



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 6, June 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.512

9940 572 462

6381 907 438

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Survey on Novel Approach for Leaf Disease Detection Using advanced Techniques

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ABSTRACT: Indian agriculture accounts for more than 70% of the country's gross domestic product. Farming generates about a third of our total domestic revenue. Different cultivable diseases are causing crop failure among the farmers, and farmers are reluctant to keep an eye on their crops due to the vastness of the area under cultivation (acres). Thus, the diagnosis of plant diseases is extremely important in the agricultural industry. For loss caused by crop diseases, which have a negative impact on the quality and yield of crops, it is necessary to identify diseases as soon as possible and as precisely as possible. Early detection and intervention will help to reduce plant disease loss as well as the overuse of medicinal products on a large scale. Previously, image recognition could be used to detect plant disease on its own. For the identification and classification of diseases, we propose machine learning mechanisms and image recognition methods. There are several processing phases that crop disease can be detected, including the collection of images, image pre-processing, retrieval of images, and classification of features. Crop disease can be detected at various stages throughout the processing cycle. Image features can be extracted from images using global image extraction techniques, which can be found here.

KEYWORDS: Deep Learning, Global Features, Classification, Image Processing.

I. INTRODUCTION

It is the nature of the goods that a farmer produces that determines his or her economic success, which is directly related to the growth and return of their plants. The disease affects a variety of plant parts, including the leaf, stem, seed, fruit, and so on. Plants are attacked by a wide range of pathogens. In order to resolve this dilemma, machine learning appears to be a more viable option for identifying and classifying plant diseases from plant videos. A number of machine learning techniques have recently been proposed, including deep learning and reinforcement learning. In India's agricultural and industrial economies, a large number of the country's major crops play a significant role. Direct livelihoods are provided to approximately 40-50 million people in India, which includes 6 million farmers.

Many different approaches have been proposed to detect leaf disease, including image filtering, segmentation, and image function extraction. There are a number of fragmentation methods available, including clustering k-means, segmentation of Canny and Sobel, and thresholding of Otsu, among others. Techniques for classification, such as the Vector Support Machine (SMV), the Neural Network (NN), and the Homogeneous Pixel Counting Technique, can be employed (HPCDD). The features that are used in the classification process are very important. There are several limitations to earlier work on disease detection, including poor precision as a result of the results and a limited number of photographs used for disease detection. The leaves of the plant are the primary source of the disease. The disease is concentrated on the leaf to an extent of approximately 80 to 90 percent. As a result, four different types of interest studies are conducted on tree leaves rather than on entire leaves; the feet are the most affected by disease and insecticides, for example (study, mawa). Machine vision systems are typically composed of three components: a CPU, a digital camera, and software programmes (applications).

Algorithms of various types are included in the application. Photo editing is an important tool for enhancing sections of an image as well as background images. The recognition of functions is one of the most important stages of image processing. A large number of scientists have been drawn to pattern recognition through image identification, and the term flow is used in the field of pattern recognition of plant leaves, which is used to diagnose leaf diseases. There have also been approaches developed over the past two decades that have not been fully resolved yet. That, on the other hand, is difficult. The most important question is how the characteristics of discrimination and secure classification can be extracted from the data.

II. RELATED WORK

Wan MohdFadzil et al. [1], Discussed the orchid plant leaves disease detection process. The optical camera is used for the orchid plant photographs. The algorithm employs a combination of different techniques including the border segmentation system, morphological processing and filtering technology used to categorise input images as a black leaf and solar scurvy into two disease groups.

Aditya Parikh et al [2] authors' focuses primarily on the detection of disease and its phase with illustrations for a cotton plant. The cotton leaf shows most signs of illness. Two case classifiers were used in the proposed work, hence the first section classifier leaf from the context using local statistical features. Then another classifier is learned to identify diseases and to locate their stage with hue and luminance from the HSV colour space. The algorithm developed for every disease is generalised.

BhumikaS.Prajapati et al [3], this paper provides a survey on cotton leaf disease identification and classification. The precise type of leaf disease on the leaf of the plant is impossible for human eyes to determine. Thus, using picture processes and machine learning methods can be useful to reliably classify the cotton leaf diseases. The pictures for this work were obtained by digital camera from the cotton field. The background removal technique on the image is used in the preprocessing phase to eliminate the background from the picture. In order to segment the images further with otsu thresholding method, the background images removed are then processed.

