A literature survey on Plant Leaf Disease Identification System Using Android

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***Abstract*: In this paper, the leaves of a plant provide the most important information or data which provides us to know which type of plant it is and which type of disease is infected on that leaf of the crop. Here, the plants play an important role in the biological field. In this project we have describe the development of an Android application that gives users or farmers the capability to identify the plant leaf diseases based on the photographs of plant leaves taken from an android application. Detecting diseases on leaf of plant at early stages gives strength to overcome it and treat it appropriately by providing the details to the farmer that which prevention action should be taken. Here we developed and application for identifying the diseases on the leaf of the crop. It plays an important role for the farmers to identify and for applying the proper pesticides on to the crop. The samples are collected with high resolution camera and with the help of those photographs the electronic expert system may have understood which type of diseases it is and the system may provide the proper information to the farmers for proper treatment of the crop. Thus making it easy for the famers to save their crops.**

***Index Terms*: Image processing, Android, Texture, Plant Leaf Disease**

I. Introduction

We know that, India is an agricultural country and the position of any country in the world depends on its agricultural production. In India the formers have wide variety to select their plant for production depending on environment. The growing of crop is being affected by insects and it can cause the significant reduction in quality and quantity of agriculture products. Detecting diseases at early stages enables to overcome it and cure it properly. But nowadays, this requires continuous monitoring of experts which might be expensive in large farms for the farmers.

But in some other, the farmers may have to go to long distance to contact to experts and it takes much time and it is very expensive for the farmers. But it is not possible to go long distance because if the expert is not present at the time for giving the opinion to the farmer related to the crop disease. So that the farmers may faces many problems for identifying which type of disease it is. So here we have to use electronic expert system for identification purpose. The electronic expert system work more appropriately than human experts. The electronic expert system is present anytime for the farmers and it is most useful thing for the farmer to identifying the diseases of the crop in small time. The electronic expert system is quite appropriate as compare to the humans. So with the help of electronic expert system the farmers are more capable to understand the diseases and they are able for a correct treatment.

For the detection of diseases on crops here we introduced a new software which are based on the image processing. In that we are using an Android phone for capturing image and with the help of those images the software will recognized which type of disease it is and what further pesticides will have used to cure diseases. So on android the notification will received with the help of internet connection.

II. LITERATURE REVIEW

[1] As we know that, there have been many recent studies based on the plant identification, classification and recognition based on the components of a plant such as flowers, leaves and barks. And they know that the exact way to extract the features of a plant includes recognition process based of the leaf images. The most common features used for the plant identification using the leaf image, are the color and shape of the leaf. Now a day, in study related to the color, a similarity between two color scan be identified by comparing the color histogram of the involved images.

[2] Dheeb Al Bashish et. al. author proposed that the RGB images be converted into HSI plane and then the color features are extracted (by SGDM generation). The texture features are extracted by obtaining Grey Level Co-occurrence Matrix. In this project the input images are segmented using K-means clustering technique and then the segmented images are recent, the author also compares between various models incorporating various components such as HSI and found that model HS provides the best efficient output amongst all other models with efficiency of 92.7%

[3] The author Gurpreet Kaur and Himanshu, M.,et. al. to provide the study of various classifiers namely K-Nearest Neighbors(KNN) classifier, Support Vector Machines(SVM) classifier, Back Propagation Neural Network-Feed Forward(BPN-FF) classifier, Probabilistic Neural Network(PNN) classifier, General Regression Neural Network(GRNN) classifier.

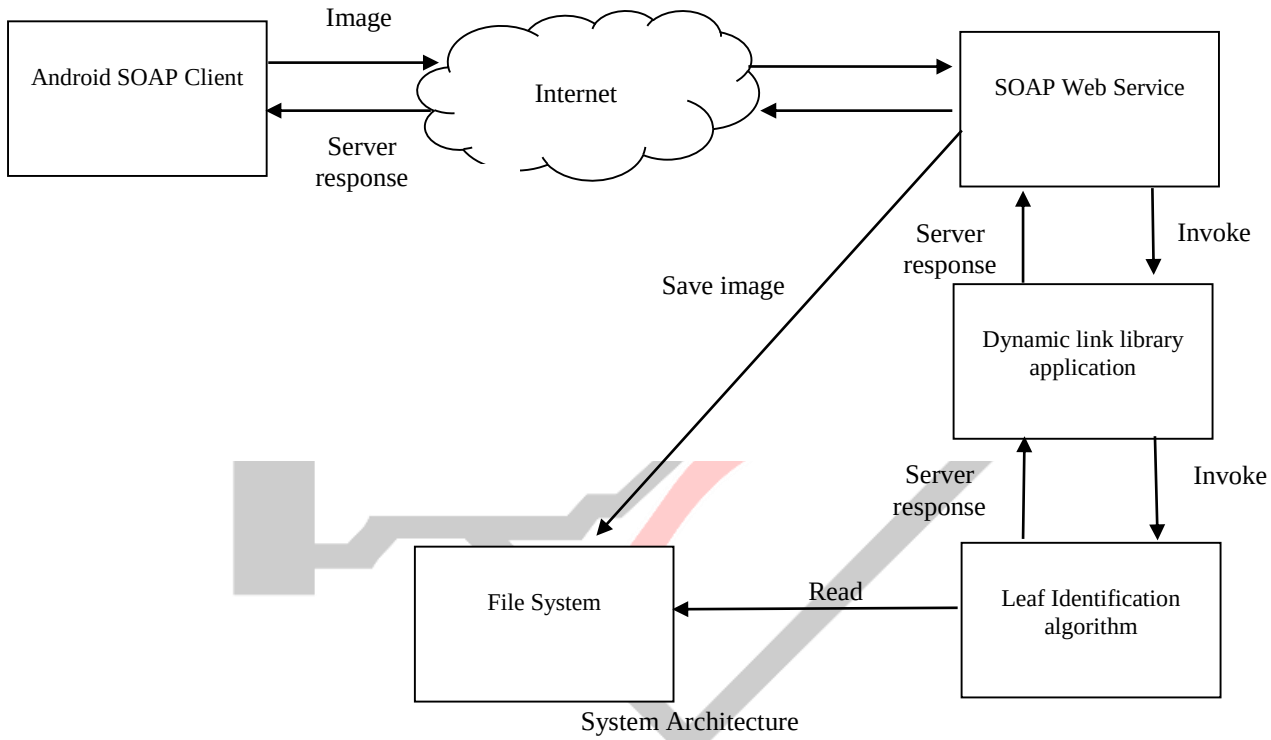
[4] In studies of, Kwang-Seok Hong proposed advanced leaf. Identification Based on the centroid and contour of the leaf for species classification According to them preprocessing procedure on the plant leaf was necessary and important procedure to identify accurately the leaf contour for correct leaf feature extraction.

