IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

National Conference on Recent Trends in Engineering and Technology

Adarsh Institute of Technology & Research Centre, Vita, Maharashtra

Vol. 10, Special Issue 1, May 2023

A Paper on a New System for Diagnosis and Identification of Plant Diseases by Using PyCharm and Python

Omkar Mahadev Mohite[1], Shreyash Rahul Kamble[2], Sanket Satish Tambare[3] Mr.A.D.Ghorapade[4],

Department Of ENTC, AITRC, VITA, India[1]

Department Of ENTC, AITRC, VITA, India[2]

Department Of ENTC, AITRC, VITA, India[3]

Department Of ENTC, AITRC, VITA, India[4]

Abstract: Agriculture now serves much more purposes than just providing food for an expanding population. Wherever an Asian population exceeds seventy percent, it is crucial. Agriculture is a country's main industry. It therefore feeds a wide variety of people. In the first place, disease-related reduced crop quality must be taken into account. The key to preventing agricultural losses may be disease detection. The purpose of this project is provided to a software solution that mechanically locates and categorizes sickness. Illness detection is involved in steps including loading an image, pre-Processing, segmentation, extraction, and classification. Images of the leaves are used to identify plant illnesses. Therefore, it is useful to apply image processing techniques to identify and categories diseases in agricultural applications.

Keywords*:* Plant disease classification, detection, and machine learning**.**

I. INTRODUCTION

One of the most important agricultural procedures is the early identification and classification of crop plant diseases. Disease-related infection causes a substantial economic loss to Every year, farmers come. Therefore, a prompt, accurate, and timely identification of the illness both reduces the risk of product loss and raises the product's quality (Phadikar et al., 2013). As a result, it aids in the nation's economic development. In conventional methods, the diagnosis of these illnesses is based either on the pathogens' visible symptoms or on pathogen identification in a lab (Barbedo, 2016). Pests and diseases cause crops or parts of plants to be destroyed, which lowers food output and increases food insecurity. Additionally, expertise in pest management Various less developed nations have better illness control. One of the main causes of decreased food production is toxic pathogens, poor diseasecontrol, and dramatic climate changes.

In order to reduce post-harvest processing, strengthen agricultural sustainability, and increase production, numerous new technologies have arisen.

II. BLOCK DIAGRAM

Image Acquisition: Using the camera, pictures of the plant leaf are taken. This image is in the RGB colour space (Red, Green, and Blue). A device-independent colour space transformation is then applied to the RGB leaf image to build a colour transformation structure.Image Preparation Various pre-processing procedures are taken into consideration to eliminate noise from the image or other item removals.

Grayscale to RGB Converter-Luminosity approach or weighted methodYou are aware of the issue with the conventional approach. That issue can be resolved using the weighted approach. Since green has a shorter wavelength than red and the three colours have different wavelengths, green is the colour that is most complementary to red.

IARJSET
ISSN (Online) 2393-8021
ISSN (Print) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
National Conference on Recent Trends in Engineering and Technology
Adarsh Institute of Technology & Research Centre, Vita, Maharashtra
Vol. 10, Special Issue 1, May 2023

