Model Optimization and Tuning Phase Template

Date	2 July 2024
Team ID	**SWTID1720176710**
Project Title	Visual Diagnostics: Detecting Tomato Plant Diseases Through Leaf Image Analysis
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters
ResNet152V2	Learning Rate, Activation funtions

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
ResNet152V2	The ResNet152V2 architecture was chosen as the final optimized model for its depth, performance, and advanced capabilities. Its 152-layer network captures complex patterns, while residual learning mitigates vanishing gradient issues, ensuring higher accuracy. Pre-trained weights from ImageNet facilitate transfer learning, reducing training time and improving accuracy. The model's flexibility allows for fine-tuning, optimizing it for our specific dataset. ResNet152V2 has a proven track record in image classification, offering robustness and reliability. Its computational efficiency makes it scalable and suitable for deployment using Flask. These factors ensure accurate, timely disease detection, enabling targeted treatments and effective crop management for healthier crops and improved yields.