A Review on Leaf Disease Detection using Feature Extraction

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Abstract:- India is fast developing country and agriculture is the back bone for the countries development in the early stages. Due to industrialization and globalization concepts the field is facing hurdles. On top of that the awareness and the necessity of the cultivation need to be instilled in the minds of the younger generation. Now a day's technology plays vital role in all the fields but till today we are using some old methodologies in agriculture. Identifying plant disease wrongly leads to huge loss of yield, time, money and quality of product. Identifying the condition of plant plays an important role for successful cultivation. In olden days identification is done manually by the experienced people but due to the so many environmental changes the prediction is becoming tough. So we can use image processing techniques for identification of plant disease. Generally we can observe the symptoms of disease on leafs, stems, flowers etc. so here we use leafs for identification of disease affected plants.

Keywords: Leaf, Disease, Feature, Extraction, Review

Literature Survey:

Arti N. Rathod et al. (2014) proposed in agriculture research of automatic leaf disease detection is essential research topic as it may prove benefits in monitoring large fields of crops, and thus automatically detect symptoms of disease as soon as they appear on plant leaves. There are the main steps for disease detection of Image Acquisition, Image Preprocessing, Image Segmentation, Feature Extraction and Statistical Analysis. This proposed work is in first image filtering using median filter and convert the RGB image to CIELAB color component, in second step image segmented using the k-medoid technique, in next step masking green-pixels & Remove of masked green pixels, after in next step calculate the Texture features Statistics, in last this features passed in neural network. The Neural Network classification performs well and could successfully detect and classify the tested disease.

Hrishikesh P. Kanjalkar et al. (2014) proposed Vegetables and fruits are most important agricultural products. In order to obtain more value added products, a proper quality control is essentially required. Many studies show that quality of agricultural products may be reduced from many causes. One of the most important factors of such quality is plant diseases. This proposed paper presents some important features of diseased leaves which will help us to find exact disease of plant.

Sachin B. Jagtap et al. (2014) proposed leaf spots can be indicative of crop diseases, where leaf batches (spots) are usually examined and subjected to expert opinion. In our proposed system, we are going to develop an integrated image processing system to help automated inspection of these leaf batches and helps identify the disease type. Conventional Expert systems mainly those which used to diagnose the disease in agriculture domain depends only on textual input. Usually abnormalities for a given crop are manifested as symptoms on various plant parts. To enable an expert system to produce correct results, end user must be capable of mapping what they see in a form of abnormal symptoms to answer to questions asked by that expert system. This mapping may be inconsistent if a full understanding of the abnormalities does not exist. The proposed system consists of four stages; the first is the enhancement, which includes HIS transformation, histogram analysis, and intensity adjustment. The second stage is segmentation, which includes adaptation of fuzzy c-means algorithm. Feature extraction is the third stage, which deals with three features, namely color size and shape of spot. The fourth stage is classification, which comprises back propagation based neural networks.

Pranita P. Gulve et al. (2015) proposed identification of the symptoms of plant diseases by means of image processing techniques is of prime concern in the area of research. There is a need for a plant disease diagnosis system that may support farmers during their daily struggle. The proposed work is a development of an efficient diagnosis system that focuses on plant disease identification by processing acquired digital images of leaves of the plant. These images are made to undergo a set of pre-processing methods for image enhancement. The enhanced image is segmented using thresholding based segmentation approaches to extract the region of interest i.e., diseased portion. Later, a satisfying set of visual texture features from the region of interest are extracted for detecting diseases accurately. Finally, treatment measures are

provided to control the disease. The advisory helps farming community in effective decision making to protect their crop from diseases.

Priya P. et al. (2015) proposed the feature extraction methods for crop and fruit diseases based on computer image processing in detail. Crop and fruit diseases are most important agricultural products. In order to obtain more value added products, a proper quality control is essentially required. There are various applications claimed to extract the accurate information from the coloured image database. The main purpose of this paper is to provide an interface for digitally illiterate users, especially farmers to efficiently and effectively retrieve information through internet. In addition, to enable the farmers to identify the disease in their crop, its causes and symptoms using image processing without classical approach and identify the disease.

R. N.kadu et al. (2015) proposed in an agricultural field plant diseases are very important aspect as it directly affect on the production of plant and economical value of market. In this research generally we uses image processing technique that is automatically detect symptoms of the disease as early as possible. This is the first and important phase for automatic detection and classification of plant diseases. There are some stages to find the disease like image acquisition, preprocessing on image, color transform usingYCbCr, segmentation using Otsu method, feature extraction using Gabor filter method and classification using SVM, using those steps we can surely detect the disease and classified it and also can take preventive measures.

