**Data Collection and Preprocessing Phase**

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| Date | 11 November 2024 |
| Team ID | team-739757 |
| Project Title | Tomato Plant Disease Detection From Leaf Images Using Deep Learning |
| Maximum Marks | 6 Marks |

**Preprocessing Template**

The images will be preprocessed by resizing, normalizing, augmenting, denoising, adjusting contrast, detecting edges, converting color space, cropping, batch normalizing, and whitening data. These steps will enhance data quality, promote model generalization, and improve convergence during neural network training, ensuring robust and efficient performance across various computer vision tasks.

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| **Section** | **Description** |
| Data Overview | The dataset consists of images of tomato plant leaves affected by various diseases, such as bacterial spots, late blight, and healthy leaves. These images vary in resolution, lighting conditions, and orientations.  The data is collected from publicly available Kaggle datasets (e.g., Tomato leaf disease detection) |
| Resizing | All images will be resized to a uniform target size of 224×224224 \times 224224×224 pixels to maintain consistency and compatibility with the Resnet architecture. |
| Normalization | Pixel values will be normalized to a range of 0 to 1 or scaled using mean subtraction and standard deviation to improve training convergence and stability. |
| Data Augmentation | Apply augmentation techniques such as flipping, rotation, shifting, zooming, or shearing. |
| Denoising | Apply denoising filters like Gaussian or median filters will be applied to reduce noise in images, improving the clarity of disease-related patterns. |
| Edge Detection | Apply edge detection algorithms to highlight prominent edges in the images. |
| Color Space Conversion | Convert images from one color space to another. |
| Image Cropping | Crop images to focus on the regions containing objects of interest. |
| Batch Normalization | Batch normalization will be applied during training to normalize the activations within layers, improving convergence and generalization of the model. |
| **Data Preprocessing Code Screenshots** | |
| Loading Data |  |
| Resizing |  |
| Normalization |  |
| Data Augmentation |  |
| Denoising |  |
| Edge Detection |  |
| Color Space Conversion |  |
| Image Cropping |  |
| Batch Normalization |  |