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# Fertilizers Recommendation System for Disease Prediction

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**ABSTRACT:** Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.

**KEYWORDS:** Deep Learning, Central Neural Network (CNN), Tensor Flow.

## I. INTRODUCTION

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques. The effects of mineral nutrition on plant disease and the mechanisms responsible for those effects have been dealt with comprehensively elsewhere. In India, around 40% of land is kept and grown using reliable irrigation technologies, while the rest relies on the monsoon environment for water. Irrigation decreases reliance on the monsoon, increases food security, and boosts agricultural production.

In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques. An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.

## II. LITERATURE SURVEY

Certain experiments have been Performed from past few years by different research and development groups . Here are some of the following groups:

[1] Lee SH, Chan CS, Mayo SJ, Remagnino P. How deep learning extracts and learns leaf features for plant classification. Pattern Recogn. 2017. Plant identification systems developed by computer vision researchers have helped botanists to recognize and identify unknown plant species more rapidly. Hitherto, numerous studies have focused on procedures or algorithms that maximize the use of leaf databases for plant predictive modeling, but this results in leaf features which are liable to change with different leaf data and feature extraction techniques. In this paper, we learn useful leaf features directly from the raw representations of input data using Convolutional Neural Networks (CNN), and gain intuition of the chosen features based on a Deconvolutional Network (DN) approach.

[2] Tsafaris SA, Minervini M, Scharr H. Machine learning for plant phenotyping needs image processing. Trends Plant Sci. 2016. it introduces and showcases the utility of machine learning for high-throughput data-driven plant phenotyping. With this letter we aim to emphasize the role that image analysis and processing have in the phenotyping pipeline beyond what is suggested in [1], both in analyzing phenotyping data (e.g., to measure growth) and when providing effective feature extraction to be used by machine learning. Key recent reviews have shown that it is image

analysis itself (what the authors of [ 1 ] consider as part of pre-processing) that has brought a renaissance in phenotyping [ 2 ].

[3] Fuentes A, Yoon S, Park DS. Deep learning-based techniques for plant diseases recognition in real-field scenarios. In: Advanced concepts for intelligent vision systems. Cham: Springer; 2020. Deep Learning has solved complicated applications with increasing accuracies over time. The recent interest in this technology, especially in its potential application in agriculture, has powered the growth of efficient systems to solve real problems, such as non-destructive methods for plant anomalies recognition. Despite the advances in the area, there remains a lack of performance in real-field scenarios. To deal with those issues, our research proposes an efficient solution that provides farmers with a technology that facilitates proper management of crops.

### III. PROPOSED SYSTEM

Web Application UI built where:

- |   |
|---|
| <b>1. Farmers interact with the portal build</b>  |
| <b>2. Interacts with the user interface to upload images of diseased leaf.</b>                          |
| <b>3. Our model built analyses the Disease and suggests the farmer with fertilizers are to be used.</b> |

