Model Optimization and Tuning Phase Template

Date	17 July 2025
Team ID	739816
Project Title	Galactic Gazetteer:A comprehensive dataset of planet images.
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
Model 1	• Conv2D filters: 32, 64, 128 • Dropout: 0.5 • L2 Regularization: 0.01 • Learning Rate: Adam optimizer (default = 0.001) • Batch Size: 32 • Epochs: 20 • Data Augmentation: - rotation_range=20 - width_shift_range=0.2 - height_shift_range=0.2 - zoom_range=0.2 - horizontal_flip=True

Final Model Selection Justification (2 Marks):

Final Model	Model 1 was chosen as the final model due to its balanced architecture, use of regularization (L2 + Dropout), effective data augmentation, and consistent performance on both training and validation sets. The model generalizes well and avoids overfitting, as shown in the accuracy and loss plots.
Model 1 (or other)	• Conv2D filters: 32, 64, 128 • Dropout: 0.5 • L2 Regularization: 0.01 • Learning Rate: Adam optimizer (default = 0.001) • Batch Size: 32 • Epochs: 20 • Data Augmentation: - rotation_range=20 - width_shift_range=0.2 - height_shift_range=0.2 - zoom_range=0.2 - horizontal_flip=True