J.Jeya Priyankha et al. (2017) proposed crop diseases may lead to severe agricultural yield. Hence classification and identification of crop diseases is essential to improve the agricultural yield. Various methods have been proposed to identifying the crop diseases, but the accuracy is considered to be issue over all the researches performed so far. In proposed system, the image is taken, preprocessing the image. The preprocessed image is subjected to K means clustering to get infected part of the leaf. The infected part is subjected to morphological processing to expanding the infected area. The infected part of leaf is subjected to histogram of oriented gradient (HOG) algorithm to extract the features. SVM classifier is used to identify and classify the diseases based on the extracted feature.

K.Narsimha Reddy et al. (2017) provides survey on different classification techniques that can be used for plant leaf diseases classification. Identification of symptoms of disease by naked eye is difficult for farmer. Crop protection in large frames is done by using computerized image processing technique that can detect diseased leaf using color information of leaves. There are so many classification techniques such as k-Nearest Neighbor Classifier, Probabilistic Neural Network, Genetic Algorithm, Support Vector Machine, and Principal Component Analysis, Artificial neural network, Fuzzy logic. Selecting a classification method is always a difficult task because the quality of result can vary for different input data. Plant leaf disease classifications have wide applications in various fields such as in biological research, in Agriculture etc. This paper provides an overview of different classification techniques used for plant leaf disease classification.

Malti K. Singh et al. (2017) proposed about 70% of the India economy depends on agriculture. Due to environmental changes such as rainfall, temperature, the crop yield gets affected severely. Phaseolus vulgaris L. is an important food legume crops and provide essential diet for millions of people across the world. It is affected by various diseases out of which Anthracnose are of major importance. Anthracnose disease is caused by fungus Colletotrichum lindemuthianum. Camellia assamica (J. W. Mast.) W. Wight is one of the most popular non-alcoholic beverage crops in the world. The leaf gets severely affected by fungus Alternaria alternata. Development of automatic detection system using advanced computer technology such as image processing help to support the farmers in the identification of diseases at an early or initial stage and provide useful information for its control. Therefore the present study was carried out on automatic disease detection of plant leaf of Phaseolus vulgaris (Beans) and Camellia assamica (Tea) using image processing techniques. It involves image acquisition, image preprocessing, image segmentation, feature extraction and classification.

Dixit Ekta Gajanan et al. (2018) proposed although professional agriculture engineers are responsible for the recognition of plant diseases, intelligent systems can be used for their diagnosis in early stages. The expert systems that have been proposed in the literature for this purpose, are often based on facts described by the user or image processing of plant photos in visible, infrared, light etc. The recognition of a disease can often be based on symptoms like lesions or spots in various parts of a plant. The color, area and the number of these spots can determine to a great extent the disease that has mortified a plant. Higher cost molecular analyses and tests can follow if necessary. This application can easily be extended for different plant diseases and different smart phone platforms.

Saradhambal.G et al. (2018) proposed crop cultivation plays an essential role in the agricultural field. Presently, the loss of food is mainly due to infected crops, which reflexively reduces the production rate. To identify the plant diseases at an untimely phase is not yet explored. The main challenge is to reduce the usage of pesticides in the agricultural field and to increase the quality and quantity of the production rate. Our paper is used to explore the leaf disease prediction at an untimely action. We propose an enhanced k-mean clustering algorithm to predict the infected area of the leaves. A color based segmentation model is defined to segment the infected region and placing it to its relevant classes. Experimental analyses were done on samples images in terms of time complexity and the area of infected region. Plant diseases can be detected by image processing technique. Disease detection involves steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification. Our project is used to detect the plant diseases and provide solutions to recover from the disease. It shows the affected part of the leaf in percentage. We planned to design our project with voice navigation system, so a person with lesser expertise in software should also be able to use it easily.

Varsha Sawarkar et al. (2018) proposed 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.

Conclusion: This paper presents a survey on different method for plant leaf disease detection using image processing technique. 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. From study of above classification techniques we come up with following conclusion. The k-nearest neighbour method is perhaps the simplest of all algorithms for predicting the class of a test example. An obvious disadvantage of the k-NN method is the time complexity of making predictions. Additionally, neural networks are tolerant to noisy inputs. But in neural network it's difficult to understand structure of algorithm. SVM was found competitive with the best available machine learning algorithms in classifying high-dimensional data sets.

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