FUNGUS ANALYSIS IN CROP USING IMAGE PROCESSING TECHNIQUE

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Abstract : ***Image Processing Technique used to identify and classify fungal disease symptoms affected on different crops. Identification of symptoms of disease difficult for farmer. Crop protection from the fungus in large farms is done by using computerized image processing technique. The image processing technique can detect diseased leaf using colour information of leaves. The plant diagnosis is limited by human due to the visual nature of the plant monitoring task, computer vision techniques seem to be well adapted. One of the plant products gets reduced by plant disease. The goal is to detect, to identify, and to accurately quantify the symptoms of diseases.***

Index Terms - Image Processing, Image Pre-processing, Segmentation, Feature Extraction, Classification.

I. INTRODUCTION

Images form important data and information in biological sciences. Digital image processing and image analysis technology based on the advances in microelectronics and computers has many applications in biology and it circumvents the problems that are associated with traditional photography. This software application helps to improve the images from microscopic to telescopic range and also offers a scope for their analysis. The naked eye observation of farmers is the main approach adopted in practice for detection and identification of plant diseases. But, this requires continuous monitoring of farmers which might be prohibitively expensive in large farms.

Automatically detection of fungus in plant is an important research topic. As it may prove benefits in monitoring large fields of crops for farmers, and thus automatically detect the diseases from the symptoms that appear on the plant leaves. This enables machine vision that is to provide image based automatic inspection, process control and robot guidance. Comparatively, visual identification is labour intensive, less accurate and can be done only in small areas. The detection and analysis of leaf fungus has been done based on masking and removing of green pixels from the image of leaves, applying a specific threshold to extract the infected region and computing the texture statistics to evaluate the diseases. Plant diseases may be broadly classified into two types. They are spot disease and fungal.

The disease Identification of symptoms of disease by naked eye is difficult for farmer. In plants, some general diseases seen are brown and yellow spots, early and late scorch, and others are fungal, viral and bacterial diseases. Image processing is used for measuring affected area of leafs of crop and to determine the difference in the colour of the affected area of crops.

The fundamental steps of image processing and fungus analysis and final optimization are used in this work. The image acquisition is performed by considering RGB colour based disease affected leaf image of crop. Support Vector Machine is used for the leaf. Image segmentation is performed with K means clustering. Image feature extraction is performed to extract the features of leaf disease symptoms by maintaining Grey Level Occurrence Matrices.

II. OBJECTIVE

Support Vector Machine is used for the leaf disease detection & classification and finally ant colony optimization is applied for the optimization of concept Farmers experience great difficulties in switching from one disease control policy to another. The naked eye observation of farmers is the traditional approach adopted in practice for detection and identification of plant diseases. On the other hand, self-phone usage has increased exponentially among the population of India. People from all walks of life are using mobile phones and different associated applications for gaining economic and social benefits.

To make an efficient use of image processing techniques. Provide solution with least hardware requirement. To develop an app that is cost efficient. Minimize the use of resources. Easy to use and accurate. Detection of fungus of Crop. Prevention of fungus of Crop.

III. PROPOSED WORK

[1]The presented work is based on crop grading. The grading of crops is based on colour of the plant leaves based segmentation method using k-means clustering. Plant leaf colour is used as a measurement of nutrient level and plant health status. A computer system is proposed, a new inexpensive and easy-to-use technique for the detection of foliar nitrogen content in leaves of plants and chlorophyll content in plants based on leaf colour.

[2]An experiment was developed on sorting system for bunches of longan fruits by using an image processing technique. In the meanwhile a Canny edge detector was operated to detect edges in the images of longan fruits. Since the shape of longans is circular, for this a circular Hough transform\ was also applied to the images in searching for longans.

[3]The ripeness level of crop may be estimated by the use of analysis of colour. An analysis of the crop image may give a very fair idea of the ripeness level. Image analysis will be used to get the exact colour range for ripen and unripen. Further the leaf colour of the crop may also be used to predict or correlate the ripeness level.

