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# IDENTIFYING THE ATTACKS ON GROWING PLANTS BASED ON IMAGE PROCESSING

Billa Deena Divya Nayomi[1], Ipshitha Charles[2], SabbiVamshi Krishna[3], Sandip Swarnakar[2,*]

[1]*Department of Computer Science and Engineering, G. Pullaiah College of Engineering and Technology*, Nandikotkur Road, Kurnool, Andhra Pradesh -518002, India

[2]*Photonics Lab, Department of Electronics and Communication Engineering, G. Pullaiah College of Engineering and Technology*, Nandikotkur Road, Kurnool, Andhra Pradesh -518002, India

[3]*Department of Electronics and Communication Engineering, Ravindra College of Engineering for Women*, Nandikotkur Road, Kurnool, Andhra Pradesh -518452, India

*Corresponding author: drsandipece@gpcet.ac.in

***Abstract*— Image processing is a diverging area where researches and advancements are taking a geometrical progress in the agricultural field. Various researches are going on vigorously in plant disease detection. Identification of plant diseases can not only maximize the yield production but also can be supportive for varied types of agricultural practices. Disease classification on plant is very critical for supportable agriculture. It is very difficult to monitor or treat the plant diseases manually. It requires huge amount of work, and also need the excessive processing time, therefore image processing is used for the detection of plant diseases. Plant disease classification involves the steps like Load image, pre-processing, segmentation, feature extraction, svmClassifer. Detecting disease may be a key to stop agricultural losses. The aim of this project is to develop a software system answer that mechanically find and classify disease.**

***Keywords*— *Image processing, Shape-based identification, Texture-based identification.***

## I. INTRODUCTION

Plant disease can be described as some form of modification that hampers the normal processes in it. Crop production can be majorly affected by these diseases which may reduce the quality and quantity of the overall produced yield. Management of large amount of crop yield involves various timely activities such as keeping a watch for diseases, which reduces it to undesirable stuff. It also involves finding immediate cure for various challenges faced [1-2]. Disease can affect the overall functional capacity of the plant. It may result in reduced growth, less fruit production, more leaf falls and many other ailments also. Sometimes the disease may spread from crop to crop or may be spread by some pathogen or other means. Sometimes they may be caused by some fungi or some bacteria. Sometimes even viruses get transferred with seeds from one place to another. In the process of detection of disease, number of imaging techniques is being used [3-5]. One of the imaging techniques being used id photo acoustic imaging, which makes the use of light absorption in case of tissues. It makes the use of property of light's absorption by tissues and its conversion into heat further resulting in the generation of photo acoustic signals. Here the pressure distribution radiated by tissues further being mapped and used for imaging purposes. Considering various imaging techniques one of the important techniques is magnetic resonance imaging [6-8]. Disease on plant leads to the significant reduction in both the quality and quantity of agricultural products. The studies of plant disease refer to the studies of visually observable patterns on the plants. Monitoring of health and disease on plant plays an important role in successful cultivation of crops in the farm. In early days, the monitoring and analysis of plant diseases were done manually by the expertise person in that field. This requires tremendous amount of work and also requires excessive processing time. The image processing techniques can be used in the plant disease detection.

## II. SHAPE- AND TEXTURE-BASED IDENTIFICATION

They used different geometric and histogram-based features from segmented diseased portions and applied an SVM classifier with different kernels for classification [9].
The shape-based method will extract the contour signature from every leaf and then calculate the dissimilarities between them using the Jeffrey-divergence measure. The orientations of edge gradients will be used to analyze the macro-texture of the leaf. identified three different soybean diseases using different color and texture features. In Ref. [10] used a feed-forward neural network and backpropagation to identify plant leaves and their diseases. In Ref. [11] used a bacterial-foraging-optimization-based radial-basis function neural network (BRBFNN) for the identification of leaves and fungal diseases in plants. In their approaches, they used a region-growing algorithm to extract features from a leaf on the basis of seed points having similar attributes. The bacterial-foraging optimization technique is used to speed up a network and improve classification accuracy.

## III. CLASSIFICATION OF DETECTION

Plants play an important role in all the aspects of life. They serve as a backbone to sustain the environment. Plants do suffer from diseases, which affects the normal growth of plants. These diseases affect complete plant including leaf, flower, fruit and stem. Detection of such plant diseases is an important task to perform. The existing method for the identification and classification of diseases from a plant is done with the help of human intervention. Experts through naked eye make observations about the diseases of a plant by continuous monitoring of plants over a large period of

time. Most of the time, these existing approaches of disease identifications are time-consuming and cumbersome. So to monitor the plant disease at an early stage, use of some automatic method can be quite beneficial. Soft computing technique having the ability to simulate human thinking is having the capability to perform the task of identification and classification of such plant diseases automatically in less time and cost [12].