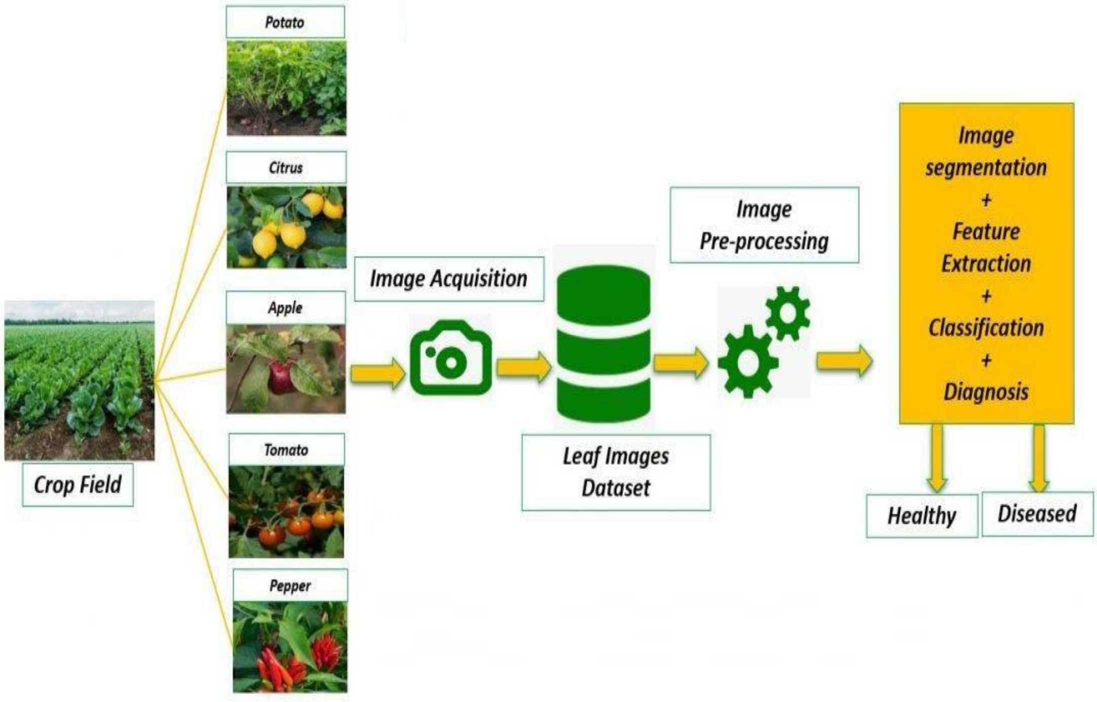

Fig. Block Diagram

Python is a high-level, interpreted general-purpose programming language. Open CV must be installed in Python. A few enthusiastic programmers created the "Open-Source Computer Vision Library" in 1999 to integrate image processing into a wide range of coding languages. It may be used on Windows, Linux, Android, and Mac and offers C++, C, and Python interfaces. It is one of the Python libraries utilized for imageprocessing. With the help of the leaf identification algorithm on the Python Web Framework, illnesses and leaves aredetected and identified. The database is used to deliver the response back to the sending farmer.

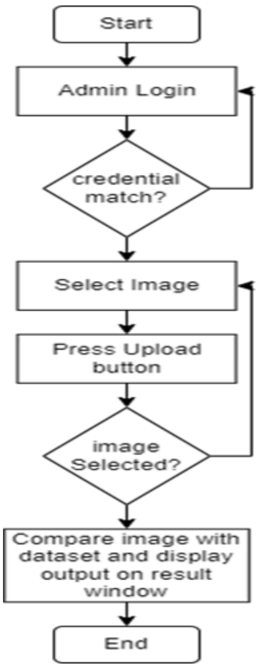

Fig. Flow Chart

This work is licensed under a Creative Commons Attribution 4.0 International License

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology
National Conference on Recent Trends in Engineering and Technology
Adarsh Institute of Technology & Research Centre, Vita, Maharashtra
Vol. 10, Special Issue 1, May 2023

III. PROPOSED WORK

The suggested method intends to create a system for automatically identifying leaves or fruits and classifying diseases in diverse fruits and plants. There are two categories for the system. phases: the training phase, which comprises the acquisition, pre-processing, and computation of the percentage of infection from test images as well as feature extraction,segmentation, and classification. Image capture: Using a camera, a picture of a plant leaf or fruit is taken. The image that is captured will be an RGB file. If necessary, a picture's scale and colour change should be done during image pre- processing. Pre-processing is the process of preparing an image for later processing by removing noise or extracting the region of interest. This project makes use of Using segmentation, the region of interest can be extracted from the input image

Fig. 1. Bacterial Blight Image.

Segmentation: Segmentation is the process of splitting an input image into various parts with some pixel similarity and shared characteristics. Segmentation is frequently used to determine the boundaries. We can obtain the region of interest with which to continue the processing by segmenting the input image. For the system depicted in Fig. 2, which is one of the most accurate segmentation techniques, we are using grab cut segmentation.

Pre-processing is the process of preparing an image for later processing by removing noise or extracting the region of interest. This project makes use of using segmentation, the region of interest can be extracted from the input image.

Segmentation: Segmentation is the process of splitting an input image into various parts with some pixel similarity and shared characteristics. Segmentation is frequently used to determine the boundaries. After masking the background pixels, the programme will use the information we provided to predict the color distribution of the foreground pixels using the Gaussian mixture model (GMM).

According to their relationship to nearby pixels, unknown pixels in a Gaussian mixture model are classified as either probable foreground or background, creating a new pixel distribution. Calculating the weights between the pixels allows one to determine how similar two pixels are. The edges between pixels will be concealed if there is a significant variationbetween their values. Extraction of features: Extraction of features is essential for correctly identifying an object. Color, mean, homogeneity, standard deviation, variance, correlation, entropy, edges, etc.

