MINI PROJECT REPORT

On

PLANT DISEASE PREDICTION

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Under the Supervision

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PLACE: BASAR

DATE: 05, July 2025.

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DECLARATION

I declare that, this written submission represents my ideas in my own words and where other's ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honestly and integrity and have not misrepresented or fabricated or falsified any idea / data /fact/source in our submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper has not been taken when needed.

Signature:

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ABSTRACT

Agriculture plays a vital role in the global economy, and crop health is essential for high yields and food security. However, plant diseases can severely impact crop productivity, leading to significant economic losses. Early detection and diagnosis of plant diseases are crucial for effective management. This project aims to design a web-based platform that leverages machine learning to predict plant diseases based on leaf images.

The website allows users, especially farmers and agricultural professionals, to upload images of plant leaves. These images are processed using a trained machine learning model—such as a convolutional neural network (CNN)—to identify symptoms and predict the specific disease affecting the plant. The platform provides real-time results, suggested treatments, and preventive measures.

The user-friendly interface is developed using modern web technologies like HTML, CSS, JavaScript, and frameworks such as Flask or Django for the backend. The model is integrated with the site to provide fast and accurate predictions. This digital tool aims to make disease diagnosis accessible and efficient, helping users take timely action to protect their crops.

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1. Introduction:

Agriculture is the backbone of many economies and a primary source of livelihood for millions of people around the world. Ensuring the health of crops is essential for maintaining food security and achieving high agricultural productivity. However, plant diseases caused by fungi, bacteria, or viruses can significantly damage crops, leading to economic losses and reduced yields.

Traditionally, identifying plant diseases has relied on manual observation by farmers or experts, which can be time-consuming, inaccurate, and not always accessible in remote areas. With the advancement of technology, especially in the fields of artificial intelligence (AI) and computer vision, it is now possible to automate plant disease detection with high accuracy.

This project focuses on designing a web-based platform that predicts plant diseases by analyzing images of affected leaves. Users can upload images through the website, and the system uses a machine learning model—typically a convolutional neural network (CNN)—to classify the disease. The website then provides the user with the disease name, its symptoms, and suggested treatments or preventive measures.

The aim is to provide a fast, accurate, and user-friendly solution that can be easily accessed by farmers, agricultural officers, and researchers. By integrating AI with web technologies, this project contributes to the development of smart agriculture tools that support early diagnosis and better disease management, ultimately improving crop health and productivity.

2. Objective:

The main objective of this project is to design and develop a web-based platform that can accurately predict plant diseases using image processing and machine learning techniques. The specific objectives include:

1. **To develop a user-friendly website** that allows users (especially farmers and agricultural workers) to upload images of plant leaves for disease diagnosis.
2. **To integrate a machine learning model**—preferably a convolutional neural network (CNN)—that can identify and classify various plant diseases from images.
3. **To provide instant results** with detailed information such as:
    - Name of the disease
    - Symptoms and causes
    - Suggested treatments and preventive measures
4. **To enhance accessibility** by making the tool available online so users from remote areas can access disease prediction services without expert assistance.
5. **To promote smart farming practices** by combining modern web technologies and AI to reduce crop loss and improve agricultural productivity.
6. **To create a scalable system** that can be expanded to support multiple plant species and diseases over time.

3. Problem Statement:

Manual identification of plant diseases is time-consuming and requires expert knowledge. There is a need for an automated system that can assist in early detection and provide recommendations for disease management.

4. Literature Survey:

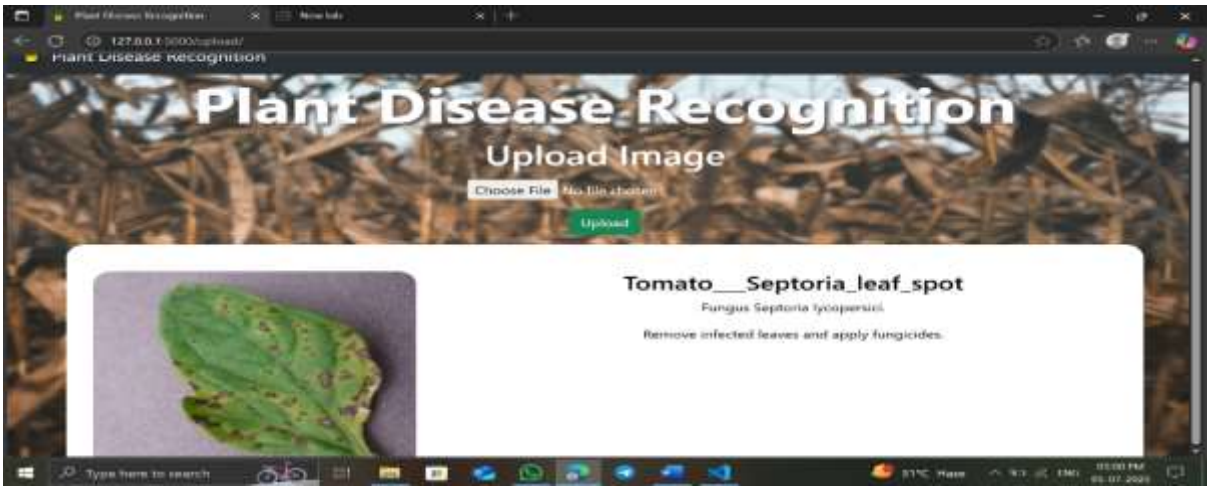
Many existing solutions are mobile-based or limited to specific crops.

