

**Chandigarh Engineering College Jhanjeri Mohali-140307**

**Department of Computer Science & Engineering**

Sample sheet (outer cover)

### Mid Term Report

### on

### PLANT DISEASE DETECTION

**Image Processing Techniques**

### Project-I

**BACHELOR OF TECHNOLOGY**

(Computer Science and Engineering)



## SUBMITTED BY:

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**Under the Guidance of** Name of Mentor

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The following is suggested format for arranging the project report matter into various chapters:

**INDEX**

**Chapter 1 Introduction**

This chapter must describe introduction about your project. Objective(s) of the project and Tools Learnt

**Chapter 2 System Requirements**

Software and Hardware requirements

**Chapter 3 Software Requirement Analysis**

Define the problem Define the modules and their functionalities

**Chapter 4 Software Design**

1. The design part must include the following items
2. DFDs in case of Database projects
3. Database Design For database projects,
4. The report must include the following items. E-R Diagrams

**Chapter 5 Implementation**

Consist of coding or code outline for various files For Database projects, the report consisting of Tables – explaining all fields and their datatypes, Stored procedures (PL/SQL)

**Chapter 6 Results and Discussions (NA FOR MID TERM)**

Output Screens Should include all user interfaces and output screens

**Chapter 7 Conclusion & Future Scope (NA FOR MID TERM) REFERENCES**

**Introduction**

Plant disease detection is a critical aspect of modern agriculture that directly impacts **crop yield, food quality, and food security**. Diseases in crops can be caused by a variety of factors including **fungi, bacteria, viruses**, and environmental stressors. If not detected and managed in time, these diseases can lead to substantial agricultural losses, threatening both economic stability and food availability. Traditional methods of identifying plant diseases largely rely on manual inspection and expert intervention, which can be **time-consuming, subjective**, and often **inaccessible** to small-scale or remote farmers.

With recent advances in **Artificial Intelligence (AI)**, **Machine Learning (ML)**, and **Computer Vision**, new possibilities have emerged for developing intelligent systems capable of detecting plant diseases automatically and accurately. These technologies have made it possible to analyze visual symptoms from leaf images and identify diseases with high precision. Moreover, the integration of **Internet of Things (IoT)** devices and **Remote Sensing** enables real-time monitoring of environmental conditions that contribute to disease outbreaks, allowing for proactive intervention.

This project aims to leverage these technologies to design and implement a smart, real-time **plant disease detection system**. By combining deep learning models with IoT-based monitoring and a mobile application interface, the system empowers farmers with timely, accurate, and actionable insights. The ultimate goal is to reduce dependence on traditional practices, promote **precision agriculture**, and support **sustainable farming** by enabling early detection, targeted treatment, and efficient resource usage.

## System Reqirements

## To effectively implement the Plant Disease Detection system, a combination of software, hardware, and additional resources is required to support both development and deployment. On the software side, **Python** serves as the primary programming language for building and training deep learning models. **TensorFlow** and **Keras** are used for designing and optimizing Convolutional Neural Networks (CNNs), while **OpenCV** handles image preprocessing and enhancement tasks. For mobile application development, cross-platform frameworks such as **Flutter** or **React Native** are employed to ensure compatibility across Android and iOS devices.

## HARDWARE REQUIREMENTS

## The Plant Disease Detection system relies on specific hardware components to ensure **m** is essential for training deep learning models such as Convolutional Neural Networks (CNNs), which require significant computational power to process and learn from large image datasets. This hardware setup accelerates training time and improves model performance. For field testing and deployment, **smartphones** are required to run the mobile application, which enables users—particularly farmers—to capture leaf images, receive real-time diagnoses, and interact with the system. These devices must support camera functionality, moderate processing power, and sufficient storage to handle image data and offline predictions. Additionally, **cloud storage support** is necessary for storing large volumes of plant images, sensor data, and model outputs, ensuring seamless access and synchronization between devices. The system may also incorporate **IoT hardware components**, such as environmental sensors for temperature, humidity, and soil moisture, which provide real-time data to enhance disease prediction and monitoring. Together, these hardware elements form the foundation for delivering a robust, scalable, and user-friendly agricultural solution.

**1.2 SOFTWARE REQUIREMENT**

The successful development and deployment of the Plant Disease Detection system depends on a robust and flexible set of software tools. At the core of the system is the **Python programming language**, which is widely used for implementing machine learning models due to its simplicity and extensive library support. For building and training deep learning models, the project utilizes **TensorFlow** and **Keras**, which provide high-level APIs for designing Convolutional Neural Networks (CNNs) and support efficient model training and optimization. Image processing tasks such as resizing, filtering, and enhancement are handled using **OpenCV**, an open-source computer vision library that enables real-time image analysis. The mobile application component of the project is developed using **Flutter** or **React Native**, both of which are cross-platform frameworks that allow for the creation of responsive and user-friendly apps for Android and iOS devices. These frameworks also support integration with backend services and real-time features, which are essential for on-field usability. Overall, this software stack ensures that the system is scalable, efficient, and accessible to end-users, particularly farmers who need quick and reliable disease diagnostics in diverse agricultural environments.

# REFERENCES

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