P. R. Rothe et al [4], early and reliably, leaf diseases in cotton crops should be recognised as counterproductive for yield. The present work provides a method for the pattern recognition of three diseases of the cotton leaf: Bacterial blight, Myrothecium and Alternaria. The photos needed for this project are taken in Buldana and Wardha districts in the fields at the Central Institute of Cotton Research in Nagpur and in the cotton fields. For the segmenting of images the active contour model is used and the Hu moment is derived as the training function for the neuro-fuzzy adaptive inference scheme.

MelikeSardogan et al [5], this paper introduces an algorithm for Convolutional Neural Network (CNN) and an algorithm for the classification and detection of tomato leaf diseases based on Learning Vector Quantization (LVQ). The dataset includes 500 pictures of tomato leaves with four disease signs. They have a CNN model for automated removal and grouping of characteristics.

NorfarahinMohdYusoff et al [6], This paper provides a technique of real-time edge detection for identification and hardware deployment of Hevea leaves diseases (rubber tree leaves). Three big hevea leaves *Corynespora* Leaf Spot, Bird's Eye Leaf Spot, and *Collectotrichum* Leaf Disease for image contrast used in this analysis By means of the sobel edge detection algorithm, the disorder on the leaves can be found. Compared to the Sobel edge detection algorithm produced with the MATLAB, the real-time edge detection result generated by FPGA Cyclone IV E is shown on a monitor.

Indumathi.R et al [7], the region of the infected leaf and the disease that invaded the leaf is found in this mechanism too. This is accomplished through image processing; devices that forecast diseases in the leaf. Our method uses KM and Random Forest algorithms to diagnose disease more precisely in the leaf. In the first place, the picture is preprocessed and the clusters procedure is used to find the region of the leaf affected.

GayatriKuricheti et al [8], This article establish a high quality crop processing algorithm for the detection and prevention of diseases spreading across the crop. The data base of various pictures was generated and analysed using



GLCM for k-means picture segmentation and textural analysis. Using the information gain algorithm, the SVM classification classifies the derived image after classifying its attributes.

ChaowalitKhitthuk et al [9], this paper provides a Color Imaging Plant Leaf Diagnostics Device with a Neural Network Unattended. The colour and texture attributes are used to treat images. The method consists primarily of two processes: the extraction of diseases and the classification of diseases. The extraction method analyses feature presence with the co-occurrence matrix and texture equations on the basis of statistical grey standard. The classification procedure employs the uncontrolled streamlined neural network ARTMAP to categorise disease forms. To assess the device recognition accuracy of rust, scab and downy mildew, four types of grape blade disease photos are used.

PENG JIANG et al [10], in this article, the Apple Leaf Data Collection (ALDD) is first built with image augmentation and picture annotation technology. This data is composed of laboratory images and dynamic images under real-time conditions. Based on this, the introduction of the Google Net Inception structure and Rainbow concatenation would provide a new form of apple leaf disease detection using deep CNNs. Finally, the proposed INAR-SSD (SSD with Inception Modul and Rainbow Concatenation) model is trained for the detection of these five popular apple leaf diseases in an outstanding test range using a set of 26,377 photos of diseased apple blades.

III. PROPOSED APPROACHES

To diagnose leaf diseases, a number of activities are included in the technique. These activities include obtaining digital images, preparing them for analysis, extracting them, and classifying them according to image attributes such as colours, form and texture characteristics, among others. The first step involves the process of photographing subjects. During this process, images from the various datasets of the blocks are used to populate the image on the screen. Pre-processing is completed in the second step of the image creation process. The extraction of images for the contaminated portion of the sheet is carried out during the third step, and it is dependent on certain properties between the image pixels or the texture of the sheet. Following this stage, some research tasks are carried out in order to identify the features that describe the image in question, which is done through the use of machine learning to compare picture characteristics. Finally, the results of the classification reveal the type of leaf disease that was discovered.

IV. CONCLUSION

In this paper, the study of the different diseases on the sheets can be identified easily at an early stage until the whole plant is damaged, since the analysis of the diseases present in the sheet is possible to identify leaf diseases. Here, the technique shown will diagnose the disease more precisely, such that, using weather data set and image processing, one can archive good efficiency by avoiding different diseases on the plant leaves. The use of classification and extraction methods has improved the machine efficiency which results better.

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7.512

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