



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

IJIRSET

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



ijirset@gmail.com



www.ijirset.com

Machine Learning Approach for Leaf Disease Detection: A Survey

Mr.Prashant Kamble, Prof. Dr.Pankaj Agarkar

Dept. of Computer Engineering, Dr.D.Y.Patil School of Engineering, Lohegaon, Pune, India

ABSTRACT: India is an agriculture country and above seventy percent of our population depends on the agriculture. One-third of our national income comes from agriculture. Agriculturalists are facing loss due to various crop diseases and it becomes tedious for cultivators to monitor the crop regularly when the cultivated area is huge. So the plant disease detection plays an important role in agriculture field. Timely and accurate disease detection is important for the loss caused due to crop diseases which affects adversely on crop quality and yield. Early diagnosis and intervention can reduce the loss of plant due to disease and reduce the unnecessary drug usage. Earlier, automatic detection of plant disease was performed by image processing. For disease detection and classification, the machine learning mechanism and image processing tools are proposed. Crop disease will be detected through various stages of image processing such as image acquisition, image pre-processing, image feature extraction, feature classification, disease prediction and fertilizer recommendation.

KEYWORDS: Classification, Feature Extraction, Image Global Features, Image Processing, Machine Learning.

I. INTRODUCTION

Farmers' economic growth depends upon the quality of the product that they grow, which is directly dependent on the plants' growth and yield they get. Plants are attacked by the different diseases that target different parts of plant body such as leaf, stem, seed, and fruit and so on. To solve this problem machine learning seems to be a better option. Various machine learning techniques are recently proposed for identification and classification of plant disease from plant images. Many crops, most importantly cash crops play a dominant role in the Industrial and Agriculture Economy of the country. India provides direct livelihood to 6 million farmers.

Various image processing concepts such as image filtering, segmentation, image feature extraction have emerged to detect the leaf diseases. There are various image segmentation methods available such as k-means clustering, Canny and Sobel segmentation, and Otsu thresholding. Techniques such as Support Vector Machine (SVM), Neural Network (NN), and Homogeneous Pixel Counting technique for Cotton Diseases Detection (HPCCDD) can be used for classification. Features play an important role in the classification process. Previous proposed works for detecting disease have some limitations such as low resulting accuracy and less number of images used to detect disease. The main source for the disease is the leaves of the plant. About 80 to 90 % of disease on the plant is on its leaf. Hence, the study of interest is the leaf of the tree rather than whole plant. The leaves are mainly suffered from diseases like insecticide (*tudtude*, *mawa*), fungus, foliar leaf, and Alternaria leaf spot.

Organization of paper

The organization of the paper is as follows section II gives the related work and limitations and last section concludes the paper with future work followed by references.

II. RELATED WORK

Wan MohdFadzil et al. [1], discussed a disease detection method for orchid plant leaves. The orchid plant leaflet images are received from the use of digital camera. The algorithm makes use of an aggregate of various strategies inclusive of border segmentation method, morphological processing and filtering technique used for categorizing input images into two disease class as black leaf spot and solar scorch.

Aditya Parikh et al [2] authors' primary focus is detection of disease and estimate its stage for a cotton using images. Mostly diseases or its symptom are observed on the leaf. This work uses cascaded classifiers with the use of local statistical data, first classifier is trained for detecting disease and find its stage. The algorithm can be applied for any disease.

BhumikaS.Prajapati et al [3], This paper presents an overview on characterization and identification of cotton leaf illnesses. It is difficult to recognize the specific sort of leaf illness which for the most part happens on the leaf of plant. For distinguish the cotton leaf infections precisely the picture handling and AI procedures can be valuable. The information were taken from the computerized camera. In pre-handling strategies, foundation expulsion technique is applied on the picture to eliminate foundation from the picture.

P. R. Rothe et al [4], Leaf diseases on cotton plant must be diagnosed earlier and with accuracy as it can prove detrimental to the yield. This paper speaks to an example acknowledgment framework for arrangement and recognizable proof of three cotton leaf infections for example Alternaria, Myrothecium, Bacterial Blight. The information were taken from the fields at Central Institute of Cotton Research Nagpur, and the cotton fields in Buldana and Wardha area. The form model is utilized for picture division.

MelikeSardogan et al [5], This work represents a Learning Vector Quantization (LVQ) algorithm and Convolutional Neural Network (CNN) calculation based technique for tomato leaf infection order and recognition. The information contains almost 500 pictures of tomato leaves with four indications. They have used a CNN for automatic feature extraction and classification.

NorfarahinMohdYusoff et al [6], It incorporate constant edge location strategy for recognizing Hevea leaves illnesses (elastic tree leaves) in pictures and its execution in equipment. There are three Hevea leaves sicknesses which are Corynespora Leaf Spot, Bird's Eye Leaf Spot and Colletotrichum Leaf Disease utilized in this investigation for picture correlation. Sobel edge discovery calculation is utilized for edge location and sickness on leaves.

