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A Review on Mango Leaf Diseases Identification using Convolution Neural Network

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Abstract – **The identification of plant diseases plays an important role in taking disease control measures to improve the quality and quantity of crops. Plant disease automation is very beneficial because it reduces the monitoring of large farms. Leaves are a food source for plants, so it is very important to detect leaf diseases early and accurately. This work includes a deep learning-based method that can automatically identify leaf diseases in mango plant species. Plants have become an important source of energy and a fundamental problem in solving the problem of global warming. However, this important source of livelihood is threatened by plant diseases. Convolutional neural networks (CNN) show unique advantages (advantages) in object recognition and image classification. This article introduces the opportunity to classify plant diseases based on CNN This model will be developed for classification of mango leaf diseases.**

Keywords – **Mango Leave Disease, CNN, Feature Extraction, Segmentation .**

I. INTRODUCTION

Mango is also known as the "king of fruits". One of the most important fruit crops in the world, accounting for about 40% of mango production worldwide, the world's first for mango production. It is estimated that the damage caused by diseases and insect pests is about 3040% of the crop [1]. Common diseases of blue plants include hypertension, access to Weber's disease, changes in blue, miners, anthracnosis, leaflets of varying arteries, etc. Such infections are caused by pathogens such as bacteria, viruses, fungi, parasites and even the worst Environment. Leaf infections affect the process of photosynthesis and lead to death. The symptoms and the affected leaf area determine the type of infection.

In the early days, agricultural experts regularly monitored plants for the diagnosis of agricultural diseases. For small farms, it is easy to spot disease and take immediate precautionary measures. For large companies, it is time Consuming and very expensive. Therefore, it is extremely important to find automated, accurate, fast, and easy-to-use technology for diagnosing plant diseases. Machine learning and learning is the most well-known and widely used method for the treatment or cataloging of herbal viruses.

Deep learning through neural network is part of the family of machine learning. Provides various applications in various fields. The development of information technology can help farmers monitor and control plant diseases.

II. RELATED WORKS

In recent years, the search for leaf diseases has been a topic of research for a long time. In order to advance the rates of recognition of infectious diseases, we explored several techniques that utilize machine learning and model recognition. These techniques include machine learning techniques such as complex neural networks [2], artificial neural networks [3], neural networks [4], vector machines [5] and other modes of communication [6,7]. With the above technologies, complex neural networks perform functional and classification functions. Other methods use matching matrices with color [8], histogram code [4], scaling algorithm [9], Canny edge detector [6] and many other algorithms to obtain the functions. Research work completed. 2 The Global Paper of Pure or Practical Mathematics, Special Publication 11068, is classified as a single disease in many plants or multiple diseases in a single plant. These modern technologies have been applied to many plants, such as wheat [2], wheat [10], corn [11], cotton [12]. Compared to other technologies, CNN requires almost no image processing. In recent times, there has been some research on the use of deep learning technologies to diagnose diseases immediately. Yang Lu and so on. There is a way to determine unhealthy leaf images in leaves using a series of deep neural networks. Photographs of 500 rice leaves, leaves, and roots were taken from the palm. Under CNN's 10-way remedial strategy, we have received training to identify 10 common genetic disorders. Since the color image is also used there is no definite feature in the whole channel, so the image is considered as [0, 1], and element

analysis and purification are used to obtain training. and experiments [2]. Alvaro Fuentes and others. [13] have suggested tomato cultivation based on the seasonal approval rating of the photo recognition and the activity of the plant and the response function. Three different detectors, such as a convolutional neural network (R-CNN faster than data, a region-based convolutional network (R-FCN) and a multi-shot bag driver (SSD) to detect diseased images 9 tomatoes In addition, data annotation and data augmentation are used to reduce false positives as well as to improve accuracy.Review [14] et al. Leaf control model based on deep neural networks. This work was able to categorize 38 categories of 14 plants and 26 diseases using 54 306 datasets as part of the Botanical Village database. This method utilizes ReLU and batch processing to obtain the speed of approval. The aim of this work was to identify five blue leaf diseases such as anthracnosis, site r Alternaria leaves, leaf leaves, leaf leaves and Weber leaves. CNN will perform the feature extraction immediately with the first step in the analysis. Classification is based on choosing the value with the highest possible value.