[4] Image processing proved to be effective tool for analysis in various fields and applications. In agriculture sector, where the parameters like yield, quality of product, canopy were the important measures from the farmer's point of view. The availability of expert and their services may consume time and many times expert advice are not affordable.

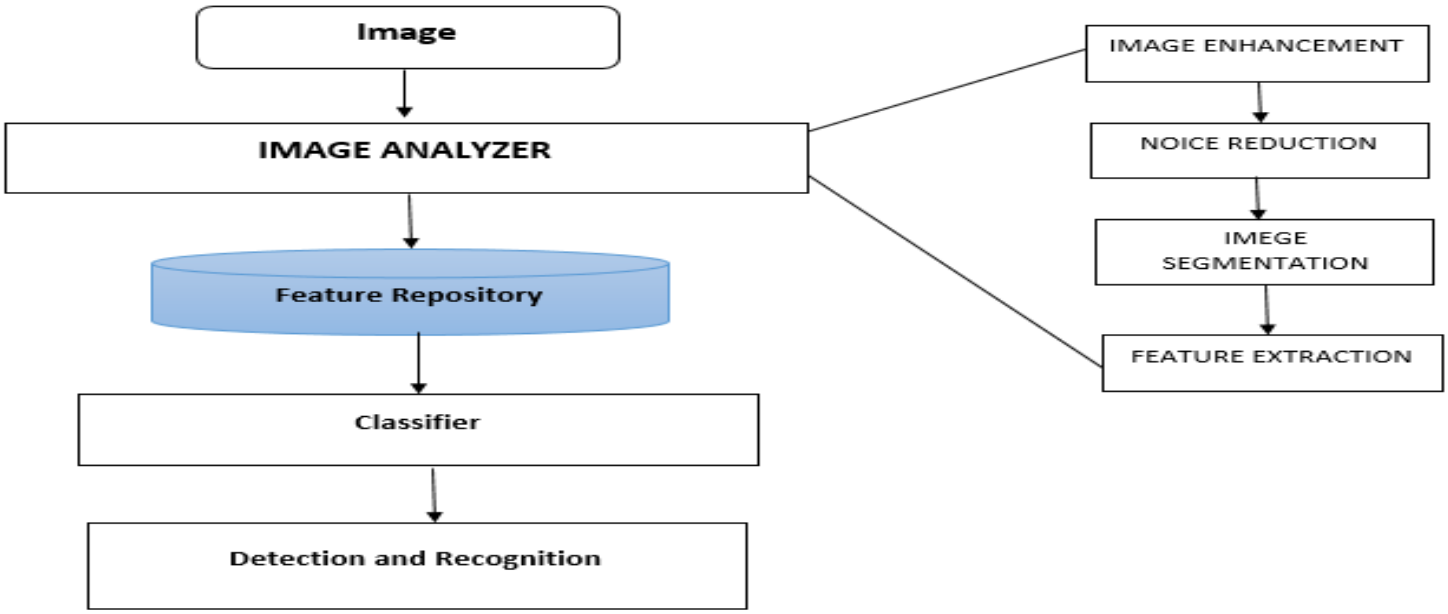
IV. LITERATURE REVIEW

Sachin Khirade and A. B. Patil [1] discussed about the main steps of image processing to detect disease in plant and classify it. It involve steps like image acquisition, image preprocessing, image segmentation, feature extraction and classification. For segmentation, Otsu's method, converting RGB image into HIS model and k-means clustering are there. Among all, k-means clustering method gives accurate result. After that, feature extraction is carried out like, colour, texture, morphology, edges etc. Among this, morphology feature extraction gives better result. After feature extraction, classification is done using classification methods like Artificial Neural Network and Back Propagation Neural Network.