Fig. 2. Segmented Image

One technique for identifying the bacterial blight disease in pomegranates is edge detection. The fruit's cracks show that there is bacterial blight present. Fig presents the edge-detected image. Edge detection can be used to locate the edges in the cut sections of pomegranate fruits that have large cuts and cracks due to the bacterial blight disease. The chopped portions make the edges quite noticeable. We fix a problem based on the amount of edge detected areas Image data is compared to the permanent database in this data comparison. As previously indicated, a permanent database indicates that the picture has various dazzling pixels, we deduce the presence of bacterial blight based on the number of bright pixels. And the number of such pixels is kept in the ongoing database. When a user submits an image, it goes through all of the aforementioned procedures. The user-provided image's bright pixel count is calculated upon edge detection. The pixel count that was collected is then contrasted with earlier pixel counts that were saved in the database. On the basis of comparison, we will determine if the fruit is contaminated or not; if it is, we will recommend a suitable solution to combatthe infection. The causes and symptoms of the bacterial disease, the infection present. The causes and symptoms of the bacterial disease, the segmented and edge detected pictures of the infected image, and the treatments for the infection with the Upon reviewing the nearly 400 infected images, we draw conclusions based on the levels of infection. Here, the levels of infection are divided into different percentages 20%, 40%,and 75%, roughly. We segmented and edge detected pictures of the infected image, and the treatments for the infection with the show usage of the required chemical fertilizers, respectively. The provision of preventive measures is made if theinfection is in its early stages.

The segmented infected image is and after segmentation, the same image is sent to clever edge detection. On careful examination of the edge-detected image, we have come to the conclusion that there is an are offering a remedy based on the proportion of infection. Roughly 35 of the nearly 450 photos with bacterial blight infection that we analyzed for levelsof infection showed levels below 20%, indicating early stages of infection. The remaining 343 images show an infection level of more than 80%, indicating that the pomegranate fruit is affected by bacterial blight. Additionally, about 72 imagesshowed an infection of about 40%, which is on the verge of becoming infected by bacterial blight. Here, we are presentingthe infection rate that was observed.

IV. RESULT

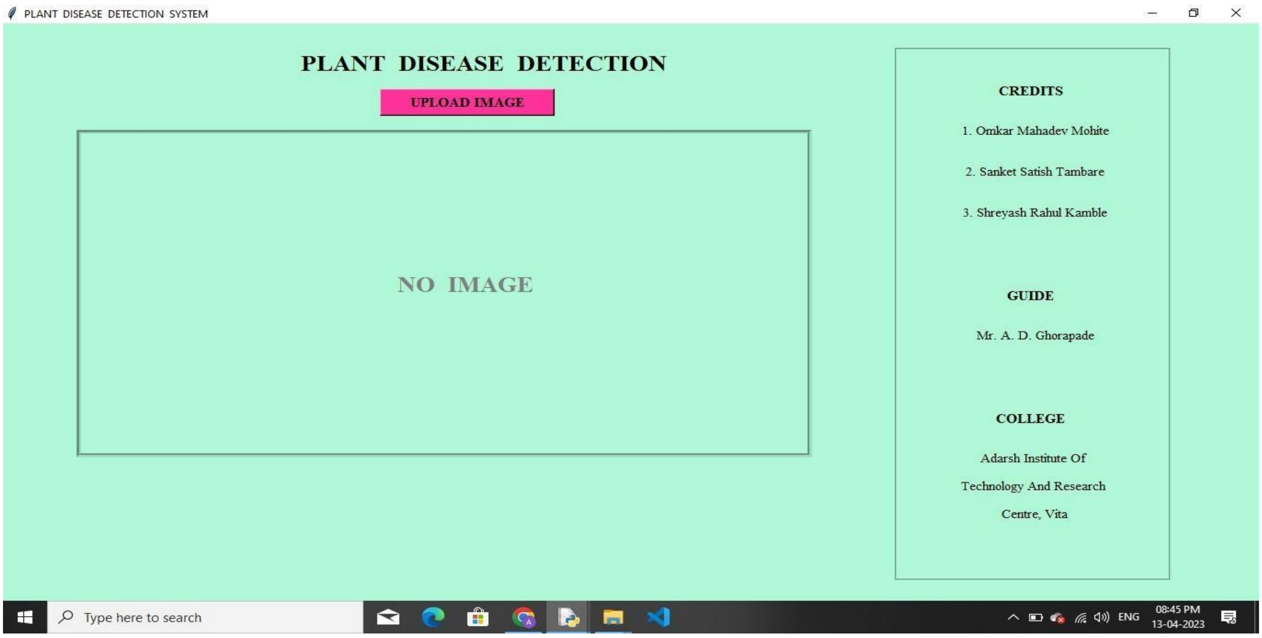

Fig. Input Screen

We must first transform RGB images into grayscale images for any image. Hu moments shape descriptor and Haralick features can only be calculated across a single channel, hence this is done. Therefore, before computing Hu moments and Haralick characteristics, RGB must be converted to grey scale.