Architecture of Deep Convolutional Neural Network: CNN creates an entry layer, a response layer, and a secret layer between them. The hidden layer consists of a convolution layer, a pooling layer, a straight linear unit, a seamless, and a common layer. When it comes to image classification, access is a picture and the result is a class name, also known as a tag. Inspired by a number of pre-trained neural network architectures (such as VGG-16, VGG-19, Alexnet), an in-depth CNN museum with three hidden panels was introduced for this work. There are no clear rules for organizing a single system. 3.1 The snapshot shown can be provided directly as an entry in the CNN model. The size of the image is shown as [the height and width of the color channel]. For colored images, the number of channels is equal to 3 and for grayscale, the number of digital channels is equal to 1. Data extraction is possible before moving the image to a CNN model. As neural networks and models for deep learning require large amounts of data, data storage is increasing by expanding the original data to generate natural data. Enhance the image by incorporating various changes, including rotation, scaling, leakage, displacement, and blessing, as it stores the symbol in the image. 3.2 The evolution of evolution The process of evolution is the work of evolution. While the first layer of CNN is always a packet, if the input is a network or map of the first layer, the input packet is pictured. The input is powered by a kernel filter to produce a product function box.

III. LITEARTURE SURVEY

Iqbal et al. Literature [1] Many studies have been proposed to determine and classify plant diseases. In this review, the author discusses all approaches related to disease control, including the basics, techniques, challenges, benefits, and disadvantages. The literature [2] has suggested the research of neural system approaches based on plant leaf gratitude and disease classification. This work presents the numerous replicas, types, mechanics, and classifications introduced, or introduces other visual considerations related to hyperspectral images. In Ma et al. During the proposed work, four cucumber diseases were identified from the leaves, namely, anthracnosis, green starch, dusty pollen and the target cell. In [4], all imageries are collected in real-time or secret by a continuous deep network (DCNN). In [5], Ferentinos presented a VGG-based neural network for leaf-shaped markers. The proposed method features a picture of the healthy and the sick. The results are confirmed by large data sets, which indicate the validity of the deep learning method. Wait. In [6], four deep-band network systems were used, such as VGG 16, Inception V4, ResNet, and DenseNets to classify images for infection. Image from the Rural Herbal Dataset, which includes 38 diseases and 14 health categories, compared to other media, the DenseNets network can achieve high visibility with high classification. quality and less time calculations.

ChutinanTrongtorkidet.al(2018): The study suggested the development of the baracuda mango (Nam-Dok Mai) system of plant pathogens, which is one of the largest exports in Thailand. But Thailand is a steamy republic or weather has led to changes in plant diseases that have affected development of mango trees. Because agronomists have no knowledge of how to properly classify plant pathogens, many types of agricultural production are declining. In addition, there is no decision-making mechanism when it comes to choosing the right methods to prevent or treat infections that occur on farms and farms. The infected plant has caused many errors in the treatment. Therefore, the system is designed to help farmers identify infected plants and solve problems immediately. An agricultural expert should be an expert in diagnosing specific diseases in agriculture. The company's diagnostic applications utilize knowledge management systems in the form of models based on data mining technology. This paper presents an illustration of leaves in the form of leaves. New grades show that the rule-based perfect collected 129 leaflets from the mango area under the Maeda University maize and standard surveys, and responded well to 89.92% of the 3 category markers (anthrax, algae, normal) were sex. Experimental results show that the rule-based model can be used in business diagnostic applications.

