Plant Disease Detection using Image Processing and AI

Project-I

Bachelor of Technology (Computer Science and Engineering)

SUBMITTED BY:

Lara Kharyal - Roll No. _____

Khushbu Chauhan - Roll No. _____

Kshijit - Roll No. _____

Aditya Kaushal - Roll No. _____

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Under the Guidance of

[Mentor's Name]

[Designation]

Department of Computer Science & Engineering

Chandigarh Engineering College

Jhanjeri, Mohali - 140307

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Chapter 1 Introduction

This project aims to build a mobile application that enables farmers and agricultural experts to detect plant diseases using image processing and artificial intelligence. The main idea is to take a picture of a plant leaf using a smartphone camera and get real-time analysis of the disease affecting the plant, if any.

The core motivation behind this project lies in solving one of the most common challenges in agriculture: the timely identification of plant diseases. In rural and remote areas, access to agricultural experts is often limited, and early-stage diseases go unnoticed, leading to crop damage and economic loss. This mobile solution brings expert-level diagnostics to the farmer's hand.

Our objectives are clear:

- Design a user-friendly mobile app for plant disease detection.
- Train a lightweight deep learning model to classify leaf diseases accurately.
- Enable offline functionality for rural usage.
- Provide treatment suggestions and preventive measures for each identified disease.

We are using Python, TensorFlow, and OpenCV to develop the AI model. For the front end, we're exploring Flutter for a cross-platform experience. CNN architectures like MobileNet and ResNet will be optimized for mobile devices using TensorFlow Lite.

This document outlines all technical aspects from system analysis to implementation, including architecture design, module definitions, and code structure.