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DESKTOP APPLICATION FOR THE USAGE OF ANALYSING AND DETECTING OF DISEASE ON PLANTS

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ABSTRACT

India is agriculture country where approximately 18% of crop yield is lost worldwide due to pest attack every year which is valued around Rs.90000 million . Large use of pesticides harms the soil, has cute toxicity to humans and animals, change in pest status in agro-ecosystems, high cost of control practices, residue problems in environment, etc. whiteflies are well-known harmful insects present on leaves of plants ,excrete sticky honeydew, cause yellowing or death of leaves and harm the crop yield. The increase of whiteflies has been mostly relied on visual judgment by farmer for density of whiteflies has been less accurate because of different levels of identification skills. Also, it takes long time for detection of whiteflies present on leaves in laboratory. Due to economic importance of crops and strong impacts of damage levels, detection of whiteflies at early stages has become important.

Keywords: Blob detection Algorithm,HSV Algorithm, Image processing, Image Segmentation, Disease Detection

I.INTRODUCTION

India is agriculture country where approximately 18% of crop yield is lost worldwide due to pest attack every year which is valued around Rs.90000 million . Large use of pesticides harms the soil, has cute toxicity to humans and animals, change in pest status in agro-ecosystems, high cost of control practices, residue problems in environment,etc. whiteflies are well-known harmful insects present on leaves of plants ,excrete sticky honeydew, cause yellowing or death of leaves and harm the crop yield. The increase of whiteflies has been mostly relied on visual judgement by farmer for density of whiteflies has been less accurate because of different levels of identification skills. Also, it takes long time for detection of whiteflies present on leaves in laboratory. Due to economic importance of crops and strong impacts of damage levels, detection of whiteflies at early stages has become important. In proposed system, using desktop based application, we are calculating affected area of plant and based on affected area we are calculating severity of disease. Also we will suggest treatment in Hindi and English for detected disease.

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II.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.

According to Paper [1] disease identification process include some steps out of which four main steps are as follows: First input is RGB image, then a colour transformation structure is taken, and afterwards using a specific threshold value, the green pixels are masked and removed, then further it is followed by segmentation process, and to get useful segments the statistics of structure is computed. At last, classifier is used for the features that are extracted to classify the disease. The proposed algorithm shows its efficiency with an accuracy of 94% in successful detection and classification of the examined diseases.

In paper [2] there are four main steps in processing developed scheme, in which, one is for the RGB input image, a colour structured transformation is created, because for the colour generation RGB is used and converted image or transformed of RGB, that is the, HSI is used as the colour descriptor. In the second step of this, by using the threshold value, the green pixels are masked and removed. In third, by using precompiled level threshold, green pixels and masking removing is done for the useful segments that are taken in first step. In this step, as the image is measured or segmented. In last step or in fourth main step the segmentation is done.

According to the Paper [3] which presents disease detecting process in domestic through an expected method like colour analysis and texture, K-mean clustering. To identify, classify and recognize different agriculture, it uses the colour features and texture those generally appear in normal and infected areas. In future, for classifying purposed and given classifiers can also be use, such as Bayes classifier, principal component classifier and K-means clustering.

According to Paper [4] represents the Triangles threshold and methods of simple thresholds. These techniques are used to lesion region area and segmentation of the leaf area respectively. In last step, categories of disease are done by calculating the leaf area and lesion area. According to the research done yet, the given method is efficient, fast and has accuracy for the calculation of leaf disease severity and leaf area calculation is done by using threshold segmentation.

Some characteristics are shared by most methods presented in this section: the images are captured using consumer-level cameras in a controlled laboratory environment, and the format used for the images is RGB quantized with 8 bits. Therefore, unless stated otherwise, those are the conditions under which the described methods operate. Also, virtually all methods cited in this system apply some kind of per-processing to clean up the images, thus this information will be omitted from now on, unless some peculiarity warrants more detailing.

III.EXISTING WORK

3.1.IMAGE PROCESSING:

The analysis and manipulation of a digitized imaged, especially in order to improve its quality. The system consists of two major parts such as the digital camera and the LABVIEW softwaretools to build Graphical User

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Interface (GUI). The firstpart of the project is to take image photos of chilli leaf. Picture need to be taken in a group of chilli leaf.MATLAB 2010 is the software chosen to perform image processing on the captured image photos. Image processing of an image photo requires numerous standard procedures and steps to be able to identify and recognize the color in an image photo. It has step-by-step procedure showing the image processing of an image photo which the user only needs a few clicks on the GUI itself.