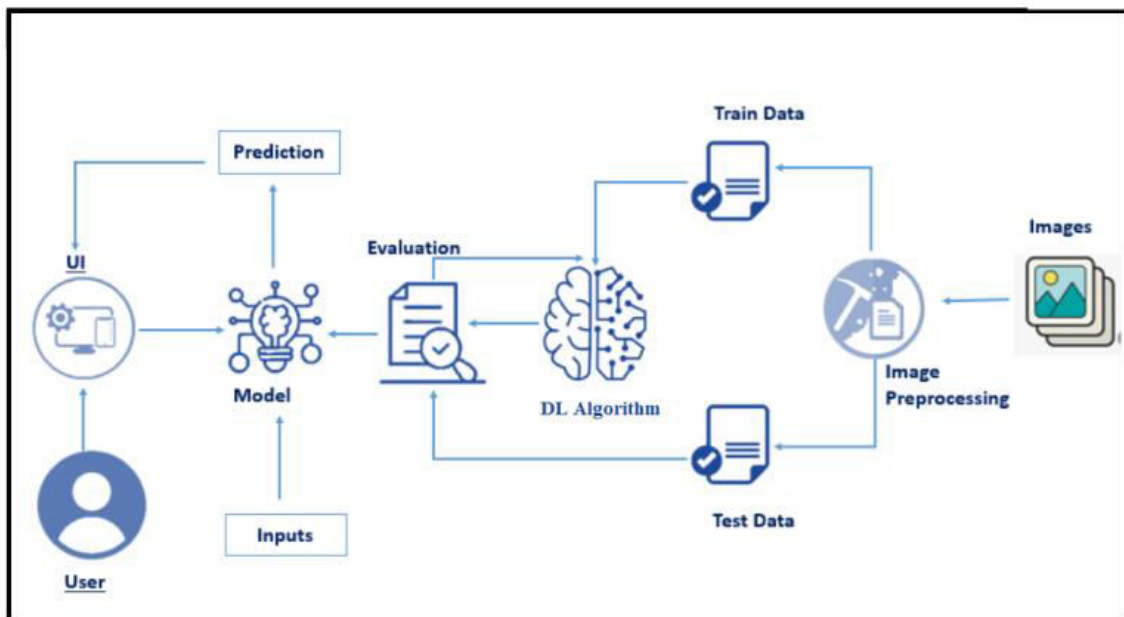


Figure3.1: Architecture of the Model.

#### IV. FLOW CHART

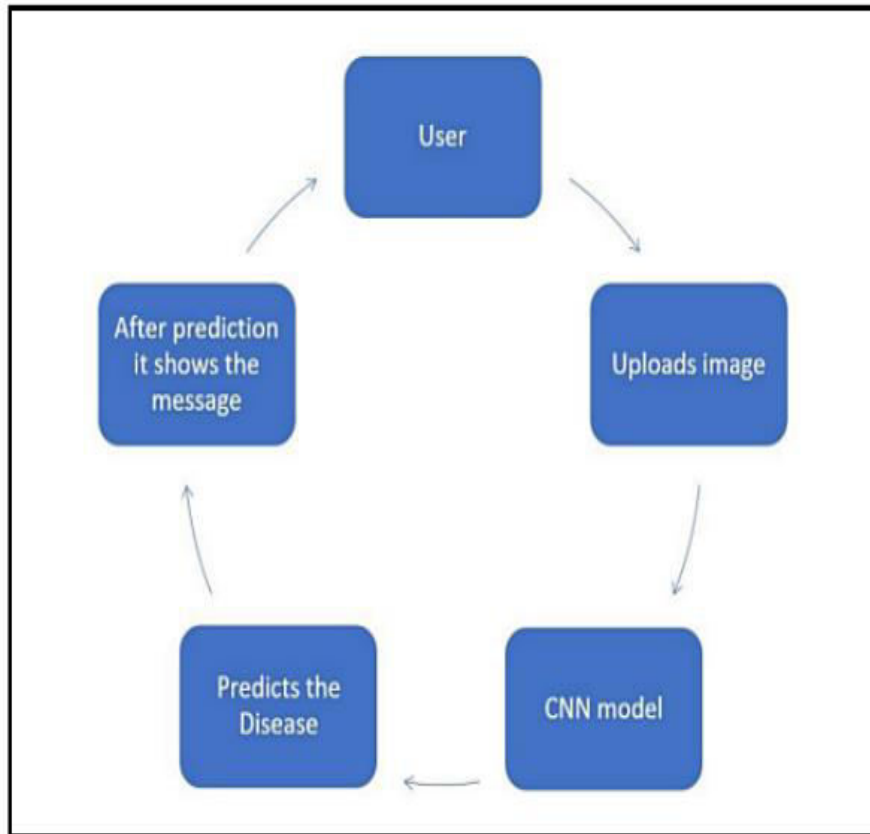


Figure4.1:Flow chart of the Model.

