

Model Development Phase Template

Date	17 July 2025
Team ID	739816
Project Title	Galactic Gazetteer: A comprehensive Dataset of planet images.
Maximum Marks	10 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

Initial Model Training Code (5 marks):

```
# Train the model
history = model.fit(datagen.flow(x_train, y_train, batch_size=32),
                    validation_data=(x_test, y_test), epochs=20)
```

Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics
Model 1	<p>The model.fit() function then trains the model using augmented image batches generated by ImageDataGenerator, which introduces random transformations like rotation and flipping to help the model generalize better. The training runs for 20 epochs, and validation data is provided to monitor performance on unseen images. This entire process helps the model learn effectively from limited data while reducing the risk of overfitting.</p> <p>Model.fit(...) starts training using mini-batches from the augmented dataset. Validation_data=(X_test, y_test) monitors generalization to unseen data.</p>	<pre> C:\Users\nagim\anaconda3\lib\site-packages\keras\src\trainers\data_adapters\py_dataset_adapter.py:121: UserWarning: Your 'PyDataset' class should call 'super().__init__()' in its constructor. 'kwargs' can include 'workers', 'use_multiprocessing', 'max_queue_size'. Do not pass these arguments to 'fit()', as they will be ignored. self._warn_if_super_not_called() Epoch 1/20 41/41 ----- 53s 1s/step - accuracy: 0.2857 - loss: 4.3670 - val_accuracy: 0.5335 - val_loss: 1.9378 Epoch 2/20 41/41 ----- 49s 1s/step - accuracy: 0.5068 - loss: 1.9874 - val_accuracy: 0.7265 - val_loss: 1.3148 Epoch 3/20 41/41 ----- 47s 1s/step - accuracy: 0.6231 - loss: 1.4050 - val_accuracy: 0.7348 - val_loss: 1.1664 Epoch 4/20 41/41 ----- 42s 1s/step - accuracy: 0.6417 - loss: 1.1886 - val_accuracy: 0.7957 - val_loss: 1.0468 Epoch 5/20 41/41 ----- 47s 1s/step - accuracy: 0.6980 - loss: 1.2404 - val_accuracy: 0.8659 - val_loss: 1.0063 Epoch 6/20 41/41 ----- 38s 911ms/step - accuracy: 0.7891 - loss: 1.1576 - val_accuracy: 0.6799 - val_loss: 1.1142 Epoch 7/20 41/41 ----- 38s 938ms/step - accuracy: 0.7872 - loss: 1.1284 - val_accuracy: 0.8889 - val_loss: 0.9389 Epoch 8/20 41/41 ----- 43s 1s/step - accuracy: 0.6879 - loss: 1.1577 - val_accuracy: 0.7713 - val_loss: 0.8552 Epoch 9/20 41/41 ----- 39s 944ms/step - accuracy: 0.7658 - loss: 0.9916 - val_accuracy: 0.8818 - val_loss: 0.8528 Epoch 10/20 41/41 ----- 33s 791ms/step - accuracy: 0.7785 - loss: 0.9171 - val_accuracy: 0.7652 - val_loss: 0.8190 Epoch 11/20 41/41 ----- 41s 987ms/step - accuracy: 0.7816 - loss: 0.9887 - val_accuracy: 0.9177 - val_loss: 0.6820 Epoch 12/20 41/41 ----- 39s 939ms/step - accuracy: 0.8823 - loss: 0.8534 - val_accuracy: 0.9146 - val_loss: 0.6919 Epoch 13/20 41/41 ----- 34s 824ms/step - accuracy: 0.8193 - loss: 0.8212 - val_accuracy: 0.7896 - val_loss: 0.8549 Epoch 14/20 41/41 ----- 40s 981ms/step - accuracy: 0.7489 - loss: 1.0126 - val_accuracy: 0.7927 - val_loss: 0.8467 Epoch 15/20 41/41 ----- 40s 968ms/step - accuracy: 0.7731 - loss: 0.9254 - val_accuracy: 0.9116 - val_loss: 0.6912 Epoch 16/20 41/41 ----- 33s 883ms/step - accuracy: 0.8353 - loss: 0.7862 - val_accuracy: 0.9421 - val_loss: 0.6841 Epoch 17/20 41/41 ----- 31s 751ms/step - accuracy: 0.8884 - loss: 0.8236 - val_accuracy: 0.8872 - val_loss: 0.6182 Epoch 18/20 41/41 ----- 35s 859ms/step - accuracy: 0.8185 - loss: 0.7868 - val_accuracy: 0.8659 - val_loss: 0.6489 Epoch 19/20 41/41 ----- 33s 799ms/step - accuracy: 0.7928 - loss: 0.8479 - val_accuracy: 0.8598 - val_loss: 0.7593 Epoch 20/20 41/41 ----- 31s 748ms/step - accuracy: 0.8246 - loss: 0.7647 - val_accuracy: 0.9116 - val_loss: 0.5518 </pre>