UdayPratap Singh et.al (2019): Fungal infections not only affect the value of the plant and its effects, but also damage the ecological value. Sweet trees, especially fruits or plants, are artificial by an epidemic called anthracnosis. The purpose of this article is to grow an effective or effective way of diagnosing the disease and symptoms, in order to find a mechanism that can solve the problem in a

cost-effective manner. With a higher emphasis on calculation or correctness, computer dream and deep learning methods have increased admiration in organization of various diseases in recent years. Therefore, this paper presents a complex, multi-layer (MCNN) network. This article is verified by an original document from Shri Mata Vaishno Devi University of J&K Katra, India, which contains 1070 blue photographs. Includes a picture of a healthy leaf and a picture of a nut leaf 'disease of its rank. The results show that, compared to the latter methods, the proposed MCNN model has higher accuracy with higher classification.

Sunayana Arya et.al (2019): Deep learning (DL) is a larger part of the fastest learning machine. Deep learning uses complex neural networks (CNN) for image categorization because deep learning can provide the most accurate answers to solve real-world problems. CNN has pre-trained architectures, such as AlexNet, Google Net, Dense Net, Squeeze Net, ResNet, VGGNet, etc. In this education, we used the CNN or AlexNet criteria to detect disease in blue leaves and potatoes and compare the accuracy and effectiveness of the architecture. This work uses 4004 images. The image of the potato was taken from the Plant site, while the mango image was taken from the GBPUAT site. The results show that AlexNet's visibility is higher than CNN's architecture.

Gina S. Tumang et.al (2019) By identifying diseases and insect pests in leaves and fruits, this study solved one of the major factors contributing to the slow decline in mango-Philippines production and is therefore one of the the leading cause of blue collar production in the Philippines. The uncertainty of farmers using various pesticides. Multi-SVM and GLCM are used in image processing to determine the characteristics of anthracnosis, fruit drill and soot with 85% accuracy. It is performed through contrast extraction, kurtosis, detection and entropy. The research project can be used as a model for other fruit trees and as a basis for managing the results of the site (especially bluegrass using computer science).

Shriroop C. Madiwalar et al. (2017): Anthrax and leaves (red leaves) are a number of diseases that affect blue plants. Mango is important, and the detection of these diseases is essential in preventing the epidemic and reducing production. Machine insights have been proposed to use blue color imaging to identify plant diseases. The method includes the use of the converted YCbCr image and creates a working vector for the input image and color scheme, which is passed on to the class in the test. GLCM, color-based technology and the Gabor filter are used to create text or color formats. Comparison of results obtained with the most advanced classifier and vector machine (SVM) was performed. Analyze different mining techniques to find separate fallouts for each method. The general results show that the accuracy of classification of the smallest registers and vector machines in the 86 image sites is 79.16% and 83.34%, respectively..

IV. PROPOSED WORK

The purpose of this process is to develop an effective and An effective method for diagnosing diseases and symptoms and thereby supporting the use of systems that can effectively solve the problem. In recent years, computer vision and deep learning methods have become very popular in the classification of various diseases due to their excellent mathematical ability and accuracy. In this process, CNN therefore proposed to classify anthracnose mango leaves. Experimental segmentation techniques can segment disease parts. And K-means cluster, using feed centroid value for disease segmentation. By applying a threshold to the nuance component of the disease component, the unnecessary green portion of the proposed model can be removed from the disease cluster

Classification Integration Phase: The use of external sensors in this work is a new approach based on CNN feature extraction and object recognition. This process ends with the introduction of powerful classification techniques that can be used for the purpose of classification. Features extracted from the three deep floors of the CNN model are included in the external design section.