The image must first be converted to HSV (hue, saturation, and value) in order to generate the histogram, therefore we are doingthat now.

Finally, the primary goal of our project is to use a Random Forest classifier to determine if a leaf is healthy or ill. The causes and symptoms of the bacterial disease, the infection present. The causes and symptoms of the bacterial disease, the segmented and edge detected pictures of the infected image, and the treatments for the infection with the Upon reviewing the nearly 400 infected images, we draw conclusions based on the levels of infection. Here, the levels of infection are divided into different percentages 20%, 40%, and 75%, roughly. We segmented and edge detected pictures of the infected image, and the treatments for the infection with the show usage of the required chemical fertilizers, respectively. The provision of preventive measures is made if the infection is in its early stages.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology
National Conference on Recent Trends in Engineering and Technology
Adarsh Institute of Technology & Research Centre, Vita, Maharashtra
Vol. 10, Special Issue 1, May 2023

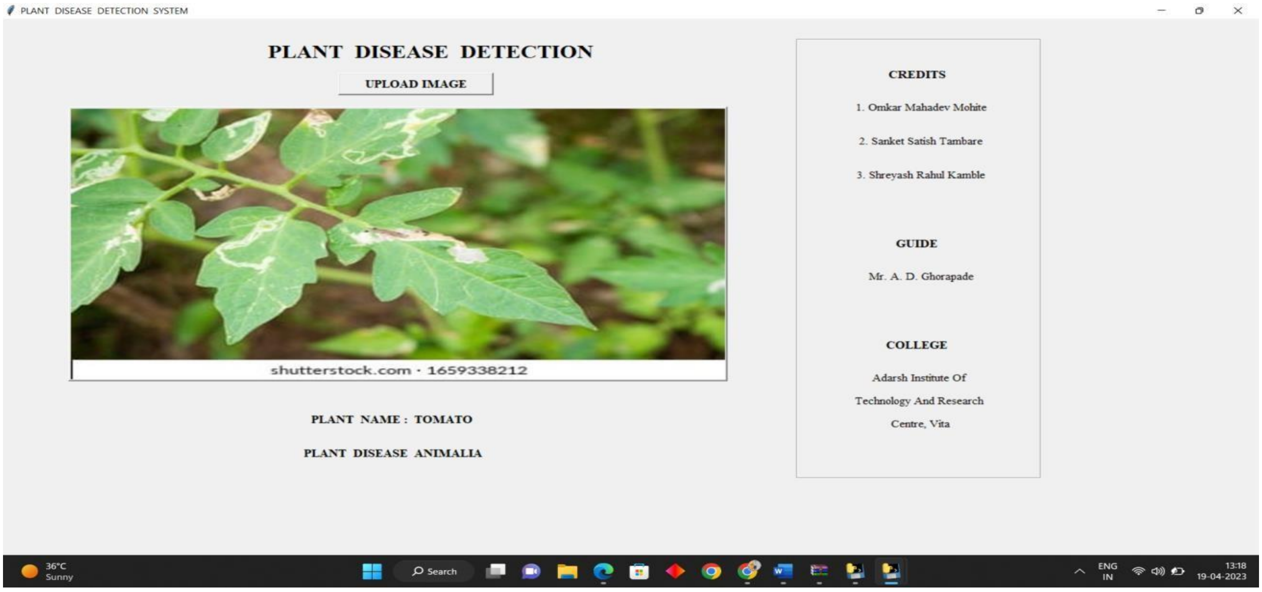

Fig. Output Screen

An image is taken using a mobile device's camera. An Android app is used to upload the captured image to a local server.Various image processing techniques are applied to the image on the server to identify the ailment As a result, the identified disease is returned on the mobile application.

V. FUTURE SCOPE

The concept is now used on a smartphone app, and it necessitates that the farmer roam around the field while taking images. Unsupervised drones that use computer vision to explore the field may be used in the future. The drone would take a number of images, which could then be uploaded back to the server where the model is running to produce a categorization result. The modification of GANS to have the discriminator serve as a multi-class classifier, so that it would have N+1 output labels rather than simply two, has also received significant investigation. The problem of plant disease detection might potentially be addressed using this strategy.

