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A SURVEY ON CLASSIFICATION OF LEAF DISEASE DETECTION USING MACHINE LEARNING AND DEEP LEARNING

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Abstract - Agriculture is critical to human survival as a source of food. Leaf disease has become a major human health issue. It can occur at any time. It might happen between the sowing and harvesting of the crops. It results in a significant dropin the market's economic value. As a result, leaf disease identification is critical in agriculture. Detecting leaf disease using conventional methods took longer, needed a large amount of manpower, and necessitated a greater understanding of plant disease. The leaf disease detection, using modern tool usage detects and classifies plant illness automatically. It can also detect the colour of the leaf, the degree of damage in the leaves, and it can be used to detect illness early on. This paper focus on the survey of such algorithm that helps to detect the leaf disease and concludes with efficient algorithm based on their performance. To create an algorithm for a system thatdetects leaf illness automatically. The following factors are considered: leaf colour, degree of damage in leaves, and area of unhealthy leaves. Different photographs from the database are used to simulate the method. The algorithm is then implemented in real time .

I. INTRODUCTION

The plant disease can directly lead to stunted growth causing bad effects on yields[2] . An economic loss of up to $20 billion per year is estimated all over the
world . Diverse conditions are the most difficult challenge for researchers due to the geographic differences that may hinder the accurate identification. In addition, traditional methods mainly rely on specialists, experience, and manuals , but the majority of them are expensive, time-consuming, and labor-intensive with difficulty detecting precisely. Therefore, a rapid and accurate approach to identify plant diseases seems so urgent for the benefit of business and ecology to agriculture .The field of agriculture is in a great threat this includes the diseases that attack the plant leaf. Our system findsthe area of leaf that has been affected and also the disease that attacked the leaf.

This review provides a definition of plant diseases and pests detection problem, puts forward a comparison with traditional plant diseases and pests detection methods .

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II. RELATED WORK

According to the difference of network structure, this study outlines the research on plant diseases and pests detection based on deep learning in recent years from three aspects of classification network, detection network and segmentation network, and the advantages and disadvantages of each method are summarized. Common datasets are introduced, and the performance of existing studies is compared.

The paper [3] discusses possible challenges in practical applications of plant diseases and pests detection based on deep learning. In addition, possible solutions and research ideas are proposed for the challenges, and several suggestions are given. Finally, this study gives the analysis and prospect of the future trend of plant diseases and pests detection based on deep learning.

The paper [4]Automatic identification of plant diseases is necessary for food security, yield loss estimation and management of disease. With the worldwide increase in digital cameras and continuous improvement in computer vision domain, the automated techniques for detection of disease are highly in demands in precision agriculture, highly productive plant phenotype, smart greenhouse and much more. Working on an open dataset which]. includes 15200 images of crop leaves, a Residual Network (ResNet34) was trained to perform this task of classification. The proposed ResNet34 model accomplished a 99.40% accuracy on a test set, illustrating the viability of the proposed model. Overall, the process of training ResNet models on an open image dataset provides a sound way towards crop disease detection using automated networks on an enormous global scale.

In paper[5] a framework utilizing raspberry PI to detect and prevent plant disease from spreading is discussed. The k means clustering algorithm was used for image analysis. It has numerous focal points for use in vast harvest ranches and in this way distinguishes indications of sickness naturally at whatever point they show up on plant leaves.This paper gives the best strategy to recognizing plant infections utilizing picture preparing and alarming the ailment brought about by email, SMS and showing the malady name on the framework proprietor's screen display. Automatic detection of symptoms of disease is useful for upgrading agricultural products. Completely automatic design and implementation of these technologies will make a significant contribution to the chemical application. The cost of pesticides and other products will be reduced. This will lead to an increase in farm productivity.

The paper[6] proposed a model that helps in automatic detection of different plant diseases at early stages. Thus, the production will increase in many
folds. The main aim of this study is to identify different types of leaf diseases. Different feature extraction techniques have been used to enhance the classification accuracy. Support Vector Machine (SVM), Random Forest and Logistic Regression have been applied to classify different types of leaf diseases. When obtained results are compared SVM outperforms other two classifiers. Results show that, the model can be used in real life applications.

