applied to find the affected area of the leaf. This is then processed to fetch 13 characters like Mean, SD, Entropy, RMS, Variance, Smoothness, Kurtosis, Skewness, IDM, Contrast, Correlation, Energy and Homogeneity through this we will measure the accuracy and find the disease.

Keywords- Image Processing, Clustering, Classification, Detection of Leaf Disease, Accuracy, Pre-processed

I. INTRODUCTION

A system that automatically detects leaf disease with the help of image processing is being developed. This in turn helps the farmers in the identifying the diseases at an early stage and provide useful information to control it. This system does few image pre-processing techniques like image acquisition, image segmentation, feature extraction and classification. Modern agricultural practices assure great development of cultivation. We have many smart agriculture developing models used as a real time monitoring systems to monitor the temperature, humidity, moisture content in the soil using various sensors. We have many systems that do work automatically but there are very few systems that detect problems and provide suggestions to those problems. One such automatic disease detection system is developed with the help of image processing. Image processing is applied in such a way that even a spot in the leaf is detected. The system detects almost all possible diseases and also addresses the severity levels of the disease.

Mostly plant leafs are infected due to pathogens, fungi, bacteria and viruses. In recent years, most of the disease detection systems were developed based on image processing. These systems input should be the set of affected plant images that are saved in the database. In this paper we are taking the images of the leaf that are already captured. The images are given to the system after that using image processing techniques the image is enhanced to increase the accuracy in finding the disease. The techniques we are using are clustering, classification, feature extraction and segmentation. The diseases will vary based on the size, color, shape and the virus affected. System takes lots of

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infected parts from the images and those images are put into image processing techniques. As there are various systems that detect leaf diseases, accuracy matters the most. The accuracy of the system is improved by using the best algorithmic pair.

II. RELATED WORK

PLANT DISEASE DETECTION AND CLASSIFICATION USING IMAGE PROCESSING AND ARTIFICIAL NEURAL NETWORK, IRJET VOLUME 05, ISSUE 06, JUNE 2018

In this paper a software solution for fast, accurate and automatic detection and classification of plant diseases through Image Processing is presented [1]. Identification of the plant diseases is the key to preventing losses in the quality and quantity of the agricultural product. Health monitoring and disease detection of plant is critical for sustainable agriculture. The typical method of studying plant disease is to rely on visually observable patterns on the plant leaves. Visually identifying plant diseases is inefficient, difficult, time consuming, requires expertise in plant diseases and continuous monitoring which might be expensive in large farms. Therefore; a fast, automatic and accurate method to detect plant disease is of great importance. Hence, image processing technique is employed for the detection of plant diseases. The implementation of these technologies will lead to improved productivity India has a diverse agricultural sector. Agriculture plays a vital role in India's economy and over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. Research in agriculture is aimed towards increase of productivity and quality of food.

TECHNIQUES USED

There are two main characteristics of plant-disease detection machine learning methods that must be achieved, they are: speed and accuracy. In this study an automatic detection and classification of leaf diseases has been introduced, this method is based on K-means as a clustering procedure and ANNs (Artificial Neural Networks) as a classifier tool using some texture feature set .The aim of this work is threefold:

1) Identifying the infected object(s) based upon K-means clustering.

2) Extracting the feature set of the infected Leaf images.

3) Detecting and classifying the type of disease using ANNs(Artificial Neural Networks).

LEAF DISEASE DETECTION USING IMAGE PROCESSING IRJET VOLUME 05 ISSUE 12 DECEMBER 2018.

Doing study on the disease severity or harshness of leaf using image processing techniques. They used feature extraction methods such as threshold and triangular threshold methods. Identification of diseased leaf of brown and blast spot of leaf image processing techniques were carried out by. They used zooming algorithm, SOM neural network for disease detection.

The authors made investigation on diseases (for e.g. Early scorch, Ashen mould, Late scorch, Cottony mould and Ting whiteness diseases) of plants using K- Means clustering, Back propagation algorithm. Made study on diseases using an image processing technique which involves morphological processing, colour clustering. Leaf disease detection of orchid leaf (for e.g.) such as Black leaf spot and Sun scorch was carried out by. They applied pattern classification and border segmentation techniques for detection of diseased on leaf. The present work has been carried out for the automatic disease detection of plant leaf and provide solution about the diseases that solution can be provided using the deep study about the diseases and the soil moisture level detection and also the temperature level detection whether that crop get

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affected by which reason exactly to determined solutions.

TECHNIQUES USED

Classification is used in the interpretation of the extracted diseased region in an image which helps in the identification of the type of disease infection in leaves. In our analysis back propagation neural network (BPNN) is used which build association between known pattern of input and specific output. The input layer analyses the diseased region while the output layer specifies the disease outcome of the affected region. A hidden layer occurs in between the input and output layer which provides connecting link between the input and output images. It is applied to obtain least error in the classification of disease of the affected region.