VI. CONCLUSION

Only a few studies on the automatic classification of rice plant diseases have been conducted in India. This paper studied deep CNN transfer learning for the first time. Disease classification for rice plants additionally, the experiments were carried out by dividing the entire dataset into various ratios of training-testing sets. The suggested model has a classificationaccuracy of 91.37% for an 80%–20% training–testing partition for identifying rice illnesses. Due to the lack of photos withstandard labels for rice illness, evaluating the suggested model against the literature is not appropriate. With a big collection of photos of rice that is ill, the performance of the suggested model can be significantly enhanced.

REFERENCES

[1] Zang Chuanlei, Zang Shanwen, Yang Jucheng, Shi Yancui and Chen Jia, "Apple Leaf Identification Using Genetic Algorithm and Correlation Based Feature Selection Method", International Journal of Agricultural and Biological Engineering, pp. 74-83, 2017.

[2] Jobin Francis, Anto Sahaya Dhas and Annop B. K., "Identification of Leaf Diseases in Pepper Plants Using Soft Computing Techniques", In proc. of IEEE Conference on Emerging Devices and Smart Systems, pp. 168-173, 2016.

[3] Manisha Bhange and H. A. Hingoliwala, "Smart Farming: Pomegranate Disease Detection Using Image Processing", In proc. of the Second International Symposium on Computer Vision and the Internet

[4] (VisionNet'15), pp. 280-286, 2015.

[5] Ashwini Awate, Damini Deshmankar, Gayatri Amrutkar, Utkarsha Bagul and Samadhan Sonavane, "Fruit Disease Detection using Color, Texture Analysis and ANN", In proc. of International Conference on Green Computing and Internet of Things(ICGCIoT), pp. 970-975, 2015.

[6] Tejal Deshpande, Sharmila Sengupta, and K. S. Raghuvanshi, "Grading & Identification of Disease in Pomegranate Leaf and Fruit", International Journal of Computer Science and Information Technologies, Vol. 5, pp. 4638-4645, 2014.

[7] Sudhir Rao Rupanagudi, Ranjani B.S., Prathik Nagaraj and Varsha G. Bhat, "A Cost Effective Tomato Maturity Grading System using Image Processing for Farmers", In proc. of IEEE International Conference on Contemporary Computing and Information (IC3I), pp. 7-12, 2014.

[8] Savita N. Ghaiwat and Parul Arora, "Detection and Classification of Plant Leaf Diseases Using Image Processing Techniques: A Review", International Journal of Recent Advances in Engineering & Technology (IJRAET), Vol. 2, pp. 2347 - 2812, 2014.

[9] Monica Jhuria, Ashwani Kumar and Rushikesh Borse, "Image Processing for Smart Farming: Detection of Disease and Fruit Grading", In Proc. of the IEEE Second International Conference on Image Information Processing (ICIIP), pp. 521-526, 2013.

[10] Bindu Tiger and Toran Verma, "Identification and Classification of Normal and Infected Apples using Neural Network", International Journal of Science and Research (IJSR), Vol. 2, Issue 6, pp. 160-163, 2013.

[11] Shiv Ram Dubey, Pushkar Dixit, Nishant Singh and Jay Prakash Gupta," Infected Fruit Part Detection using K-Means Clustering Segmentation Technique", International Journal of Artificial Intelligence and Interactive Multimedia, Vol. 2, pp. 65-72, 2013.

[12] Naganur and sannakki, "Fruits Sorting and Grading using Fuzzy Logic", International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), Vol. 1, Issue 6, pp. 117-122, 2012.

[13] Shiv Ram Dubey and Anand Singh Jalal, "Detection and Classification of Apple Fruit Diseases using Complete Local Binary Patterns", In proc. of IEEE, Third international conference on Computer and Communication Technology, pp. 247-251, 2012.

[14] Pertot, Tsvi Kuflik, Igor Gordon, Stanley Freeman and Yigal Elad, "Identificator: A Web-Based Tool for Visual Plant Disease Identification, a Proof ofConcept with a Case Study on Strawberry", Computers and Electronics in Agriculture, Elsevier, Vol.88, pp.144-154, 2012.

[15] Hetal N. Patel, Dr. M. V. Joshi, "Fruit Detection using Improved Multiple Features Based Algorithm", International Journal of Computer Applications, Vol. 13, pp. 0975– 8887, 2011.

[16] Al-Hiary, S. Bani-Ahmad, M. Reyalat, M. Braik and Z. ALRahamneh, "Fast and Accurate Detection and Classification of Plant Diseases", International Journal of Computer Applications, Vol. 17, pp

© IARJSET This work is licensed under a Creative Commons Attribution 4.0 International License