The paper[7] focuses on soy bean disease classification using SVM and Deep learning algorithms. The plant attributes of about 36 are collected for 683 instances, and SVM classifier is applied to classify 19

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classes of diseases. Deep learning custom net multilayer perceptron is then applied to classify the soybean data set.643 instances are correctly classified and 40 are incorrectly classified and the classification accuracy is
94.1435%. The classification accuracy of Deep learning classifier is obtained to be 88.7262%. The attributes of the layers of the architecture need to be optimized to increase the classification accuracy.

In paper[8] detection process marks the beginning of a series of activities to fight the diseases and reduce their spread. Some diseases are also transmitted between animals and human beings, making it hard to fight them. Our focus is to clarify the details about the diseases and how to detect them promptly with artificial intelligence. We discuss theuse of machine learning and deep learning to detect diseases in plants automatically. Our study also focuses on how machine learning methods have been moved from conventional machine learning to deep learning in the last five years. Furthermore, different data sets related to plant diseases are discussed in detail. The challenges and problems associated with the existing systems are also presented.

We can identify the tomato leaf diseases for detection for surveillance and monitoring experts is the standard approach for detection. The plants get seriously affected if the proper control hasn't been taken. Detection of disease through some mechanized technique and methodology is efficient and constructive because it decreases an outsized toil of surveilling in the large cultivation.It also covers distinct disease classification methods of working which is used for the detection of diseases in plants. In this survey it is found that RESNET algorithm performs better.

PROPOSED SYSTEM

The goal of the suggested system is to create an automaticleaf disease detector.

SOFTWARE BLOCK DIAGRAM :

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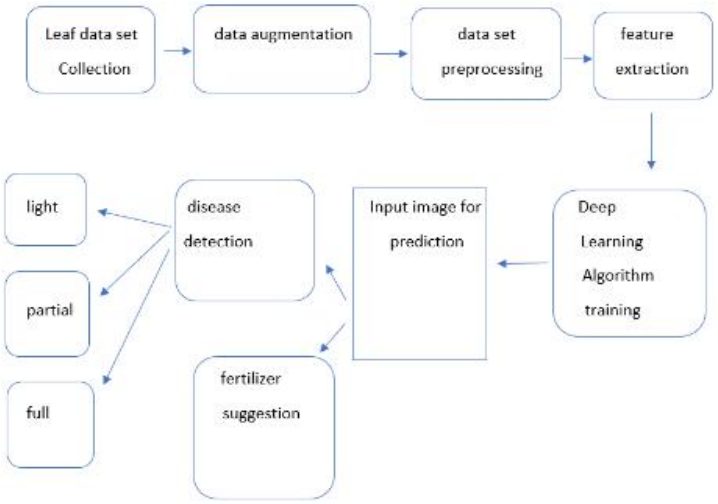

Fig 1 indicates the software diagram of the proposed system.

HARDWARE BLOCK DIAGRAM :

7 Jun 2020 – 11 Jun 2020 :IEEE publisher

https://ieeexplore.ieee.org/document/9182128

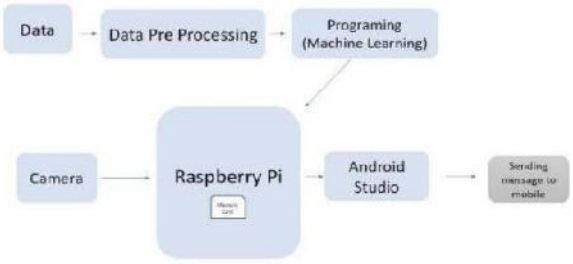

Fig 2 indicate the hardware diagram of the proposed system

Data augmentation will be applied to the input image from the dataset (rotate, shift, zoom, and vertical rotate). The input image will then be preprocessed, with the dataset being preprocessed in simple and aspect ratio, and the image being converted to an array. The feature extraction step will be followed by deep learning algorithm training, following which it will go through the convolution process, input image for prediction, and lastly forecast disease (mild, partial, full) and fertilizers

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CONCLUSION :

This paper elucidates an automatic approach for the classification of leaf diseases. To achieve the same, a survey was taken on machine learning and deep learning approaches .

RESNET is used in the design of the proposed system . The algorithm will be tested with different inputs to analyze the performance . Then the algorithm will be implemented in real time.

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