LEAF DISEASE DETECTION AND SELECTION OF FERTILIZERS USING ARTIFICIAL NEURAL NETWORK IRJET VOLUME 04 ISSUE 06 JUNE 2017

Plant disease especially on leaves is the one of the major reagent of reduction in both quality and quantity of the food crops. The quality and quantity of food production become reduced only because of pest's presence in the crops and leaves. Thus it leads to increase in difficulty, food insecurity and fatality rate. In modern years in order to identify the plant disease, so many different concepts of image process technology have been adapted. One of the dominant dilemmas for agronomist is to reduce and destroy the progress of pests affecting the crop harvest. The common pests like aphids, fungus, gnats, flies, slugs, snails, caterpillars, etc these pests are most commonly determined in the plant disease. Almost all agriculturists are used to identify pests systemically over examination by using their eyes but this access is high and it takes some time. The techniques of digital image processing have been organized in the agriculture field in order to analyze the purposes in different agricultural applications like plant recognition, crop yield estimation, soil quality estimation etc. Feature extraction method of neural network with GLCM approach was also established in order to detect the crop disease. The extraction of texture feature will be carried out by both using GLCM.

A NOVEL MACHINE LEARNING BASED APPROACH FOR DETECTION AND CLASSIFICATION OF SUGARCANE PLANT DISEASE BY USING DWT IRJET VOLUME 04 ISSUE 12 DECEMBER 2017

Input has to be the set of affected plant images that are saved in the database. These images are captured by the camera by continuously monitoring the field. In this paper we are taking already captured images .The images are given to the system after that using image processing techniques the quality of the image is increased. And by increasing the accuracy for finding the disease is the task to be improved. The techniques we are using are classification, feature extraction, segmentation. The symptoms of the diseases will vary with respect to size, colour, shape based on the virus affected. Here in this paper we are solving the problem of feature extraction and pre-processing by enhancing the image quality. System takes lots of infected part images from crops are else downloaded from the Flickr and Google and those images are going through the image processing techniques .In the recent times improving the accuracy is main thing to detect the disease faster. Image segmentation is main technique to detect the affected area using threshold value. Here according to the pixel of the image the threshold value have to be assigned according to the pixel the system will compare with images that saved in the dataset. By using DWT algorithm the pixel of the image is to be compared and remove the unused pixels using Fourier transform by forming a matrix over the image. Most of the plants will be in green pixels if its changed means that part is affected by some virus or fungus. The proposed method is the improvement of the approach which will increase the accuracy and quality of the image. According to the severity of the situation the system will give the simple recommendations and notifications to suggest some pesticides and mention the fungus that is affected.

III. EXISTING SYSTEM

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The existing system uses K-Means clustering and Support Vector Machine classification algorithm to detect the disease in the leaf of the image uploaded to the system. The system does usual preprocessing steps followed by clustering and classification. This system gives an accuracy of about 80%. This approach significantly does not support an accurate detection of leaf disease since this system is very time consuming. The system has failed in improving the accuracy of leaf disease detection. The existing system uses 11 features such as Mean, SD,Variance, Smoothness, Kurtosis, Skewness, IDM, Contrast, Correlation, Energy and Homogeneity to determine the accuracy.

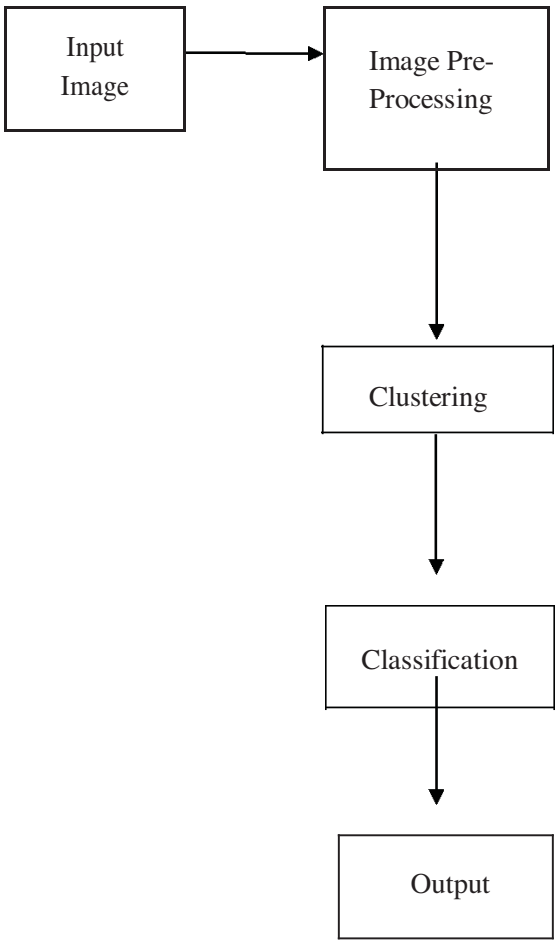

Fig.3 Architecture Diagram of Existing System

IV. PROPOSED SYSTEM

Our system uses K-Medoid clustering and Random Forest classification algorithms to detect the leaf diseases. This system is found to efficient in finding the disease accurately. The working of the system is as follows: The system maintains an image dataset of infected and healthy leaves. The entire dataset is divided into train and test dataset on a random basis. With this data the system is trained to find the diseases in the leaf.

