Project Initialization and Planning Phase

Date	9 June 2024
Team ID	SWTID1720033149
Project Title	Visual Diagnostics: Detecting Tomato Plant Diseases With Leaf Image Analysis
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template

Identifying and diagnosing tomato plant diseases poses significant challenges to farmers, affecting their ability to maintain healthy crops and their overall satisfaction with available tools. To address the challenges tomato farmers face in diagnosing plant diseases, we propose developing an intuitive diagnostic tool that uses a smartphone or dedicated device to analyze leaf images. This tool leverages advanced deep learning to quickly and accurately identify diseases, providing instant results and actionable treatment recommendations. Designed for ease of use, it ensures accessibility for all farmers, reducing reliance on subjective visual inspections and costly lab tests. This solution aims to improve crop health, increase yields, and enhance farmers' trust and satisfaction by offering a reliable, cost-effective, and efficient method for disease management.

Project Overview	
Objective	The objective is to develop an automated system that uses image analysis to accurately identify tomato plant diseases from leaf images, enabling early detection and precise treatment to improve crop health and yield.
Scope	The project involves collecting diverse tomato leaf images, developing and validating a CNN model for disease detection, creating a user-friendly interface for diagnosis, and deploying the system for agricultural use. It targets key tomato-growing regions and includes plans for maintenance and updates. Limitations include image quality and environmental condition variability.
Problem Statement	
Description	Tomato farmers need help accurately diagnosing plant diseases due to the limitations of visual inspections and traditional methods.
Impact	Early and accurate diagnosis will prevent disease spread, increase yields, and reduce costs.

Proposed Solution	
Approach	Develop a deep learning-based tool that utilises convolutional neural networks (CNNs) for analysing standardised tomato leaf images, integrating real-time disease detection and user-friendly functionality for agricultural use.
Key Features	**Advanced Deep Learning:** Employs CNNs for precise disease detection. **Instant Diagnosis:** Provides immediate analysis and recommendations. **Intuitive Interface:** Designed for easy use by farmers. **Up-to-date Database:** Regularly updated for accuracy.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	1 x NVIDIA P100 GPU
Memory	RAM specifications	16 GB RAM
Storage	Disk space for data, models, and logs	100 GB
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	TensorFlow, Keras, NumPy, Pandas, Matplotlib,PIL
Development Environment	IDE, version control	Jupyter Notebook, Kaggle
Data		
Data	Source, size, format	Kaggle dataset (Tomato Leaf Disease Dataset), 10,000, JPEG images organized in directories by class images