The goal of Sanjiv Sannakki et.al [2] is to diagnose the disease using image processing and artificial intelligence techniques on images of grape plant leaf. They classify mainly two diseases, downy mildew and powdery mildew of grape leaf. To remove background, Masking is used and improve accuracy. Anisotropic Diffusion is used to preserve information of affected portion of leaf. Segmentation is carried out using k-means clustering method. After segmentation process the Feature Extraction take place by calculating Gray Level Co-occurrence Matrix. And finally classification is done using Feed Forward Back Propagation Network classifier. They have used only Hue feature which gives more accurate result.

Ms. Kiran R. Gavhale et al. [3] presented number of image processing techniques to extract diseased part of leaf. For Pre-processing, Image enhancement is done using DCT domain and colour space conversion is done. After that segmentation take place using k-means clustering method. Feature extraction is done using GLCM Matrix. For classification of canker and anthracnose disease of citrus leaf, SVM with radial basis kernel and polynomial kernel is used.

V. DATA FLOW DIAGRAM



VI. METHODOLOGY

There are five main steps used for the detection of fungus in crops. The processing scheme consists of image acquisition through digital camera or web, image pre-processing includes image enhancement and image segmentation where the affected and useful area are segmented, feature extraction and classification. Finally, the presence of diseases or fungus on the plant leaf will be identified. In the initial step, RGB images of leaf samples were picked up. The step-by-step procedure as shown below:

1) RGB image acquisition;
2) convert the input image into colour space;
3) Segment the components;
4) obtain the useful segments;
5) Computing the texture features;
6) Configuring the neural system for recognition.

4.1 Image Acquisition

Firstly, the images of various leaves acquired using a digital camera with required resolution for better quality. The development of an image database is clearly dependent on the application.

4.2 Image Pre-processing

In the second step, this image is pre-processed to improve the image data that suppress undesired distortions, enhances some image features important for further processing and analysis task. It includes colour space conversion, image enhancement, and image segmentation. The RGB images of leaves are converted into colour space representation. The purpose of the colour space is to facilitate the specification of colours in some standard accepted way. RGB images converted into Hue Saturation Value (HSV) colour space representation. Because RGB is for colour generation and his for colour descriptor. HSV model is an ideal tool for colour perception. Hue is a colour attribute that describes pure colour as perceived by an observer. Saturation termed as relative purity or the amount of white light added to hue and value means amplitude of light. After the colour space transformation process of the plant leaves, hue, shade component used for further analysis. Saturation and value are dropped since it does not give extra information.

4.3 Feature Extraction

Segmentation is also done through Clustering. Pixels of the colour image are clustered for segmentation using an unsupervised technique Fuzzy C. This is applied for ordinary images. It results to fragmentation if it is a noisy image. A basic clustering k-means algorithm is used for segmentation in textured images. It clusters the related pixels of image to segment the image. Segmentation is done through feature clustering and there it will be changed according to the colour components. Segmentation is also purely depending on the characteristics of the image. Features are taken into account for segmentation. Difference between the intensity and colour values are used for segmentation. Improved k-mean used to solve low-level image segmentation.

4.4 Comparisons with predefine result

Comparison method essentially consist of detecting features in image that can be compare or match with different features in the database. Comparisons is an important task of the project.

VII. CONCLUSION

The present paper reviews and summarizes image processing techniques for several plant species. The image processing technique have been used for recognizing plant diseases. The major techniques for detection of crop diseases are: BPNN, SVM, K-means clustering, and SGDM. These techniques are used to analyses the healthy and diseased plants leaves. Some of the challenges in these techniques viz. effect of background data in the resulting image of the leaves, optimization of the technique for a specific plant leaf diseases, and automation of the technique for continuous automated monitoring of plant leaf diseases under real world field conditions. The review suggests that this fungus detection technique shows a good potential with an ability to detect plant leaf diseases and some limitations. Therefore, there is scope of improvement in the existing research.

VIII. REFERENCES

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