Deep learning models such as CNNs (Convolutional Neural Networks) have shown high accuracy in image classification tasks.

Open datasets like Plant Village have enabled researchers to train and test models for plant disease detection.

5. Modules Description:

a. User Interface (Frontend):



View prediction results and suggestions

b. Backend Server:

Receives image from fronten

Preprocesses image

Loads ML model

Returns prediction

c. Machine Learning Model:

Trained on Plant Village dataset

CNN architecture (e.g., VGG16, ResNet)

d. Database (optional):

Store user queries and prediction history

6. Tools and Technologies:

Frontend: HTML, CSS, JavaScript.

Backend: Python, Flask

Machine Learning: TensorFlow / Keras.

Dataset: Plant Village

Hosting: Heroku / Render / GitHub Pages (for static frontend)

7. Dataset Details:

Name: Plant Village

Images: 50,000+ images of healthy and diseased leaves

Classes: Tomato, Potato, Apple, etc.

Preprocessing: Resizing, Normalization, Augmentation

8. Implementation:

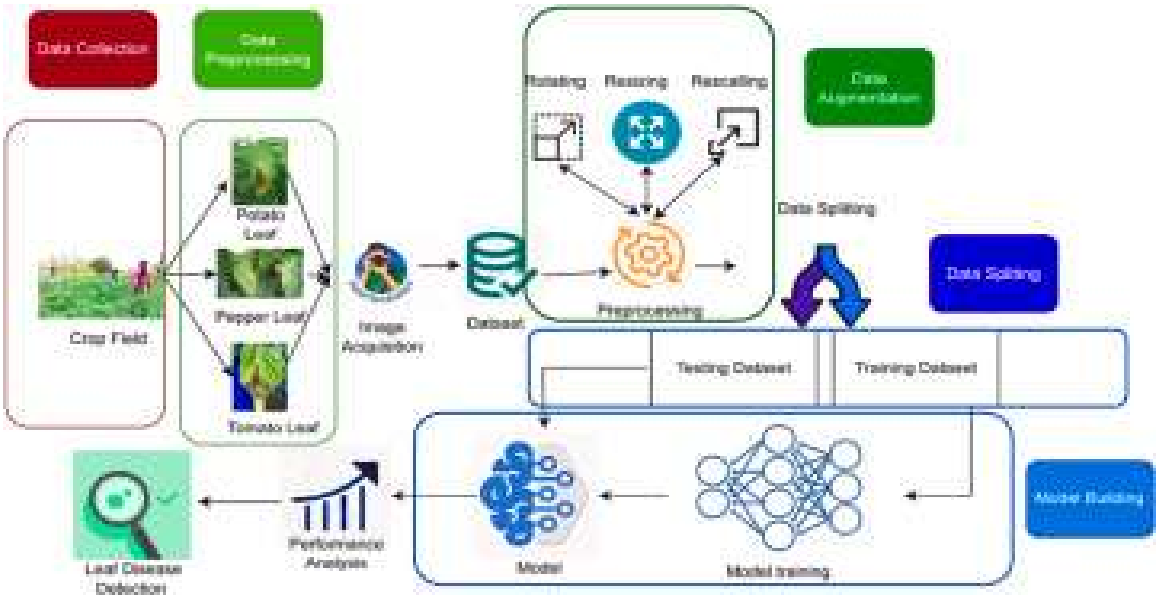
Data preprocessing and augmentation

Model training with Deep learning (efficientnetb4**)**

Export model as .keras

Create API endpoint to predict disease from uploaded image

Display result with disease name and treatment tips



9. Results:

Accuracy achieved: ~95%

Confusion matrix and classification report

10. Conclusion:

This project successfully demonstrates the use of machine learning for predicting plant diseases through a user-friendly website. It can help farmers make timely decisions to protect crops and reduce losses.

11. Future Enhancements:

Add support for more plant types

Implement multilingual support

Enable real-time camera input

Suggest nearby agricultural help centers

12. References:

1.Mohanty, S. P., Hughes, D. P., & Salathé, M. (2016).
"Using deep learning for image-based plant disease detection."
Frontiers in Plant Science, 7, 1419.
https://doi.org/10.3389/fpls.2016.01419

2.Ferentinos, K. P. (2018).
"Deep learning models for plant disease detection and diagnosis."
Computers and Electronics in Agriculture, 145, 311–318.
https://doi.org/10.1016/j.compag.2018.01.009

3.Hughes, D. P., & Salathé, M. (2015).
"An open access repository of images on plant health to enable the development of mobile disease diagnostics."
arXiv preprint arXiv:1511.08060.
https://arxiv.org/abs/1511.08060