3.2 COLORS FUNDAMENTALS AND MODELS

Basically, the colors that humans and some other animal perceive in an object are determined by the nature of the light reflected from the object. Due to absorption characteristics of the human eye, colors are seen as variable combinations of the primary colors red (R), green (G), and blue (B) the primary and secondary color. The purpose of a color model is to facilitate the specification of colors in some standard, generally accepted way. In essence, a color model is a specification of a coordinate system and a subspace within that system where each color is represented by a single point. In the RGB model, each color appears in its primary spectral components of red, green, and blue. This model is based on a Cartesian coordinate system is RGB primary values are at three corners the secondary colors cyan, magenta, and yellow are at three other corners black is at the origin and white is at the corner farthest from the origin. In this model, the gray scale extends from black to white along the line joining these two points. The different colors in this model are points on or inside the cube, and are defined by vectors extending from the origin.

3.3 IMAGE CAPTURED

The photo image prepared as experiment sample for this research paper have some fixed details. Both of the healthy and diseased leaf samples were used for the experimental purpose of this system. For better result, the leaves sample should be in good condition and sharp.

Throughout the photo capturing section, the distance of the camera and the leaf was adjustable in order to get a clear shot of leaf pattern. The input photo image is a JPG image file and the size of resolution is 3872 x 2592 pixels.

```
a=imread (‘A (1).JPG');
A=imresize (a, [800 536]);
```

The imread function is read image from graphics file. The imresizefunction is to returns an image of the size specified by [m-rows n-cols]. Images are resized for easier image processing.

To identify the affected area, the images of various leaves are taken with a digital camera or similar device. Then to process those images, various image-processing techniques are applied on them to get different and useful features required for later analysing purpose.

The step-by description of the procedure of proposed system is as follows:

1) Image acquisition.

2) Pre-processing of input image.

3) Segment the components using genetic algorithm.

4) Obtain the useful segments to classify the leaf diseases.

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We perform all the experiment in MATLAB. For

input data disease samples of plant leaves like rose with bacterial disease, beans leaf with bacterial disease, lemon leaf with Sun burn disease, banana leaf with early scorch disease and fungal disease in beans leaf. Images which are followed by output segmented images. Segmented image can be classified into different plant diseases. To remove noise in image or other object removal, different pre-processing techniques is considered. Image clipping i.e. cropping of the leaf image to get the interested image region. Image smoothing is done using the smoothing filter. Image enhancement is carried out for increasing the contrast. the RGB images into the grey images using color conversion. Segmentation means partitioning of image into number of parts which having same features or having some similarity. The segmentation can be done using various methods like Otsu' method, k-means clustering, converting RGB image into HIS model etc from the location referring different sites, the digital image is acquired. Regardless of what image acquisition device are adopted, the image which have input always not satisfactory. If noises are present in image the region of curiosity in the image is not clear and other objects interference exists. In the image clipping, smoothing, enhancement are the three steps included in pre-processing phase. The process of image collection and lots of information may bring noise which may easily lead from operating and saving to the image would make the quality of image dropped, thereby affects following of diseases. To perform demonising different kinds of reduction technique are applicable .By choosing the appropriate threshold, medium filter perform better with the salt and pepper noise. The image will have dark pixel in bright region and will have bright pixel in dark region, when it has salt and pepper. Medium filter is a nonlinear filter which is an effective method to remove the noise. By removing black dots called pepper, medium filter fill the image with bright dots called the salt. It simply placed each pixel value with medium of the intensity level in the neighbourhood of pixel.

IV.TECHNOLOGY TO BE USED

Proposed system uses some algorithms and Methodologies are as follows :

4.1 BLOB DETECTION ALGORITHM :

This algorithm helps to draw rectangles around defected part. 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.

4.2 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 advantages of using hue are:

- The relationship between tones around the color circle is easily identified
- Shades, tints, and tones can be generated easily without affecting the hue.

Saturation corresponds directly to the concept of tint in the Color Basics section, except that full saturation produces no tint, while zero saturation produces white, a shade of gray, or black.