[5] Recently, according to James S. Copea, and David Comey one of the most familiar method applied to recognize the leaves is the Elliptic Fourier Descriptors (EFds, or Elliptic Fourier Analysis; EFA). According to the author in this technique the shape of the leaf is analyzed in the frequency domain, instead of the spatial domain. In this project in order to define the outline, a set of Fourier harmonics are calculated, and each of the set has four coefficients. Those collection of coefficients forms the Fourier descriptor, with more number of harmonics providing more simplified descriptions.

[6] In this, Yu mung proposed The Scale Invariant Feature Transform (SIFT) algorithm, which is capable of transforming an image into a collection of local feature vectors and feature vectors are supposed to be invariant and distinctive to any form such as scaling, translation or rotation of the image. In actual, these are used to find the different objects in distinct images and the transform can also be extended to match the leaves in the images.

III. OVERVIEW OF PROPOSED METHODOLOGY

As we know that, Images form necessary data and information in biological field. In recent, Plant diseases have turned into a problem as it can cause significant reduction in both quantity and quality of agricultural products. Automatically detection of plant leaf diseases is a necessary topic as it helps to improve benefits in observing large fields of crops, and thus automatically detect the diseases as they appear on plant leaf. This proposed system is a software solution for automatic computation and detection of texture statistics for plant leaf diseases. Then from the texture statistics, the presence of diseases on the plant leaf is assess.



System Architecture

IV. THE STEPS FOR PROPOSED SYSTEM

1. The color transformation structure

The RGB images of leaves is converted into HSI (Hue Saturation Intensity) color space representation. The purpose of this color space is to make the easiest way to find the color that is of red, green, and blue color. Hue saturation intensity color is more popular than other color model because it based on human perception. Here the RGB color module is used because the system only understands the RGB color. With the help of RGB color the remaining color will be generated. Here the saturation means the purity of the color module. Here the color space is easily converted from one space into other space. So after the transformation process is done only the H component will take for analysis purpose and remaining S and I component will be dropped. They are not taken for the analysis process.

2. Masking green pixels:

Here, we identify mostly the green colored pixels and after that, based on specified threshold value that is computed for these pixels. Mostly the green pixels are masked as follows: if the green component of the pixel intensity is less than the pre- calculated threshold

value, the red, green and blue components of the pixel is set to a zero. The green colored pixels mostly represent the healthful areas of the leaf and they do not add any valuable information to disease identification and furthermore.

3. Masking of masked cells:

In this the pixels having zero values red, green, blue components were removed completely. This is helpful for more accurate disease classification and significantly decreasing the processing time.

4. Segment the component:

Now, the infected part of the leaf is extracted. The infected part is then segmented into a number of patches of equal size. The specific size of patch is chosen in such a way that the significant data is not lost. In this approach small size of 32×32 is taken. The next step is to draw the needful segments. All segments do not contain significant amount of information. For further analysis, the sizes which are having more than fifty percent of the information are taken into account.

5. Calculating the main features using color co-occurrence procedure:

After the segmentation is done, the color co-occurrence structure analysis method is developed through the SGDM (Spatial Gray Level Dependence Matrices). The gray level co-occurrence procedure is a statistical way to describe shape by statistically processing the way certain gray levels occur in relation to other gray levels. Here, these matrices measure the probability that a pixel at one part in gray level will occur at a distinct distance and orientation from any pixel given that pixel has a second part of gray level. The SGDM's is represented by the function $P(i,j,d,\theta)$ where I represent the gray level of the location(x,y) and j shows the gray level of the pixel at a distance d from location(x,y) at an inclination angle of θ. SGDM's are generated for H image.

6. Evaluation of texture statistics:

Now, Image texture features like Contrast, Energy, Local homogeneity, Cluster shade and Cluster prominence are calculated for the Hue content of the image.

V. CONCLUSION

In this modern world, based on the analysis, grayscale images are easy to process and implement. They have better clarity and suited for analysis than RGB images. Histogram equalization is used to enhance the contrast of the images and provides clear image to human eyes. That's why these types of images will be used to analyses and diagnosis the plant leaves diseases and determines the diseases level of the plant leaves. Now a day, Mobile phone has become available at the grass-root level providing different social and economic benefit. The aim of this proposal was to develop a user friendly automated system for the farmers that will help them in determining detection diseases of leaves without bringing an expert to the field.

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