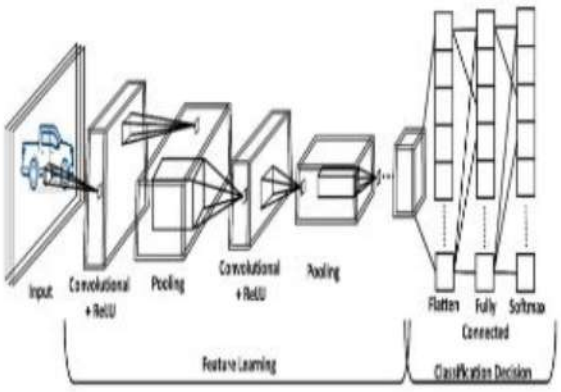


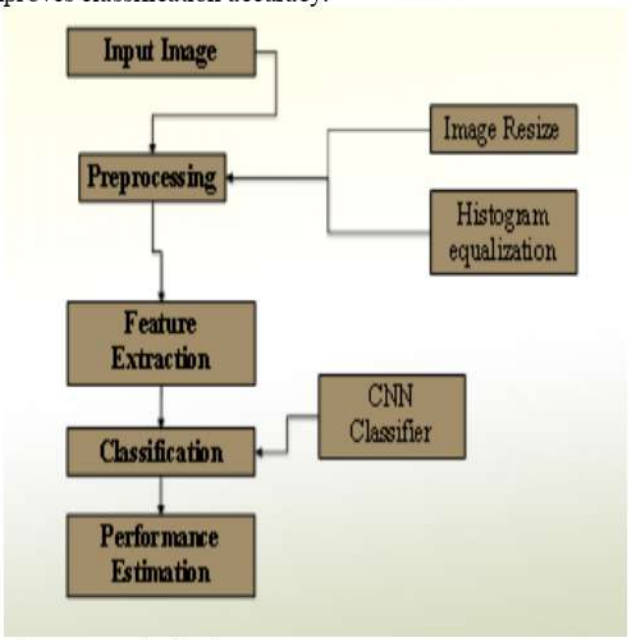
Fig1.1 CNN layers.

The hierarchical CNN system structure consists of multiple layers, each of which converts input into meaningful representation.

Feature Extraction: Features play an important role in distinguishing one disease from another. We intend to use color Features such as meaning and unusual behavior. We also intend to use features such as kurtosis, shading, highlighting in clusters and shades of clusters. In order to remove the pure properties, a black-red coherence matrix is obtained. Other features for which we conduct a systematic review are the number of defects in the predefined color area and the number of pixels in the disease area, which are determined by the color-coded analysis of all the diseases we will be working on. .

Eliminate some infections. Often, the meanings and common modifications of the R, G and B components in the patient part are often misused

Size Reduced: Features extracted from the deeper layers of the CNN model have a higher size, and their use then blends classification ceremonies, thus increasing the weight of classification. . Unless the next round of operations affects the operation, only a small part of the calculation work is maintained. In fact, reducing the size of the workpiece not only adds to the speed, but also improves classification accuracy.



Performance Analysis

- **True positive (TP)** = the number of cases correctly identified as patient.
- **False positive (FP)** = the number of cases incorrectly identified as patient.
- **True negative (TN)** = the number of cases correctly identified as healthy.
- **False negative (FN)** = the number of cases incorrectly identified as healthy.
- **Accuracy:** The validity of this exam lies in its aptitude to distinguish patients from healthy cases. In order to compute precision of the quiz, we need to analyze true conversion rate of the true negatives in all the evaluation cases. When it comes to math, it can be said
- Accuracy = (TP+TN) / (TP+TN+FP+FN);
- **Sensitivity:** The sympathy of the quiz lies in its skill to accurately control the patient's condition. In order to make an estimate, we need to count the number of patients who actually behave. Mathematically, it could be said:
- Sensitivity = (TP) / (TP + FN)
- **Specificity:** The unique feature of this test is that it can accurately identify the health issues. To evaluate this, we need to calculate the most effective combination of healthy cases. Exactly, it could be said:
- Specificity = (TN) / (TN + FP)

V. CONCLUSION

The future CNN-based mango sprig illness ID perfect can classify various diseases in mangoes from healthy humans. Later CNN fixes not want any cumbersome processing of input images and manual functions, faster convergence speed and good exercise performance, it is more popular than conventional algorithms for many applications. By providing more images in the dataset and adjusting the parameters of the CNN model, classification accuracy can be further improved. However, obtaining the optimal limits for the CNN perfect is quiet a study test.

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