Plant Leaf Diseases Detection

Shivaji Shelke[1], Deepak Kharat[2] , Kapil Dixit[3], Shahrukhpasha Pandhare[4] , Prof. Rupali Parte[5]

JSPMs Jayawantrao Sawant, Collage Of Engineering,
Hadapsar, Pune-411028

shivajishelke0387@gmail.com[1] *dkharat327@gmail.com*[2] *kjdixit7@gmail.com* *shahrukhpashapandhare@gmail.com*[4]

ABSTRACT- India is an agricultural country where approximately 18% of crop yield is lost worldwide due to pest attack every year which is valued around Rs. 90,000 million. Large use of pesticides harms the soil, has acute toxicity to humans and animals, changes in pest status in agroecosystems, the high cost of control practices, residue problems in the environment, etc. Whiteflies are well-known harmful insects present on leaves of a plant, excrete sticky honeydew, cause yellowing or death of leaves and harm the crop yield. The increase of whiteflies has been mostly relied on a visual judgment by farmers. Also, it takes a long time for detection of Whiteflies present on leaves in a laboratory. Due to the economic importance of crops and strong impacts of damage levels, detection of whiteflies at early stages has become important.
In proposed solution, using android application, we are calculating affected area of the plant and based on affected area we are calculating the severity of a disease. Also, we will suggest treatment in Hindi for detected disease.

Keywords— **Arduino Uno, Android OS, GSM module LCD Screen.**

I. INTRODUCTION

Agriculture has become much more than simply a means to feed ever growing populations. Plants have become an important source of energy, and are a fundamental piece in the puzzle to solve the problem of global warming. There are several diseases that affect plants with the potential to cause devastating economic, social and ecological losses. In this context, diagnosing diseases in an accurate and timely way is of the utmost importance.

There are several ways to detect plant pathologies. Some diseases do not have any visible symptoms associated, or those appear only when it is too late to act. In those cases, normally some kind of sophisticated analysis, usually by means of powerful microscopes, is necessary. In other cases, the signs can only be detected in parts of the electromagnetic spectrum that are not visible to humans. A common approach in this case is the use of remote sensing techniques that explore multi and hyper spectral image captures. The methods that adopt this approach often employ digital image processing tools to achieve their goals. However, due to their many peculiarities and to the extent of the literature on the subject, they will not be treated in this system.

Most diseases, however, generate some kind of manifestation in the visible spectrum. In the vast majority of the cases, the diagnosis, or at least a first guess about the disease, is performed visually by humans. Trained raters may be efficient in recognizing and quantifying diseases; however, they have some associated disadvantages that may harm the efforts in many cases.

II. MOTIVATION

Farmers are the backbone of India. Realizing the significance of the problems associated with plant disease. System model for disease detection of leaf agricultural development in India motivated this work to develop a user friendly application for the person associated with agriculture development.

III. OBJECTIVE

The objectives are as follows: To make an efficient use of image processing techniques..Provide solution with least hardware requirement..To develop an Android application that is cost efficient, as android phones are widely available at low costs.Minimize the use of resources as farmers can't afford costly equipment.Easy to use and accurate so that farmers can adopt the application quickly.

IV. LITERATURE SURVEY

Vegetable pathologies may manifest in different parts of the plant. There are methods exploring visual cues present in almost all of those parts, like roots, kernels, fruits, stems and leaves. As commented before, this work concentrates in the latter two, particularly leaves. This section is divided into three subsections according to the main purpose of the proposed methods. The subsections, in turn, are divided according to the main technical solution employed in the algorithm. A summarizing table containing information about the cultures considered and technical solutions adopted by each work is presented in the concluding section.

V. ALGORITHM

Blob Detection:

In this algorithm, methods are aimed at detecting regions in a digital image that differ in properties, such as brightness or color, compared to surrounding regions. Independently detect corresponding regions in scaled versions of the same image.

A blob is a region of an image in which some properties are constant or approximately constant; all the points in a blob can be considered in some sense to be similar to each other.

HSV Color model :

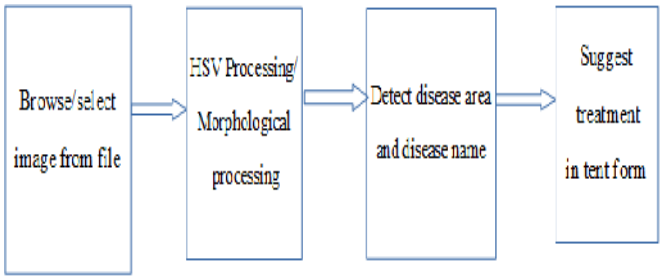
HSV stands for hue, saturation, and value.

- The hue(H) of a color refers to which pure color it resembles. Hues are described by a number that specifies the position of the corresponding pure color on the color wheel.

The saturation (S) of a color describes how white the color is.

- The value (V) of a color, also called its lightness, describes how dark the color is.

