IDENTIFICATION OF PLANT DISEASE USING IMAGE PROCESSING TECHNIQUE

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Abstract - Agriculture is a critical part of our country's economy. Farmers can choose from a wide variety of crops for their farms. In any case, crop production for full benefit and commonplace processing may be science at times. With the aid of technical assistance, this can be created. The omission that Continually growing crops necessitates supreme power, especially for disease management, which will have a major impact on factors of production in order to generate economic benefit. The picture approach is the most important technique for getting a paying job in agricultural application. performs. Find a disease by looking at a picture of plants. With assistance for agricultural production, this effect could be mitigated. Since the majority of the first signs are microscopic, human vision limits the ability to identify the illness. This technique is repetitive and time consuming. There is a need for a fashion system that identifies, classifies, and categorises fashion automatically. Detects sickness symptoms in a quantitative manner. The main image processing techniques used for identifying leaf diseases are k-means bunch and SVM. This method would greatly help in the effective detection of disease. Picture acquisition, image pre-processing, segmentation, feature extraction, and classification are the five steps for disease detection. The disease is exploited by using this definition. Identification is completed with all types of leaves, and the user will also identify the infected region of the leaf in share by correctly distinguishing the disease, the user will be able to rectify the issue in a very simple and low-cost manner.

1. INTRODUCTION

1.1 Introduction

The project's aim is to identify and diagnose infection at an early stage, estimate the seriousness of infection, and promptly self-address the problem with the required chemical or fertilizer. The signs or structure of the plant leaves, stem, bud, and flower were used to distinguish the healthy and unhealthy (infection and agent inflicting the infection) plant organisms. crop, and so on, to raise awareness among farmers. Agriculture can be a country's backbone. Farmers have a wide range of crops to choose from for their farms. In either case, crop cultivation is usually scientific for maximum benefit and natural manufacturing. This could be produced with the help of technical assistance. The supervising of crops that are constantly maintained has paramount importance. power, especially for disease management, which will have a significant impact on factors of production, resulting in associated economic benefit. The greatest technique that getting a paying job in agricultural application functions is the method of picture. From the picture of plants, you will find a health issue. This outcome would be aided by agricultural assistance. advancement Since the majority of the first signs are microscopic, human visual capacities limit the ability to diagnose illness. This technique is repetitive and time consuming. There is a need for a fashionable device that automatically recognizes, classifies, and quantifies illness symptoms. For researchers, plant scientists, and farmers, producing

high-quality crops and increasing yields of various crops such as harvest, foodstuff crop, and farming crops is a difficult job. As a consequence, there's a need for land crop control. Innovative developments are on the rise. Adapting an automated unwellness analysis system with image processing and neural networks would most likely detect early unwellness with a low error rate and be cost efficient in sustaining a commercially viable agricultural system. Image processing techniques are often used to detect disease or insect attack on any part of the plant, including the leaf, stem, buds, and fruits. The signs of infection on any part of the plant include odd coloured spots, rust forming, wilt, decayed parts, and so on. It is often studied through photographs that show variations in color, form, and texture, among other things. Depending on the form of ailment. The magnitude of the compact area is usually determined by imputes or attributes of the symptoms. For instance, once the leaf has been infected with the bound malady. The image of the entire leaf is captured, and the leaf is extracted precisely, discarding the background and other objects present in the image. In recent times, the advent of image processing and machine learning has played a significant role in the field of precision farming and management. By implying that of pictures taken, the digital image process functions in handling and addressing the quality of crop output. In the field of classification, algorithms and machine learning techniques are extremely useful.

Temperature, wind, humidity, and other environmental factors all play a role in the cause of diseases or infections in a group of plants. The sudden change in the normal behavior of an atmospheric phenomenon or temperature can have a significant effect on the growth of plants. If the temperature is unusually hot or cold, supported the notion that a particular plant species wouldn't be able to grow properly. The infectious agent rate will multiply when the temperature varies, whether it is extremely hot or extremely cold. Similarly, a moist surface and regular irrigation during the season encourage disease production in the crop. Living organisms cause biotic plant diseases, which affect a wide variety of species or cultures of the same

generation. It is passed on from one plant to another, whether they are of the same genus or not. The signs and symptoms are apparent. It may be the tormenter's fault. or infectious agents that afflicted the crop during the previous cultivation season, and it would be a common disease of a particular species. The infection differs by species, and hence the infection period, which appears to be uneven in nature. Diseases caused by organic phenomena are progressive in nature and have an effect on the entire plant system. or perhaps a gift from the soil that has an effect on future cultivations. Plant sickness, microorganism sickness, infectious agent sickness, and bug attack are the main organic phenomenon factors that affect the crop area unit.

1.2 Problem Statement

• We summarise the main image processing techniques used for identifying leaf diseases, including k-means agglomeration and SVM. This process would greatly assist in the effective identification of disease to an associate degree. There are five steps to defining a disease, and they are all the same.