## IV. Literature Survey

In Ref. [13] present survey on different classification techniques that can be used for plant leaf disease classification. For given test example, k-nearest-neighbor method is seeming to be suitable as well as simplest of all algorithms for class prediction. If training data is not linearly separable then it is difficult to determine optimal parameters in SVM, which appears as one of its drawbacks [14]. In Ref. [15] discussed a disease detection method for orchid plant leaves. The orchid plant leaflet images are received the usage of digital camera. The algorithm makes use of an aggregate of various strategies inclusive of border segmentation method, morphological processing and filtering technique used for categorizing input images into two disease class as black leaf spot and solar scorch. In Ref. [16-22] explained method for resilient and advance identify of leaflet patch in sugar beet. For capturing images, Nikon photographic camera was used that was mounted on a stand to stay constant distance. The author used white background whereas capturing images to avoid the additional complications in process. The method implements hybrid methods of guide matching and support vector machine. This technique usage color primarily forms options for segmentation, orientation code matching and support vector machine classifier for final malady classification. In Ref. [5] proposed a novel approach of identification of Cotton crop diseases from RGB images has been exposed in this paper. The author has Proposed Enhanced PSO feature selection method which adopts user features like variances, texture, color and edge to extract the features and Skew divergence method. Using Back propagation neural network (BPN), Fuzzy and SVM classifiers the obtained features are extracted with the help of and Genetic algorithm (GA) feature selection and Edge CYMK color feature. Cross validation of three classification models were assessed to test this hypothesis. Six types of diseases such as, Root rot, Leaf Blight, Micro Nurient, Verticilium Wilt, Bacterial Blight, Fusarium wilt have been accurately classified to evaluate its efficiency.

## V. Proposed Approach

The output of classification is used for the decision support system to gives the decision related health of plant leaves.

A. Image Acquision: The leaf images of plant are acquired by using the camera of mobile. The dataset contains 120 images of healthy, infected leaf images set. Dataset having mainly two classes of image set- one if healthy leaf images and second class contains the infected leaf images which have disease wise sub classes.

B. Pre-Processing: The pre-processing stages are applied on given image in order that made it appropriate for additional process. The primary pre-processing stage is to resize the given input image. The initial size of image is large that occupy longer for process time. Therefore, each image is converting into 512 X 512 sizes to evade prolonged.

C. Segmentation: Segmentation of image is applied for background subtraction. Two main techniques are mainly used for background subtraction: cluster based and color based. The proposed system will give better results using cluster subtraction. In color-based subtraction unwanted background is removing by using R, G and B elements. Which pixel have G element more than the R and B that are keep and other part is removed.

D. Classification: After segmentation next stage is feature extraction. The feature extraction technique permits to extract the properties of an image which is able to facilitate in accurate classification. The co-relation, energy, homogeneity etc. are the features are used for analysis. There are several of approaches that are used for image classification. A number of the strategies are principal component analysis (PCA), fuzzy logic, K-nearest neighbor (KNN), support vector machine (SVM), artificial neural network (ANN), neuro-fuzzy interference system, etc. [4].

## VI. Preprocessing

The input image was first preprocessed to be resized with Principal Component Analysis (PCA) to reduce the dimension of input vector of neural network. PCA transforms the data to a different coordinate system in which the greatest variance by any projection of the data lies on the first coordinate, the second greatest variance on the second coordinate and so on. Each coordinate is called a principal component. The PCA also performs dimensionality reduction while preserving as much of the randomness in the high dimensional space as possible.

## VII. Feature Extraction

Preprocessing was followed by a phase of feature extraction for proper classification of the diseases. The color was the desired feature after hue saturation. Features like texture and shape were then extracted from the infected leaves through Gabor filtering method.

## VIII. Conclusion

Conclusions In the presented research a novel application of ascertaining the presence of four different health conditions including healthy, downy mildew, powdery mildew and black rot by using One Class Classification is demonstrated. The developed model was trained on vine leaves to identify four different health conditions. The novelty of the current application is high generalization capability which was proven through testing in various leaf samples belonging to different plant species. The results proved that the model was efficient for most of the cases. More specifically, 44 of the 46 tested plant disease combination were successfully classified, giving a total success rate of 95%. Conflict resolution has proven crucial, for the accurate classification of more than 50% of the cases, reaching an identification capability of 100%. Each newly added image that is fed to the model, enriches its existing database and expands its recognition ability. The presented application is capable of identifying the afore mentioned health conditions in plant species other than the already tested and of detecting conditions other than the already tested and classifying them as new categories.

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