

Tomato Leaf Disease Detection Using Machine Learning

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Abstract

India being the huge market of agriculture provides the appropriate environment for different varieties of crops. One of the highly produced staples of the market of India is the tomato crop with great commercial value. India is one of the largest countries in terms of production of tomato. However, it is a sad truth that the amount of production and the quality of production of tomato crop is decreasing day by day due to different diseases which affect the crop. This meets the farmer with heavy losses. To decrease this loss, it is very much necessary to have a complete supervision over the growth of the crop. There are various categories of diseases that harm these tomato leaf on a very large scale like Late Blight, Bacterial Spot, Early Blight, Septoria Spot, Mosaic Virus etc. So, it is necessary to get a solution to prevent these diseases beforehand. This could be done only if we can detect the disease when it is in its beginning stage. With the help of different ML algorithms, leaf disease detection can be done very easily and more precisely with great results. In this paper, Convolutional Neural Networks (CNN) and Res Net 50 are applied to the dataset. The CNN shows the best accuracy among both the applied algorithms.

Keywords

Tomato, Disease, Machine Learning, CNN, Res Net 50, Agriculture, Detection.

1. Introduction

India being an economical giant with more than 65% of population linked directly with agriculture or its products. Farmers face a huge loss due to plant diseases. Mostly tomatoes are produced on the soil which is well-drained. It is seen that out of every 10 farmers 9 grows tomatoes in their field. In India, the area of cultivation of tomato crop reaches around approximately 3, 50,000 hectares and the quantities of production is somewhat around 53,00,000 tons. For getting fresh tomatoes which would taste good many gardeners also grow it in their gardens. But many times, those farmers and gardeners don't get complete progress of the development of the crop. This increases the chances of getting diseases. Plant affected due to diseases makes 10 to 30% of the overall loss in crops. Detection of these diseases in plants is very much necessary for reducing the losses in production. It is a very difficult task to manually monitor the diseases because of its complex nature and also it consumes a lot of time. So, it is important to decrease the human effort applied in this task and increase the prediction accuracy and making the farmers live free of worries. The major objective of this paper is to detect diseases which harms the tomato leaves accurately. In this paper CNN and Res Net 50 have been implemented to work on the collected data.

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