PLANT DISEASE PREDICATION

Minor Project-I

(ENSI152)

Submitted in partial fulfilment of the requirement of the degree of

MASTER OF COMPUTER APPLICATIONS

to

K.R Mangalam University

By

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CERTIFICATE

This is to certify that the Project Synopsis entitled, “PLANT DISEASE PREDICATION” submitted by “Utkarsh Singh , Ankit” to K.R Mangalam University, Gurugram, India, is a record of Bonafide project work carried out by them under my supervision and guidance and is worthy of consideration for the partial fulfilment of the degree of Master Of Computer Applications of the University.

Type of Project (Tick One Option)

Industry/Research/University Problem

Signature of Internal supervisor:

Dr. Swati Gupta (Assistant Professor)

Signature of Project Coordinator

Date: 30th April 2025

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to all those who supported and guided us throughout the development of our project, “Plant Disease Predication” We are deeply thankful to Swati, our internal guide, for his valuable guidance, constant encouragement, and constructive feedback, which played a vital role in the successful completion of this project. We also extend our heartfelt thanks to Megha Sharma, our external mentor, for his expert advice, insights, and unwavering support at every stage of the project. We are grateful to the School of Engineering and Technology for providing us with the opportunity and resources to work on this project, as well as for fostering an environment that encourages innovation and learning. Lastly, we would like to acknowledge the teamwork, dedication, and contributions of each member of our group — Utkarsh, Ankit — without whom this project would not have been possible. We are truly thankful to everyone who directly or indirectly contributed to the success of Plant Disease Predication.

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INDEX

1. Introduction

Plants play a vital role in agriculture, food security, and the environment. Diseases in plants can drastically reduce crop yield and quality, leading to economic losses and food shortages. Early and accurate prediction of plant diseases can help farmers take timely actions to mitigate damage. This project aims to develop a machine learning model to predict plant diseases using image data

2. Objectives

- To collect and preprocess a dataset of plant leaf images.
- To train a machine learning model (CNN) to classify different plant diseases.
- To evaluate the accuracy and performance of the model.
- To create a simple interface for users to upload leaf images and receive disease predictions.

3. Literature Review

Various studies have demonstrated the effectiveness of using machine learning and deep learning, particularly Convolutional Neural Networks (CNNs), for image-based plant disease detection. Tools like TensorFlow and PyTorch provide frameworks to build such models. Public datasets like PlantVillage have proven valuable for model training and benchmarking.

4. Methodology

4.1 Dataset

• Source: PlantVillage dataset (Kaggle)

• Images: ~50,000 images of healthy and diseased plant leaves

• Classes: Multiple diseases across crops like tomato, potato, maize, apple, grape, etc.

4.2 Preprocessing

• Image resizing (e.g., 128x128)

• Normalization of pixel values

• Data augmentation (rotation, flipping, zoom) to increase robustness

4.3 Model

• Architecture: Convolutional Neural Network (CNN)

• Layers:

- Convolutional layers
- Max-pooling layers
- Flatten
- Dense layers

• Activation Functions: ReLU, Softmax

• Loss Function: Categorical Crossentropy

• Optimizer: Adam

4.4 Training

• Epochs: 20–50

• Batch Size: 32

• Validation Split: 20%

5. Results and Evaluation

- Accuracy: ~95% on test data
- Confusion Matrix: Demonstrates strong performance across most classes
- Loss Curve: Shows good convergence
- Limitations: Misclassification among similar disease types

6. Tools and Technologies

- Python
- TensorFlow / Keras
- OpenCV
- Jupyter Notebook / Google Colab

7. Future Work

- Deploy the model as a mobile app
- Integrate real-time camera capture for predictions
- Expand dataset to include more crops and regional diseases

8. Conclusion

The project demonstrates that machine learning, specifically CNNs, can be effectively used to predict plant diseases from leaf images. With further enhancements, such a system could assist farmers and agricultural professionals in disease management.

9. References

• Mohanty, S.P., Hughes, D.P., & Salathé, M. (2016). Using Deep Learning for ImageBased Plant Disease Detection.

• https://www.kaggle.com/emmarex/plantdiseas