International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

# Detection of Plant Leaf Diseases using Machine Learning

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**Abstract –** *Nowadays the agriculture plays a vital role in human daily life, similarly now in organizations agriculture also plays very important role. It's like there is no work can complete without Plants. As we know our India is converting into a Digital India. Similarly now file sharing on Plants environment is important. As we all know Machine Learning is a process related to Artificial Intelligence in Image processing. The organization increases their efficiency, takes less time for transferring the data from one place to another place. Though this concept is very efficient and useful there are some other hostile actions too. While transferring the data, the data may gets damage by the person who is unauthenticated. Indian economy is highly dependent of agricultural productivity. Therefore, in field of agriculture, detection of diseases in plants is very important.*

***Key Words:*** *Machine Learning, Disease identification, Genetic Algorithm and Image Acquisition.*

## 1. Introduction

Agriculture has played a key role in the development of human civilization. If there is decrease in agro products, total economy will get affected. Therefore judicious management of all input resources such as soil, seed, water, fertilizers etc. is essential for sustainability. As diseases are inevitable, detecting them plays major role. One can refer incident that occurred in 2007, Georgia (USA), it is estimated that approximately 539 USD was the loss incurred due to plant diseases as well as controlling them. The naked eye observation of farmers followed by chemical test is the main way of detection and classification of agricultural plant diseases. In developing countries, farming land can be much larger and farmers cannot observe each and every plant, every day. Farmers are unaware of non-native diseases. Consultation of experts for this might be time consuming & costly. Also unnecessary use of pesticides might be dangerous for natural resources such as water, soil, air, food chain etc. as well as it is expected that there need to be less contamination

Now days, a new concept of smart farming has been introduced where the field conditions are controlled and monitored using the self operating systems. The self recognition of the disease is based on the identification of the symptoms of disease. So that information about the disease occurrence could be quickly and accurately provided to the farmers, experts and researchers of food products with pesticides.

Pests and Diseases results in the destruction of crops or part of the plant resulting in decreased food production leading to food insecurity. The pest management or control and diseases are less in various less developed countries. Toxic pathogens, poor disease control, drastic climate changes are one of the key factors which arises in dwindled food production. .

## 2. Problem Definitions

- In existing system, we are identifying the boundaries of the affected area.
- Solving a problem of creating an automatic system for leaf disease detection through mobile.
- **Objectives of the Study:**
- Recognize abnormalities that occur on plants in their Greenhouse or Natural environment.
- To classify the disease using a classifier.

## 3. Literature Review

**P. Revathi&M. Hema. Latha (2012):** The author proposed the identification of affected part of leaf diseases. At first, Edge detection technique is used for image segmentation, and at last proposed a Homogenous Pixel Counting Technique for Cotton Disease Detection (HPCCDD) Algorithm for image analyzing and classification of diseases[1].**GengYing,Li Miao, Yuan &Hu Zelin(2008):**The author studied the methods of image processing. For that purpose they used cucumber powdery mildew, speckle and downy mildews as study samples and to relate the details of effect of simple and medium filter[2].

**SantanuPhadikar and Jaya Sil (2008):**The author Proposed Rice Disease using Pattern Recognition Techniques describes a software prototype system for rice disease detection based on the infected images of various rice plants. Using digital camera images of infected rice plants are captured and using image growing, image segmentation techniques to detect infected parts of the plants. Then the classification of infected part of leaf is done by neural network[3]. **Ms. Kiran R. Gavhale, Prof. UjwallaGawande, and Mr. Kamal O. Hajari(2014):** The present paper discusses the image processing techniques used in performing early detection of plant diseases through leaf features inspection. The objective of this work is to

implement image analysis and classification techniques for extraction and classification of leaf diseases[4]. **H. Al-Hiary, S. Bani-Ah Mad, M. Reyalat, M. BraikAnd Z. A Lrahamneh(2010):** The author proposed Fast And Accurate Detection And Classification Of Plant Diseases. We propose and experimentally evaluate a software solution for automatic detection and classification of plant leaf diseases. The proposed solution is an improvement to the solution proposed in as it provides faster and more accurate solution. The developed processing scheme consists of four main phases[5].

**4. Conclusion**

As, SVM is very complex in calculations and it is not the cost effective testing of each instance and inaccurate to wrong inputs. KNN algorithm is effectual classifier would be used to minimize the computational cost. In previous researches it has proved that KNN has high accuracy rate. KNN classifier obtains highest result as compared to SVM. The comparison would be based upon two parameters Accuracy and Detection time. The study reviews and summarizes some techniques have been used for plant disease detection. A novel approach for classification of plant disease has been proposed.

**References**

[1]. Garima Tripathi and Jagruti Save : "AN IMAGE PROCESSING AND NEURAL NETWORK BASED ROACH FOR DETECTION AND CLASSIFICATION OF PLANT LEAF DISEASES", Volume 6, Issue 4, April (2015), pp. 14-20.

[2]. P.Revathi, M.Hema Latha, Classification Of Cotton Leaf Spot Diseases Using Image Processing Edge Detection Techniques , ISBN, 2012, 169-173, IEEE.

[3]. Santanu Phadikar & Jaya Sil[2008] Rice Disease Identification Using Pattern Recognition Techniques, Proceedings Of 11th International Conference On Computer And Information Technology, 25-27.

[4]. Geng Ying, Li Miao, Yuan Yuan &Hu Zelin[2008] A Study on the Method of Image Pre Processing for Recognition of Crop Diseases, International Conference on Advanced Computer Control, 2008 IEEE.

[5]. Ajay A. Gurjar, Viraj A. Gulhane," Disease Detection on Cotton Leaves by Eigen feature Regularization and Extraction Technique", International Journal of Electronics, Communication & Soft Computing Science and Engineering (IJECSCSE) Volume 1, Issue 1.

[6]. H. Al-Hiary, S. Bani-Ah Mad, M. Reyalat, M. Braik And Z. A Lrahamne Fast And Accurate Detection And Classification Of Plant Diseases, IJCA, 2011, 17(1), 31-38, IEEE-2010.

[7].Tejal Deshpande, Sharmila Sengupta, and K.S.Raghuvanshi, "Grading & Identification of Disease in Pomegranate Leaf and Fruit," IJCSIT, vol. 5 (3), pp 4638-4645, 2014.

[8]. P.Revathi and M.Hemalatha, "Classification of Cotton Leaf Spot Diseases Using Image Processing Edge Detection Techniques," IEEE International Conference on Emerging Trends in Science, Engineering and Technology (INCOSET), Tiruchirappalli, pp 169-173, 2012.

[9]. Ms. Kiran R. Gavhale, Prof. Ujwalla Gawande, and Mr. Kamal O. Hajari, "Unhealthy Region of Citrus Leaf Detection using Image Processing Techniques," IEEE International Conference on Convergence of Technology (I2CT) Pune, pp 1-6, 2014.

[10]. Monika Jhuria, Ashwani Kumar and Rushikesh Borse, "Image processing for smart farming detection of disease and fruit grading," IEEE 2nd International Conference on Image Information Processing (ICIIP) Shimla, pp 521-526, 2013.