**Project Initialization and Planning Phase**

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| Date | 10 November 2024 |
| Team ID | team-739757 |
| Project Title | Tomato Plant Disease Detection From Leaf Images Using Deep Learning |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution) template**

This project proposal outlines a solution to the problem of identifying diseases in tomato plants using images of leaves and deep learning technology. By leveraging AI-based image recognition, this solution aims to help farmers detect diseases early, reduce crop loss, and improve farm productivity.

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| **Project Overview** | |
| Objective | To develop a deep learning model that can accurately detect and classify diseases in tomato plants from leaf images, allowing for early diagnosis and intervention. |
| Scope | The project will focus on building and deploying a mobile-compatible application for tomato farmers. It will support image uploads, disease prediction. This tool will be trained on a dataset of tomato leaf images with labeled diseases. |
| **Problem Statement** | |
| Description | Tomato plants are vulnerable to various diseases that often go undetected until they cause significant damage. Early detection is challenging due to the subtle nature of early symptoms, and traditional methods are labor- intensive and require expert knowledge. This project addresses the need for an accessible, automated solution for disease detection. |
| Impact | By automating disease detection, this solution will enable tomato farmers to identify issues early, reduce crop loss, and save on costs associated with manual inspection or incorrect treatments. |
| **Proposed Solution** | |
| Approach | **Approach:** The solution involves developing a ResNet152V2, a deep convolutional neural network, is used in this project for its high accuracy and ability to capture complex image features.making it ideal for distinguishing tomato plant diseases from leaf images. The model will be integrated into a user-friendly mobile application that allows farmers to upload images and receive real-time disease diagnoses. |
| Key Features | Image upload and preprocessing for optimal prediction accuracy  Real-time disease classification with confidence scores  Disease management suggestions based on predicted disease type  Mobile compatibility for ease of access in the field |

**Resource Requirements**

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| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** | | |
| Computing Resources | CPU/GPU specifications, number of cores | NVIDIA GPU, 16 GB VRAM |
| Memory | RAM specifications | 8 GB |
| Storage | Disk space for data, models, and logs | 1 TB SSD |
| **Software** | | |
| Frameworks | Python frameworks | Flask |
| Libraries | Additional libraries | TensorFlow, PyTorch or Keras , scikit-learn, Matplotlib |
| Development Environment | IDE, version control | Jupyter Notebook, Git, Google Colab |
| **Data** | | |
| Data | Source, size, format | Kaggle dataset, 11,000 images |