Image acquisition, image pre-processing, segmentation, feature extraction, and classification are all steps in the image processing process. By using this definition, the user can correctly identify the unhealthiest for all types of leaves, as well as recognise the affected region of the leaf in share. By correctly identifying the healthiness, the user can rectify the matter easily and for a low cost.

1.3 OBJECTIVE:

• The aim of this project is to create a software package that can detect and classify disease automatically. The identification of health problems is accomplished by steps such as image loading, pre-processing, segmentation, extraction, and classification. The photographs of leaves are used to identify plant diseases. Develop and test a machine-

driven detection strategy for plant diseases such as flora and microbial infections

1.4 Motivation

Crop cultivation is extremely significant in the agricultural sector. At the moment, food loss is mostly due to contaminated crops, which decreases the assembly rate as a result. The ability to detect plant diseases at an early stage has yet to be investigated. The most difficult job is to Reduce the use of pesticides in the agricultural sector and increase the assembly rate's level and number.

Since India is known for its agriculture, the majority of the population is involved in the industry. The agricultural industry plays a significant role in the economy. The rest of the Plants are contaminated with a variety of plant and microbial diseases. The disease is also caused by the atmospheric environment, which is due to the rapid growth of the population. The key challenges of property growth are to reduce pesticide use, value to avoid wasting the environment, and increase the standard. The use of pe could be reduced if precise, accurate, Pesticides can be used less frequently.

2. Literature Survey

Crop cultivation is a crucial aspect of the agricultural sector. At the moment, food loss is mostly due to contaminated crops, which decreases the assembly rate as a result. The ability to detect plant diseases at an inopportune period isn't discussed. The most difficult task is to reduce pesticide use in agricultural fields while increasing the quality and quantity of crops. the rate of assembly Our paper is used to investigate plant disease prediction at an inopportune moment. To estimate the infected space of the leaves, we suggest using an increased k-mean clump algorithmic programmed. To segment the infected area and assign it to its appropriate categories, a color-based sectioning model is created. Analyses based on experiments were carried out on sample images in terms of time complexity and infected area space. Image processing can be used to identify plant diseases. Image acquisition, image pre-processing, image segmentation, feature extraction, and classification are all steps in the sickness detection process. Our project is used to keep track of plant diseases and provide solutions. over the ailment It depicts the proportion of the affected part of the leaf. We have a tendency to design our project with a voice navigation system, so even someone with no experience with tech should be able to use it easily.

2.1 Plant Infection Detection Using Image Processing

A rustic's economy is based on agricultural productivity. The key to avoiding production losses and raising the standard of agricultural products is the identification of plant diseases. Traditional methods are accurate; however, they require an individual's resource for visually perceiving plant leaf patterns and diagnosing illness. the old For labors, technique necessitates more time-consuming and repetitive work. Early detection of disease through mistreatment automated techniques may reduce productivity losses in large farm lands. In this paper, we propose a vision-based automated disease detection mistreatment detection method. Technique for image processing. Square image processing algorithms By identifying the color function of the leaf space, a measure was established to detect plant infection or sickness. Color segmentation is done using the K mean law, and disease classification is done using the GLCM. Plant infection based on vision produced cost-effective results and promising results.

2.2. Detection of plant leaf diseases using image segmentation and soft computing techniques

Agricultural productivity is one of the most significant factors in the economy. This is one of the reasons why disease detection in plants is so important in the agricultural sector, since disease in plants is very natural. If proper care is not taken during this period, it has serious implications for the plants, and as a result, many products have been produced. Performance, quantity, and efficiency are all impacted. For instance, a disease known as very little leaf unwellness plant disease may be a dangerous disease found in pine trees in the United

States. Disease detection using an automated technique is helpful because it decreases the amount of time spent watching large farms of crops, and it detects signs of disease at a very early stage.

When diseases appear on plant leaves, they are known as diseases. This paper presents an associate rule for an image segmentation technique that is used to identify and classify plant leaf diseases automatically. It also contains a survey of various disease classification methods that can be applied to plant disease detection. Picture segmentation is a crucial aspect. The mistreatment genetic rule is used to diagnose illness in plant plant disease.

3. OVERVIEW OF THE SYSTEM

The previous system can only confirm the type of health issue afflicting the leaf. We are aiming to have a resolution in a shorter amount of time and to guide you through the project. Leaf image data collection, pre-processing, and analysis are all part of the well-planned technique.

those photographs; the point in which those photographs were taken GLCM is used to remove the function from the k-means cluster approach, and then the random forest recursive is used for technique work.

3.1 Applications

In agricultural applications, the image process is used for the following purposes:

• Identification is accompanied by sickness.

• Measure the volume of room that has been impacted.

• Defining the affected space's shape.

• Verify the color of the affected region.

　• Texture analysis based on leaf size and shape.

　• It aids in the diagnosis and treatment of crop issues.