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The *VALUE* (V) of a color, also called its *LIGHTNESS*, describes how dark the color is.Advantages of using value are:

- Pure colors are produced by specifying a hue with full saturation and value
- Shades are produced by specifying a hue with full saturation and partial value
- Tints are produced by specifying a hue with partial saturation and full value
- Tones are produced by specifying a hue and partial saturation and value
- White is produced by specifying zero saturation and full value, regardless of hue
- Black is produced by specifying zero value, regardless of hue or saturation
- Shades of grey are produced by specifying zero saturation and partial value.

The advantage of HSV is that each of its attributes corresponds directly to the basic color concepts, which makes it conceptually simple. The perceived disadvantage of HSV is that the saturation attribute corresponds to tinting, so de-saturated colors have increasing total intensity.

4.3 RGB COLOR MODEL:

The RGB color model approximate the way human vision encodes images by using three primary color channels that is red, green, and blue. Emitted light sources such as CRT monitors, flat-panel displays, and video projectors use the RGB color model, as do image-capturing devices such as video cameras and computers.

The RGB color model is additive, which means the red, green, and blue channels combine to create all the available colors in the system. When all three primary color values are the same, the result is neutral, or grey scale. For example, if all three primary colors are 0 per cent, the result is black. If all three primary colors are 100 per cent (the maximum value), the result is white.

4.4 IMAGE PROCESSING:

Image processing is traditionally concerned with preprocessing operations such as Fourier filtering, edge detection and morphological operations. Computer vision extends the image processing paradigm to include understanding of scene content and object classification.

4.5 IMAGE SEGMENTATION:

Image segmentation is the process of partitioning a digital imageinto multiple segments. The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects andboundaries (lines, curves, etc.) in images. More precisely, image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics.

The result of image segmentation is a set of segments that collectively cover the entire image, or a set ofcontoursextracted from the image (see edge detection). Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, or texture. Adjacent regions are significantly different with respect to the same characteristic(s).

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V. BLOCK DIAGRAM

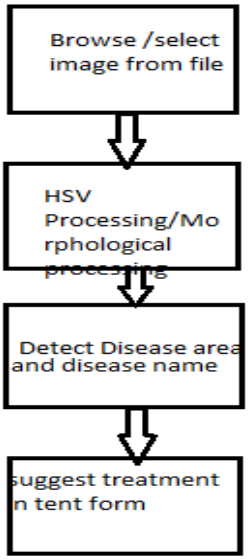

fig. Plant Disease detection

Following are the steps for plant disease detection:

1. Firstly user can register into the system .
2. After registering into the system ,he/she get username and password for entering onto the system.
3. User can browse/ select the image from the dataset. Image is in the Buffered Format and we can translate it into HSV color format/Morphological processing.
4. When the user gives the buffered image to the system it converts the original image into the HSV and then the process of detection starts.
5. Once the detection of the leaf starts the system first analyze where all the diseases are and the once the system has analyzed the disease it starts it processing.
6. After analyzing the disease the system displays the blocks on the leaf where the leaf is been affected.
7. The affected part is represented by the blocks and after that the system shows the cure and the weather by which the has been affected.

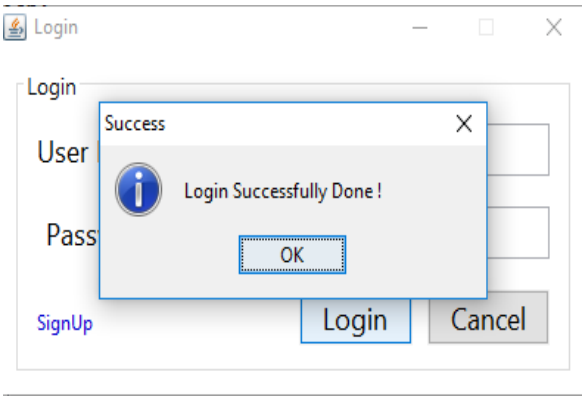

Fig.1 User authentication

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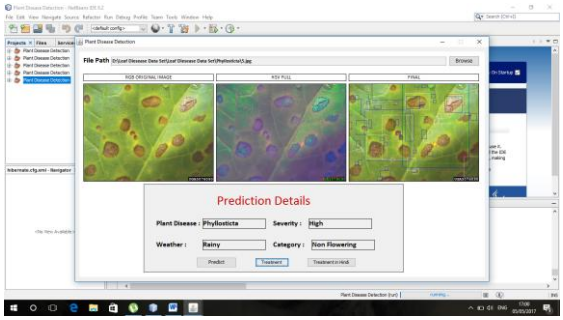

Fig.2 Process of plant disease detection

Fig.3 Suggest treatment and Disease Name in English

Fig.4 Suggest treatment and Disease Name in Hindi

5.1 PROPOSED SYSTEM:

In this proposed system conventional image is converted into HSV image (clear vision of image) in which all the details about the leaf are provided including their disease details which is used for the farmers know which is the disease. It proposes to use the clear image instead of blur image with blob detection algorithm for various diseases identification.