Feature Extraction

The system takes the input of an infected leaf and the contrast of the image is enhanced followed by few pre processing steps. The reason for enhancing the contrast of the image is to get clarity of the image in detail. Then the R, G, B colors of an image is plotted as a bar graph.

After enhancing the image, the pixels of the image is clustered randomly. We have to select the best clustered image that shows us the infected parts of the leaf clearly. On choosing the best clustered image we can find the percentage of affected area.

Followed by this, 13 features like Mean, SD, Entropy, RMS, Variance, Smoothness, Kurtosis, Skewness, IDM, Contrast, Correlation, Energy and Homogeneity of the leaf is calculated. Then the image is classified by comparing the image with the existing dataset. This results in the type of disease that has infected the leaf.

As an enhancement our system also prescribes the fertilizer to be used to treat the leaf in order to save it. This is done with the help of dataset that holds the leaf disease name along with the fertilizers that can be used to treat it. This dataset is used to provide us a suggestion for the fertilizer that can be used.

This is a normal search process which acts a dictionary with key value pair. The name of the disease is treated as a key by searching the key we get the equivalent value which is the fertilizer as a result.

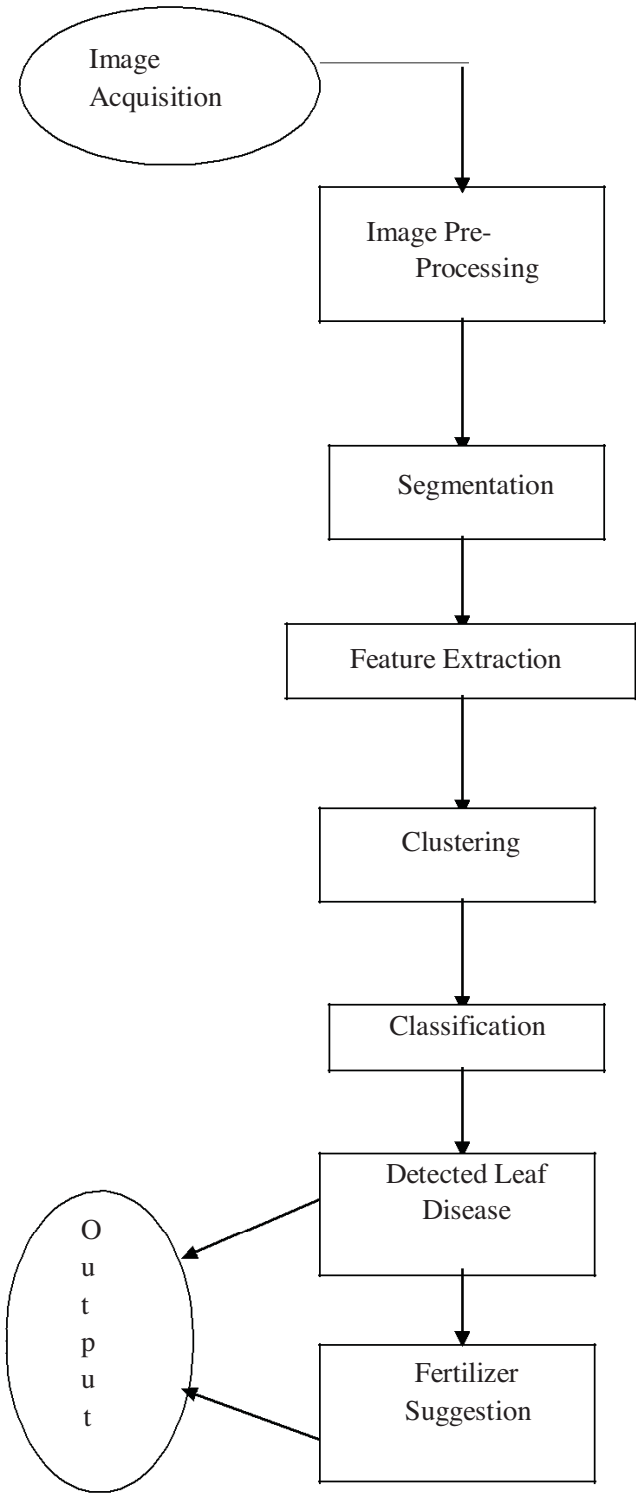

Fig.4 Architecture Diagram of Proposed System

V.CONCLUSION

With the algorithms used and the dataset provided the systems makes the best attempt to find the disease of the input leaf image and the fertilizer that can be used to treat it. The accuracy of the system stands high with the ability of detecting the disease. The time taken for computing the disease in the infected leaf is reduced in this system and the memory consumption is also manageable. As the trained dataset grows the efficiency of the system increases which in turn increases the accuracy in finding the disease. Thus the system stands for the betterment of farmer's welfare thereby increasing the production and the economy of the country. This system can be further enhanced by changing different algorithmic pair to find the disease in a more accurate way.

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