



COCONUT TREE DISEASE IDENTIFICATION USING IMAGE PROCESSING

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Abstract:

The identification of coconut tree disease is the major objective of the project, in which it focuses on increasing the quality of the product and yield. It is difficult for a farmer to monitor the coconut tree disease manually which may consume a lot of time. The symptoms can be found on leaf, stem, fruits and lesions of a tree. The system provides the usage of mobile phones to capture the image of the affected parts of a tree, and then it will be verified by the expertise and the result will be sent to the farmer with the remedies of the particular disease.

Key Words: Image processing, Disease identification, RGB Color Model.

Introduction:

India is an Agricultural country. Agriculture is the mother of all cultures. In India we cultivate all kind of crops, this due to the availability of all kinds of soils, enrichment of water, moderate temperature and other materials. India is in the second place worldwide in farm outputs. Agriculture contributes about 17% to the total GDP, hence it is an important sector in Indian economy. It plays a vital role in case of employment, as it provides employment to over 60% of the total population. Agriculture sector provides raw materials for industrialisation. Agriculture also gives its contribution to their national income in smaller percentage.

Detecting the disease is the major role as it affects the quality of the product and yield. In recent years, plant pests and diseases has drastically increased. Due to the affect of

disease on crops, it reduces the production, food quality, fibre and biofuel crops. This leads agriculture to struggle in case of supporting the rapidly growing global population. Disease are caused by different types fungi, bacteria, viruses and nematodes. Fungi produces 'mycotoxins' these mycotoxins in turn affects humans and animals. Plant disease are infectious that are caused by living agents or pathogens, which can be spread through an infected plant or plant debris to health plant. 85% of plant diseases are caused by fungal. It also effects on environment like soil erosion, land degradation. Farmers invest billions of dollars on management of disease, but this results in poor disease control this is because of inadequate technical support.

Plant pests and disease has become a threat to food security. Many pathogens produce toxins that would create health issues for consumers. It also causes chronic health issues like cardiovascular and respiratory diseases, hearing loss, skin cancer, amputations and arthritis. Plant diseases reduces food availability which results in inadequate food and starvation. Plant disease not only affects crop yield, it also reduces fruit quality and nutritional value.

Image processing is a method where it operates on image, in order to get magnified image or to get some useful information from it. The disease can get affected to any part of the plant therefore identification and prevention is an important task. Adaptation of image processing for identification of plant disease is more useful as at present the disease

undergo naked eye observation by expertise and continuous monitoring which results to be more expensive and time consuming. Plant disease identification in the existing system is time consuming, laborious and less accurate which can be only done in limited areas. Wherein automatic detection technique it consumes less effort better accuracy Image processing technology can be used to analyse disease images and it extracts features of disease spot based upon its color, texture, and few other characteristics. By doing so the technique proves to be cheaper. Image processing measures the affected area of the disease and it determines the difference in the color of the affected area.

RGB color model is a model in which red, green, and blue light are added together in different ways to produce numerous array of colors. It is the most commonly used color representation for digital color images. The major use of RGB color model is representation, sensing and displaying the image in an electronic systems. RGB model uses 8 bit monochrome standard.

Objective of the project:

1. To develop an application that allows farmers to identify pests and plant diseases using their mobile phones.
2. Providing remedial measures to diseases, in order to benefit the farmers.
3. As the system model is operated through mobile, each and every farmer can access the information at the same time, thus it eliminates the waste of time for standing in a queue.
4. To provide an application which is user friendly.

Literature Review:

Paper[1] At first the sample images are collected from the Grape farm using with different resolution with different camera, then to that images have to remove the unwanted noise and redundancy present in the image, then have to extract the useful information from the image, then the Histogram is computed from all of the pixels from the image, in the next stage the feature extracting, extracting the relevant information from the

leaf images such as color, texture, shape and edges are extracted to get a good results and accuracy, In the last stage after feature extraction, the features extracted from testing leaves are compared with training leaves . Then the images are classified based on the matched features. So the Support Vector Machine (SVM) technique is used for classification of leaf disease.