To accomplish the above task, you must complete the below activities and tasks:

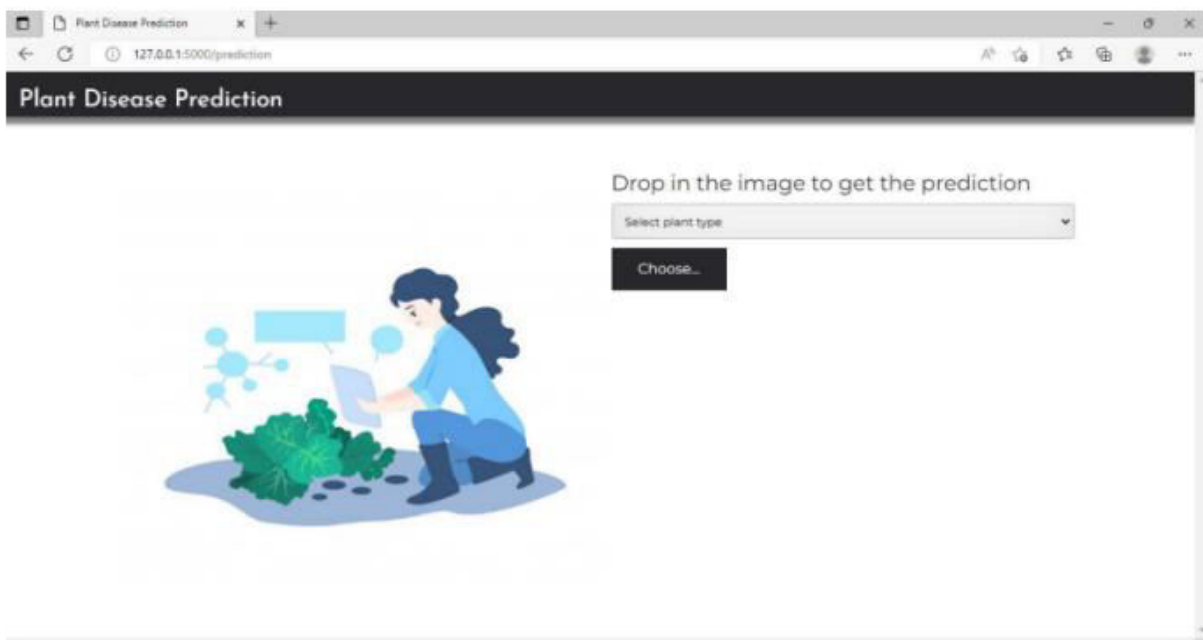
- Download the dataset.
- Classify the dataset into train and test sets.
- Add the neural network layers.
- Load the trained images and fit the model.
- Test the model.
- Save the model and its dependencies.
- Build a Web application using a flask that integrates with the model built

## V. RESULT

### ➤ Home Page:



### ➤ Prediction Page:



➤ **Result Page:**

**Plant Disease Prediction**



Drop in the image to get the prediction

Fruit

Choose...



Prediction: Oopps!! Your apple plant is infected by Black Rots. This infection is a fungal infection. To control baick rot, remove the cankers by pruning at least 15 inches below the end and burn or bury them. Treating the sites with the antibiotic streptomycin or a copper-based fungicide will be helpful.

**Plant Disease Prediction**



Drop in the image to get the prediction

Vegetable

Choose...



Prediction: Yaayy!! Your pepper plant is healthy. But, take the necessary precautions like, putting the plant where it gets at least 10 hours of direct sunlight. Keep soil evenly moist for good growth. Peppers need well draining soil that is rich and loamy, but avoid too much nitrogen in the soil. Too much nitrogen can cause plenty of leaves and little to no peppers. Your soil should have a pH between 6.0 and 6.5.

**VI. CONCLUSION**

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques. Usage of such



applications could help the farmers to necessary precautions so that they don't face any loss as such.

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