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PLANT DISEASE DETECTION USING MACHINE LEARNING

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Abstract: The application of algorithms to automatically learn from data and make predictions or judgements without being explicitly programmed is known as machine learning, and it is a subfield of artificial intelligence. Machine learning's fundamental goal is to analyses and comprehend the structure of data so that it may be fitted into models that can be used to predict or decide. Visible indicators including shape, size, dryness, and wilting can be very useful in identifying the status of the plant when it comes to identifying plant diseases. The suggested research article will examine various machine learning techniques for predicting plant diseases. Three factors host plants that are prone to disease, a hospitable environment, and a viable pathogen influence the development of illnesses in plants.

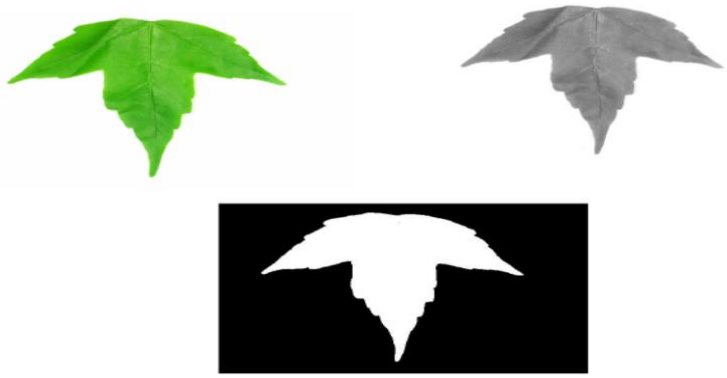
Keywords: Plant disease detection, Machine learning

INTRODUCTION

It is crucial to introduce technological improvement in domains relating to crop productivity in nations like India. The goal of research projects and speculative study methods in the significant field of qualitative farming is to raise crop output and quality standards while minimizing costs and maximizing financial gain. The agricultural construction model exists as a result of a complex interaction between soil, seeds, and growth-promoting chemicals. Fruits and vegetables are currently one of the most important agricultural products produced. A product value assessment and improvement has always been critically significant in the directive for getting surplus and worthwhile products. Diseases render a plant incapable of performing its essential functions, such as transpiration, in its normal state.

METHODOLOGY

Several actions must be taken in order to determine the health or sickness of the leaf. for example, preprocessing, feature extraction, classifier training, and classification. Preprocessing involves reducing and uniformly sizing all of the photos. The next step is to extract features from a preprocessed image, which is done using HOG's assistance. An object detection feature descriptor is Hog.[6] The intensity gradients in this feature descriptor are used to characterize both the object's look and the image's shape. One benefit of Hog feature extraction is that it works with the newly formed cells. This is unaffected by any alterations. In this case, we used three feature descriptors.

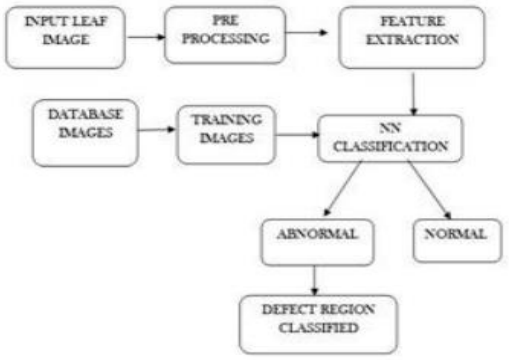


RGB image, Gray image ,

Binary image

Color Histogram: A color histogram shows how the colors in an image are represented. Prior to computing the histogram, RGB is transformed to HSV color system. It is required since the HSV model closely resembles how the human eye distinguishes the colors in an image, it is necessary to transform the RGB image to HSV. The description of the number of pixels that are accessible in the specified color ranges is provided by the histogram plot.

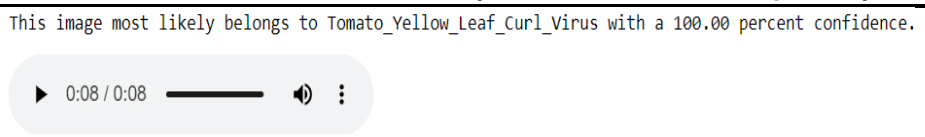
BLOCK DIAGRAM



BLOCK DIAGRAM [8]

RESULT

We are using machine learning first we will input the leaf image, then preprocessing is applied which convert the original image to the Greyscale Conversion then we will apply the Gaussian Filter for Smoothening the image then we will apply the thresholding, Morphological Transform HSV Color Space Conversion. After that algorithm of ml system compare the image in training images. some defined algorithms are feature extraction, clustering, segmentation we need this algorithm to reduce the time complexity.



CONCLUSION

The methodology that is being suggested for the next tomato plant leaf disease detection system focuses on developing a cutting-edge and effective system that makes it easier for farmers to produce high yields of tomatoes. The research seeks to identify the most prevalent illnesses that affect people. [8]Early blight, bacterial spot, and curl on tomato leaves were detected utilizing an image processing technique within machine learning. Using the plant's image, the farmer will be able to precisely identify the type of disease a certain plant is suffering from.

Pre-processing, Segmentation, Feature extraction, Classification using KNN

In this study, we compare our system against already-existing systems that used the right technique and implementation. The functionality of the suggested system is superior to that of the current disease detection system since it can produce results that are more accurate and precise and can be implemented more quickly and easily. It attempts to simplify farmers' lives. The system can benefit the agricultural industry by improving crop production and management, as agriculture is a major factor in the rise in our nation's per capita income.

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