The paper [2] presents the method of detecting jute plant disease using image processing. The Image is captured and then it is realized to match the size of image to be stored in the database. Then image is enhanced in quality and noises are removed. The image with customized thresholding formula undergoes Hue based segmentation. Then the image is converted into Hue, saturation and value (HSV) from Red, Green and Blue (RGB) as it helps extracting region of interest. This process can significantly support detecting stem oriented diseases for jute plant.

Paper [3] includes tomato disease detection using computer vision. The gray scale image is turned into binary image depending on threshold value. This threshold algorithm is used for image segmentation. This threshold values are given color indices like red, green, blue. But this thresholding is not a reliable method as this technique only distinguishes red tomatoes from other colors. It becomes difficult to divide the ripe and unripe tomatoes. For the K-means clustering algorithm is used to overcome the drawbacks. The K-means create a particular number of hierarchical clusters. This method is numerical, unsupervised, non-deterministic and iterative. Then separating the infected parts from the leaf the Red, Green and blue (RGB) image was converted into YcbCr to enhance the feature of image. The final step is calculation of the percentage of infection and dividing the ripe and unripe tomatoes.

Paper[4] describes various plant diseases and it has also discussed about precision agriculture (PA) using Image processing. It mainly focusses on Higher yielding and good quality of crops. It develops a technique for soil testing and disease identification under a single platform. Here disease can be found on many parts of the plant like leaf, stem, root. In

this study they have discussed more upon leaf diseases. It undergoes many stages like Image acquisition, Image pre processing, Disease segmentation, Feature extraction, Disease classification to identify the disease. This

paper represents various researches done in current domain of crop diseases.

Paper[5] In this, they have adopted Deep learning algorithms which possess a great significance intelligent agriculture, agricultural production and ecological protection. It proposes the mathematical model of plant for disease identification which improves its accuracy. The region proposal network (RPN) is used to recognize and localize the leaves, then these images which are segmented by RPN algorithm contain the feature of symptoms through Chan-Vese (CV) algorithm and then they are input into the transfer learning model and further examined with black rot, and rust diseases.

In paper[6] The RGB images are converted into the gray scale image using color conversion. Various enhancement methods like histogram equalization and contrast adjustment are used for enhancement of image quality. Different types of classification features like Support Virtual Machine (SVM) and Artificial Neural Network (ANN)

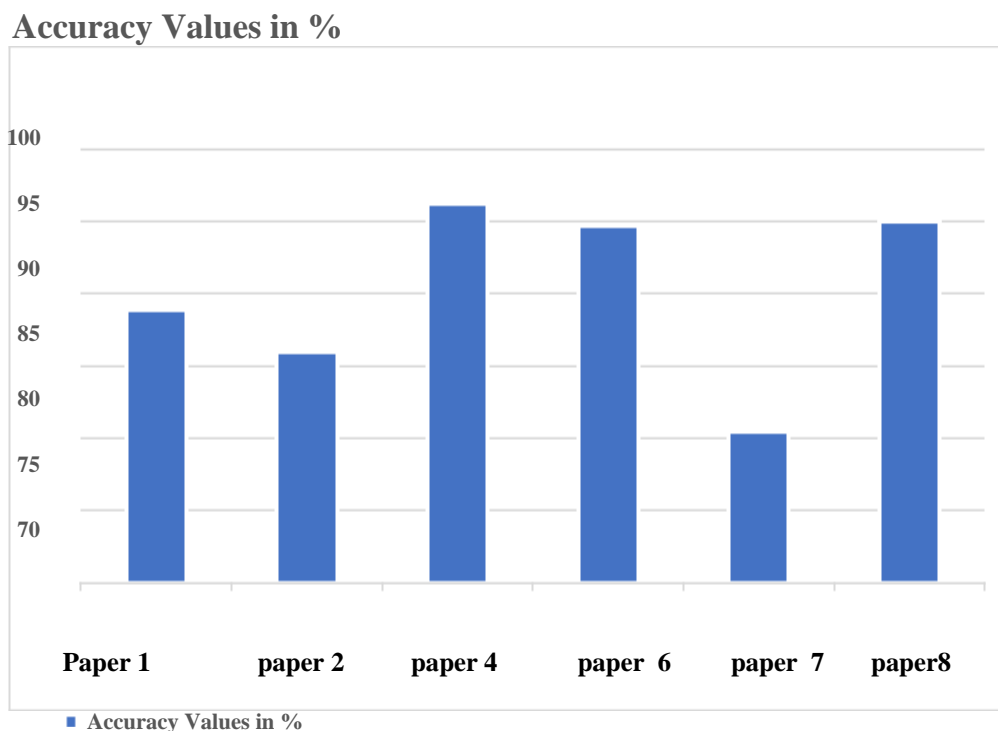
classification are used here. It uses different types of feature values like texture feature, structure feature and geometric feature. By using Artificial Neural Network (ANN) classification, it can identify the disease of the paddy plant.

