**Plant Disease Detection System**

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**ABSTRACT**

Plant diseases are an ongoing challenge for emerging farmers, which threatens money and food security. Recent changes in the penetration of smartphones and computer viewing models have created an opportunity for the separation of images in agriculture. Convolutional Neural Networks (CNN) are regarded as technological standards in image recognition and provide the ability to provide a quick and clear diagnosis. In this paper, the effectiveness of the ResNet34 model previously trained in diagnosing plant diseases is being investigated. The advanced model is still distributed as a web application and can detect 7 plant diseases with healthy leaf tissue. Database containing 8,685 leaf photographs; installed in a controlled environment, it is established to train and validate the model. Verification results show that the proposed method can reach 97.2% accuracy and an F1 rating above 96.5%. This shows the technological potential of CNNs in the identification of plant diseases and paves the way for AI solutions for emerging farmers.

**Keywords:**Plant disease detection, Tensor flow, green house, Convolution neural network, Data model, image to byte code.

1. **INTRODUCTION**

The agricultural land mass is more than just being a feeding sourcing in today’s world. Indian economy is highly dependent of agricultural productivity. Therefore in field of agriculture, detection of disease in plants plays an important role. To detect a plant disease in very initial stage, use of automatic disease detection technique is beneficial. For instance a disease named little leaf disease is a hazardous disease found in pine trees in United States. The affected tree has a stunted growth and dies within 6 years. Its impact is found in Alabama, Georgia parts of Southern US. In such scenarios early detection could have been fruitful.

The existing method for plant disease detection is simply naked eye observation by experts through which identification and detection of plant diseases is done. For doing so, a large team of experts as well as continuous monitoring of plant is required, which costs very high when we do with large farms. At the same time, in some countries, farmers do not have proper facilities or even idea that they can contact to experts. Due to which consulting experts even cost high as well as time consuming too. In such conditions, the suggested technique proves to be beneficial in monitoring large fields of crops. Automatic detection of the diseases by just seeing the symptoms on the plant leaves makes it easier as well as cheaper. This also supports machine vision to provide image based automatic process control, inspection, and robot guidance.

Plant disease identification by visual way is more laborious task and at the same time, less accurate and can be done only in limited areas. Whereas if automatic detection technique is used it will take less efforts, less time and become more accurate. In plants, some general diseases seen are brown and yellow spots, early and late scorch, and others are fungal, viral and bacterial diseases. Image processing is used for measuring affected area of disease and to determine the difference in the colour of the affected area.

1. **Problem Formulation**

A number of crop types namely, fruit crops, vegetable crops, cereal crops and commercial crops to detect fungal diseases on plant leaves. Different methods have been adopted for each type of crop. For fruit crops, k-means clustering is the segmentation method used, texture features have been focused on and classified using ANN and nearest neighbour algorithms achieving an overall average accuracy of 90.723%. For vegetable crops, Chan-vase method used for segmentation, local binary patterns for texture feature extraction and SVM and k-nearest neighbour algorithm for classification achieving an overall average accuracy of 87.825%. The commercial crops have been segmented using grab-cut algorithm. Wavelet based feature extraction has been adopted using Mahalnobis distance and PNN as classifiers with an overall average accuracy of 84.825%. The cereal crops have been segmented using k-means clustering and canny edge detector. Colour, shape, texture, colour texture and random transform features have been extracted. SVM and nearest neighbour classifiers used getting an overall average accuracy of 83.72%.A chilli plant leaf image and processed to determine the health status of the chilli plant. Their technique is ensuring that the Chemicals should apply to the diseased chilli plant only. They used the MATLAB for the feature extraction and image recognition. In this paper pre-processing is done using the.