VI. ARCHITECTURAL DIAGRAM



VII. TECHNOLOGIES TO BE USED

A. About JAVA

Java has been tested, refined, extended, and proven by a dedicated community of Java developers, architects and enthusiasts. Java is designed to enable development of portable, high-performance applications for the widest range of computing platforms possible. By making applications available across heterogeneous environments, businesses can provide more services and boost end-user productivity, communication, and collaboration—and dramatically reduce the cost of ownership of both enterprise and consumer applications.

The original and reference implementation Java compilers, virtual machines, and class_libraries were originally released by Sun under proprietary licenses. As of May 2007, in compliance with the specifications of the Java Community_Process, Sun relicensed most of its Java technologies under the GNU General Public License. Others have also developed alternative implementations of these Sun technologies, such

as the GNU Compiler for Java (byte code compiler), GNU Class path (standard libraries), and Iced Tea-Web (browser plugin for applets).

B. About Android

An Android phone is a powerful, high-tech smartphone that runs on Google's Android operating system. Pick an Android mobile phone and you can choose from hundreds of great applications and multitask with ease. You'll also get regular software updates that add great new features to your smartphone. Android is an OS created by Google for use on mobile devices, such as smartphones and tablets. It's an OS that's available on devices made by a variety of manufacturers, giving you more choices of device style and pricing. Also, with the Android OS**,** you can customize your device in many ways.

MATHEMATICAL MODEL

System Specification:

S= {S, s, X, Y, T, f_{main}, DD, NDD, f_{friend}, memory shared, CPU_{count}}

- **S (system)**:- Is our proposed system which includes following tuple.
- **s (initial state at time T)** :-GUI of Plant Disease Detection. The GUI provides space to enter a query/input for user.
- **X (input to system)** :- Input Query. The user has to first enter the query. The query may be ambiguous or not. The query also represents what user wants to search.
- **Y (output of system)**:- List of URLs with Snippets. User has to enter a query into Plant Disease Detection then Plant Disease Detection generates a result which contains relevant and irrelevant URL's and their snippets.
- **T (No. of steps to be performed)**:- **6**. These are the total number of steps required to process a query and generates results.
- **f_{main}(main algorithm)** :- It contains Process P. Process P contains Input ,Output and subordinates functions. It shows how the query will be processed into different modules and how the results are generated.
- **DD (deterministic data)**:- It contains Image data. Here we have considered PLI i.e. Plant Leaf Images which contains number plant leaf images. Such images are used for showing results. Hence, PLM is our DD.
- **NDD (non-deterministic data)**:- No. of input queries. In our system, user can enter numbers of queries so that we cannot judge how many queries user enters into single session. Hence, Number of Input queries are our NDD.
- **f_{friend}** :- WC And IE. In our system, WC and IE are the friend functions of the main functions. Since we will be using both the functions, both are included in f_{friend} function. WC is Web Crawler which is bot and IE is Information Extraction which is used for extracting information on browser.
- **Memory shared**: - Database. Database will store information like list of receivers, registration details and numbers of receivers. Since it is the only memory shared in our system, we have included it in the memory shared.
- **CPU_{count}**: - 2. In our system, we require 1 CPU for server and minimum 1 CPU for client. Hence, CPU_{count} is 2.

Subordinate functions:

- Identify the processes as P.

S= {I, O, P....}

P= {IC, IE}

Where,

- IC is Image Capture
- IE is Information Extraction.

- P is processes.

- **IC= {U, PD}**

  Where,

  - U=input Query
  - PD is output of Image Capture

  whicb is detected Plant Leaf Disease

- **IE= {PD,Info}**

  Where,

  - PD is input which is detected plant

  leaf disease given to IE

VIII. CONCLUSION

In this system, Image processing-based approach is proposed for plant diseases detection. This proposed system describes different techniques of image processing for several plant species that have been used for detecting plant diseases. The disease of the plant is known at an early stage and the cure is suggested using different languages (Hindi, Marathi, etc).

REFRENCES

[1] Jagdish D. Pujari, “Image Processing Based Detection Of Fungal Diseases In Plants,” International Journal of Computer Applications. 52(2) 2012, pp. 34-40.

[2] Vijay Sing,"Detection Of Plant Leaf Diseases Using Imagae Segmentation And Soft Computing Techniques "

[3]Mahesh Ramsuran,Somverr Kishnah,"Plant Leaf Recognitrion Using Shape Features And Color Histogram With K-Nearest neighbour Classifier"

[4] Amar Kumar Dey,Manisha Sharma,"Image Processing Based Leaf Rot Disease,Detection of Betel Vine"

[5]Kay Thew Min Han,Bunyarit Uyyanovara,"A Survey Of Blob Detection Algorithms For Biomedical Images".

[6]Monzurul Islam,Anh Dinh,Khan Wahid,"Detection Of Potato Disease Using Image Segmentation ANd Multicast Suppo Vector Machine".