Paper[7] Nowadays Artificial neural network (ANN) and image processing has become important techniques in plant health detection systems. Here they have designed a device for detecting two types of fungi (Pseudoperonospora cubensis, Sphaerotheca fuliginea) which infect cucumber. The device recognises the disease by detecting the symptoms on plant leaves. The system includes a CCD digital camera, thermal camera, light dependent resistor lightening module and computer.

Paper[8] this paper is based upon Machine learning algorithm. At last in the results the selection of algorithm plays a major role. The images involved in the system should of good quality so that images can be analysed properly. At first it inputs the images of affected areas of crops and agricultural products, which undergoes some process like resizing, color

enhancement and cropping. Further segmentation of images and feature extraction is done. Through these steps the identification of disease is done

Sl. No.	PAPER	METHODOLOGY
1	Grape leaf disease detection using SVM classifier.	k-means clustering algorithm with SVM color co-occurrence method.
2	Detecting Jute plant disease using image processing and machine learning.	Color co-occurrence methods, Multi-SVM classifier.
3	Maturity and disease detection in tomato using computer vision.	K-means clustering, Thresholding algorithm.
4	Crop plant disease detection using Image processing.	Image processing, SVM classifier, Otsus's thresholding.
5	Plant disease identification based on Deep learning algorithm in smart farming.	Deep learning, Region proposal network (RPN), Chan-Vese (cv).
6	Detection and measurement of paddy leaf disease symptoms using Image processing.	ANN, FUZZY classification, SVM, K-means algorithm, color co-occurrence method.
7	Cucumber disease detection using Artificial neural network.	ANN, Grey level co-occurrence method (GLCM).



Methodology:

In RGB color model red green and blue light are added together in different ways to reproduce a broad array of colors. It is an additive color model.

The main usage of RGB color model is for representation, sensing and display of images in electronics system. It is also used in conventional photography. RGB is a device that reproduce a given RGB value differently and responses to individual R, G and B levels vary from one person to another and even over time Color TV image scanners, video cameras and digital cameras are input devices of RGB whereas set of various technologies like (CRT, plasma, LCD), computer and mobile phone displays LED displays are typical RGB output devices.

Steps we use in our system are

- 1) Java default function FILE CLASS java 8 java 1.25
- 2) We create File class object which we need to fetch we will store inside it
- 3) We fetch pixel in the class we take width and height of images and we take this by default function
- 4) This function will get by class called buffer image
- 5) This buffer image gives the width and height of the image
- 6) When we get the width and height of image it gives the height if pixel values
- 7) The pixel values will be set by admin
- 8) Here we use first for loop to height
- 9) Here we use first for loop to width

- 10) For ex matrix problems solution $r*c$,..... $h*w$
- 11) First $h*r$
- 12) Second $w*r$
- 13) Like 0 0 first pixel will get
- 14) Den 0 1 second pixel will get
- 15) Den 0 2 third pixel will get
- 16) In buffer image java class, there is class called get RGB () default function
- 17) This function works like x and q values in matrix form and it calculates the RGB color or each pixel wise what we gone do means we calculate the absolute value and we find the difference
- 18) Based on the value we count for all pixel and den
- 19) We take the average values and we count the total pixel in image
- 20) That average values gives the accuracy of the output

Conclusion:

We have developed a system which will help to predict the crop yield, is one of the major elements that helps in the improvement in crop maturity and quality. For measuring the crop yield, we are taking the crop image and extract the features. This system is going to be a great help to Indian farmers to know about their crop yield. There are many challenges to Indian government like farmer suicide, pollution of land due to pesticides and industrialisation. Hence, this system helps the government in order to help farmers.

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