Main perspective of this system is to make more growth of crops and to cure the plants which have been affected by any weather conditions or by any diseases and to provide some technology based environment to agriculture sector.

5.2 PRODUCT FUNCTION:

Proposed system uses flow which includes:

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1. Image is converted to HSV format.
2. Disease parts of plan leaf will be observed and HSV range will be determined.
3. Blobs(rectangle) will be drawn around detected disease area.
4. Plant disease will be determined based on detected disease area and HSV value.
5. System will able to give output in the form severity like low medium and high.

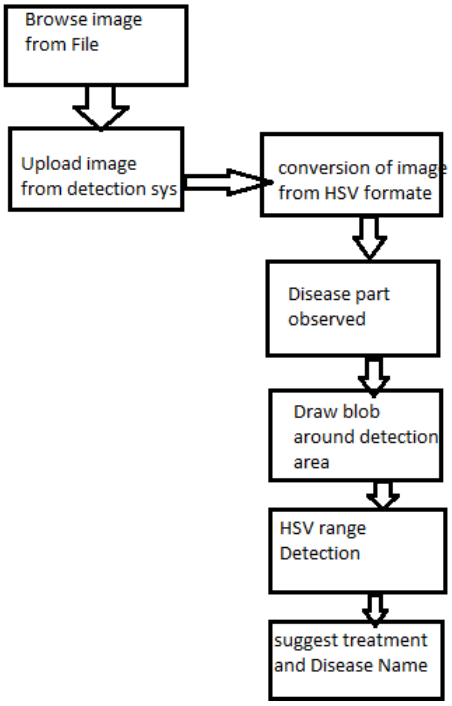

Fig.5 Flow of plant disease detection

VI. USER CHARACTERISTICS:

Proposed system involves important role for the User:

- Firstly user can registered into the system.
- After registering into the system, system provides GUI to the user to interact with system.
- User can select image from files upload it on application,
- User will get disease information on GUI.
- User will give language preferences to system.
- Will get result in English and Hindi.
- System can also provide weather condition.
- System can give the information about flowering and non-flowering plants.

VII. ALGORITHM:

Step 1: Accept a Query (Q).

Step 2: call IC function

2.1: Get U as Input to IC.

2.2 : Output as PD.

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Step 3: call to IE Function

3.1 : Get PD as Input .

3.2 : Get Relevant Information about disease and treatment.

Step 4: Display Result.

Step 5: Stop.

VIII. IMPLEMENTATION AND DISCUSSION

In this proposed system, we briefly discuss the existing works about Agriculture Sector.

- In this proposed system conventional image is converted into HSV image (clear vision of image) in which all the details about the leaf are provided including their disease details which is used for the farmers know which is the disease.
- It makes the farmer detect the disease and then the system provides the cure for the disease.
- This proposed system is to use smart technology instead of manual identification and analysing the disease and its cure. The system provides all the details about the affected leaf with the weather conditions.

IX.FUTURE RESEARCH DIRECTIONS

The main aim of this paper is to provide the guidelines for further research related to detection of disease which is affected by whiteflies,bacteria,weather-condition

The outlines are given below:

- This application can even be implemented as mobile based application.
- This system can detect more diseases and can provide many more languages.
- It can be a part of Make In India by including more advanced technology.
- Design a system which will work with both offline and online.

X.CONCLUSION

In plant Disease detection system, Image processing-based approach is proposed and useful for plant diseases detection. The plant Disease detection system is developed for flowering and non-flowering plant. 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 like English and Hindi. The system is also give the information about weather.

XI.ACKNOWLEDGEMENTS

This project aims at providing a Desktop application for the usage of analysing and detecting of disease on plants. We are profoundly grateful to**Prof. Mrs. Mehzabin Shaikh**for her expert guidance and continuous encouragement throughout to see that this project rights its target since its commencement to its completion. We

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