**Model Optimization and Tuning Phase Template**

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| Date | 20 November 2025 |
| Team ID | 740018 |
| Project Title | Deepfruitveg:Automated Fruit And Vegetables Identification |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

The Model Optimization and Tuning Phase of Deepfruitveg involves fine-tuning hyperparameters, adjusting learning rates, enhancing model architectures, and applying regularization techniques to improve accuracy and performance for fruit/vegetable identification.

### Hyperparameter Tuning Documentation (8 Marks):

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| **Model** | **Tuned Hyperparameters** |
| |  | | --- | | **Convolutional Neural Network (CNN)** | | - Learning Rate: 0.001 - Batch Size: 32 - Epochs: 50 - Dropout Rate: 0.3 - Optimizer: Adam - Activation Function: ReLU |
| **Transfer Learning (VGG16, AlexNet)** | - Learning Rate: 0.0001 - Epochs: 50 - Fine-tuning layers: Last 4 layers - Batch Size: 32 - Optimizer: Adam |
| **MobileNet** | - Learning Rate: 0.0005 - Batch Size: 32 - Epochs: 100 - Optimizer: Adam - Dropout Rate: 0.2 - Learning Rate Decay: 0.96 |

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### Final Model Selection Justification (2 Marks):

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| **Final Model** | **Reasoning** |
| **ResNet (Residual Network)** | ResNet offers the best balance of accuracy, efficiency, and scalability for automated fruit and vegetable identification, making it the optimal model. |