Identification of Diseases for Tomato Leaves Using AlexNet

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Abstract:
Plants are the key source of human energy generation and have nutritional, therapeutic, and other benefits. Plant diseases cause a significant loss in crop productivity, and manually inspecting for plant diseases is a labor-intensive and ineffective approach. To overcome this problem automated plant disease detection systems have been developed using many approaches rely on machine learning and image processing to address the indicated issue. The ability of plant illnesses to alter the color and texture of leaves is exploited to build techniques for detecting plant diseases. In this discipline, deep learning models like VGG and ResNET are often applied. However, because they are primarily focused on disease classification on a specific crop or dataset, the majority of these models are not scalable. The purpose of this work is to present an enhanced approach for detecting leaf diseases. The suggested system is built with Alexnet and trained and tested on a variety of tomato leaf diseases. This model achieves 94.9% accuracy for classification and validation. In future this model is implemented by increasing number of diseased classes as well as other plant disease.

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Contents

I. Introduction

Every life depends mostly on plants for food. Spread of diseases in plants is bad for community along with threatens the resilience of the world economy [1]. Pests and illnesses kill one-third of all crops. It is crucial to monitor sanitary conditions and look for weeds [2]. Most plant diseases are brought on by bacteria, fungi, and nematodes and they significantly affect crop output and quality. The diagnosis of a plant's leaf, the monitoring and early detection of disease symptoms, and the early disease prediction are all conceivable [3]. The human eye is capable of spotting symptoms visually. Direct observation is the method most frequently used to identify illness in plants. However, this process needs both human involvement and ongoing supervision. You can do away with manual observation work by using an automatic detection system. Numerous advantages come with automatic disease recognition, including precise prediction and time and effort savings [4]. There is a need for methods like technology that can identify and categorize diseases with the fewest number of errors feasible. Various research projects are carried out in this area [5]. Plant pathogens can also be grouped which are based on their morphological and chemical characteristics. Diseases in plant are categorized using a variety of techniques, like fuzzy logic, SVM (support vector machines) and ANN (artificial neural networks) [6]. The rate of agricultural output is directly correlated with crop health. The identification and management of crop diseases is the most crucial procedure in a crop production system. Systems for automatically detecting plant diseases can be created utilizing machine learning and image processing. For instance, an automated system can be taught to spot the beginning of a sickness as well as to track the disease's course through photographs of leaves. Changes in leaf size, texture, and color are among the most prevalent signs. Through image processing, it is able to diagnose plant diseases and offer appropriate treatments.

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References

Keywords

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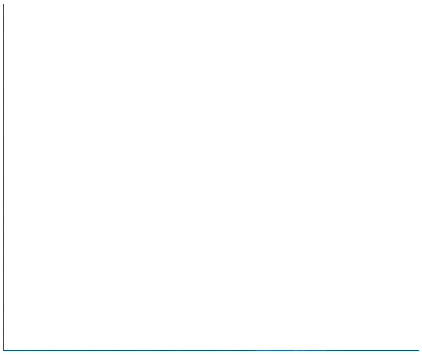

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