Indumathi.R et al [7], The proposed framework finds the zone of leaf which has been influenced and furthermore the sickness that assaulted the leaf which is accomplished by utilizing Image Processing method and there are a few frameworks which predicts the infections in the leaf. The framework utilizes Random Forest calculation and K-Medoids grouping to create exact yield in the identification of infection. The picture is experiencing pre-prepared procedure and afterward the bunching technique is utilized to locate the influenced region on the leaf.

GayatriKuricheti et al [8], This paper presents an algorithm for preventing and detecting the diseases to the whole crop and its productions high quality crop. The k-means image segmentation is used for creating and processing the databases different leaf image. The GLCM is used for leaf image textural. The SVM classifier is used to classify the feature extracted images.

ChaowalitKhitthuk et al [9], This work represents disease diagnosis system from colour imagery using unsupervised neural network. The colour and texture features are used for processing image. The system executed disease classification and disease feature extraction. Four types of grape leaf disease images are used to test which are rust, scab, downy mildew and no disease.

PENG JIANG et al [10], In this paper, the apple leaf infection dataset (ALDD), which is comprise of complex pictures and research facility pictures under genuine field conditions, is first developed through picture explanation and information increase advancements. Another apple leaf illness discovery model that utilizes profound CNNs is proposed by presenting the Rainbow connection and Google Net Inception structure. Utilizing dataset of 26,377 pictures of sick apple leaves, the proposed INAR-SSD model is prepared to recognize these five regular sicknesses.

III. PROPOSED APPROACHES

The methodology involve several phases such as image pre-processing, image acquisition, image feature extraction, leaf diseases classification which is based on image feature that is texture feature, shape feature, colour feature etc. The main stage is the picture obtaining stage, It included picture is transferred from the pictures of the different leaves dataset. In the subsequent stage picture pre-handling is done. In the picture include extraction for the contaminated piece of the leaf which depends on explicit properties among pixels in the picture or their surface. After this stages,



factual examination undertakings are done to order the highlights that speak to the given picture using machine learning to compare image features. Finally, classification output shows the identified leaf disease.

IV. CONCLUSION

In this paper, tended to how the illness examination is workable for the leaf sicknesses discovery, the investigation of the different infections present on the leaves can be successfully distinguished in the beginning phase before it will harm the entire plant. Here the method introduced can ready to identify the illness all the more precisely, we can say that, we can chronicle great profitability by forestalling the different sicknesses present on the leaves of plant utilizing climate dataset and picture handling. The use of grouping and highlight extraction measures has improved the presentation of the framework which gives better outcomes.

REFERENCES

- [1] Wan MohdFadzil, Shah Rizam, Jailani R, Nooritawati M.T, "Orchid leaf disease detection using Border Segmentation technique," IEEE Conference on Systems, Process and Control (ICSPC), Vol.1, pp.168- 179, December 2014.
- [2] Aditya Parikh, Mehul S. Raval, ChandrasinhParmar, Sanjay Chaudhary, "Disease Detection and Severity Estimation in Cotton Plant from Unconstrained Images", 2016 IEEE International Conference on Data Science and Advanced Analytics.
- [3] BhumikaS.PrajapatiVipulK.DabhiHarshadkumarB.Prajapati, "A Survey on Detection and Classification of Cotton Leaf Diseases", International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) 2016.
- [4] P. R. Rothe, R. V. Kshirsagar, "Cotton Leaf Disease Identification using Pattern Recognition Techniques". International Conference on Pervasive Computing (ICPC).
- [5] MelikeSardogan, AdemTuncer, YunusOzen," Plant Leaf Disease Detection and Classification based on CNN with LVQ Algorithm" International conference on computer sciences 2018.
- [6] NorfarahinMohdYusoff, Ili Shairah Abdul Halim, Noor Ezan Abdullah, A'zraaAfhzan Ab. Rahim," Real-time Hevea Leaves Diseases Identification using Sobel Edge Algorithm on FPGA: A Preliminary Study" ICSGRC 2018.
- [7] Indumathi.R, Saagari.N, Thejuswini.V, Swarnareka.R,"Leaf Disease Detection and Fertilizer Suggestion's" ICSCAN 2019.
- [8] GayatriKuricheti, Supriya P "Computer Vision Based Turmeric Leaf Disease Detection and Classification" ICOEI 2019.
- [9] ChaowalitKhitthuk, ArthitSrikaew, KittitAttakitmongcol and PrayothKumsawat," Plant Leaf Disease Diagnosis from Colour Imagery Using Co-Occurrence Matrix and Artificial Intelligence System" IEECON 2018.
- [10] Peng Jiang, Yuehan Chen, Bin Liu, Dongjian He, and Chunquan Liang "Real-Time Detection of Apple Leaf Diseases Using Deep Learning Approach Based on Improved Convolutional Neural Networks" IEEE Access 2019.



**Impact Factor:
7.512**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

9940 572 462 6381 907 438 ijirset@gmail.com



www.ijirset.com

Scan to save the contact details