　• It's also useful for small nurseries.

3.2. SYSTEM MODULES

Module-1: Create Database

We began our project by planning data for ANN to use in coaching and research. All of the images of cotton leaves that could be used for coaching and testing are included in this file. Image samples make up the image details. It is the picture knowledge that is to blame. the higher the classifier's potency, since it is the classifier that dictates the rule's toughness. We've taken some pictures of the cotton leaves for each of the illnesses, and the ANN has been trained based on the choices that have been derived from those pictures.

Module-2: Input Image

. Take a look at the image that was taken by the unit. Since it would have an effect on the image, the image was taken without any direct sunlight. The ANN that we've trained will test any picture of the cotton leaves in or outside of the information during this time.

Module-3: Image Preprocessing;

A series of methods, including image segmentation and have extraction, are used to pre-process the image of the cotton leaves. This approach has been completed so that it can be used in the Neural Network back propagation method.

Module-4 : Image Enhancement

The noise cancellation technique completes the image enhancement process. The technique of correcting component values that do not mirror the verity intensities of the significant scene is known as noise cancellation. The image's context is stripped and separated to because of the black history The image's RGB (red, green, and blue) components are extracted first, then it's reworked into an HSV (hue, saturation, and value) image.

Module-5 : Image Segmentation

The process by which the binary image of the defected leaf is extracted is known as image segmentation. A black and white picture is produced

using this process. Since the defected portion of the image is white, the background image is black. The image's noise is depicted as a Pieris rapae feature that wraps around the defected room.

Module-6 : Classification

With the help of RGB and HSV elements from the image, the process was able to detect cotton leaf with or without defects. This data is then stored in a variety of storage units as accepted or rejected binary values of one or zero.
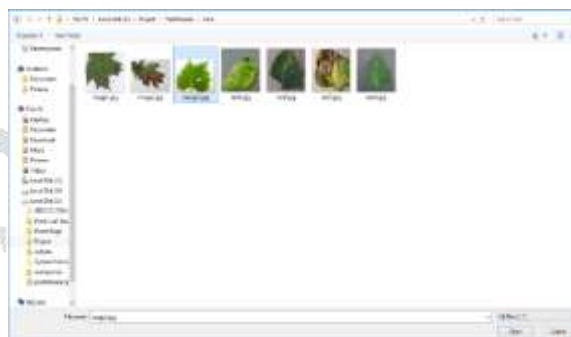
4.   RESULTS

Fig No. 1 Snapshot of Home Page

Fig No. 2 Snapshot of Admin Login page

Fig No.3 Snapshot of Main page

Fig No.4 Snapshot of upload file page

No.5 Snapshot of uploading infected image

Fig No. 6 Snapshot of disease details

Fig No.7 Snapshot of precaution page
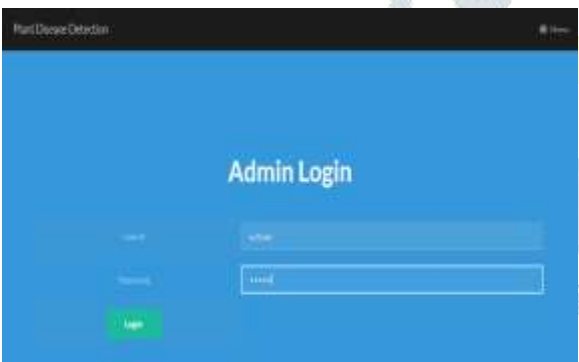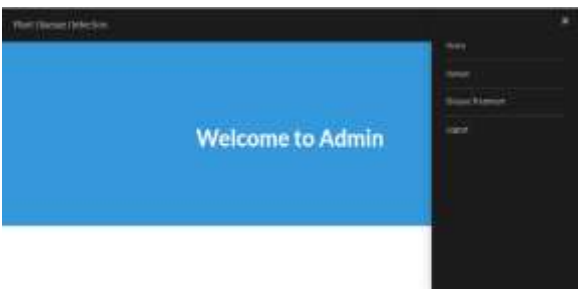
5. CONCLUSION AND FUTURE ENHANCEMENTS

Alternaria Alternate, Anthracnose, Microorganism Blight, and Cercosporin Leaf are the subjects of this research. In, ML which look for these automated sickness detection techniques that make use of image processing techniques. It entails image preprocessing, image segmentation, feature extraction, and classification after a picture has been loaded. Automatic detection system development Using advanced technology such as image analysis can assist farmers in identifying diseases at an early or early stage and provide valuable information for their management. We would like to continue working on lots of disease detection.

Future Enhancement

The main goal of the study is to find different plant diseases using an image procedure that uses an image pre-processing technique to method the image and approved colors adjustments on the image to highlight the most affected portion of the leaf and determine the type of illness. data that is backed up This research focuses on the plant's visually focused consistency. Farmers in the future will have an easier time diagnosing plant disease.

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