

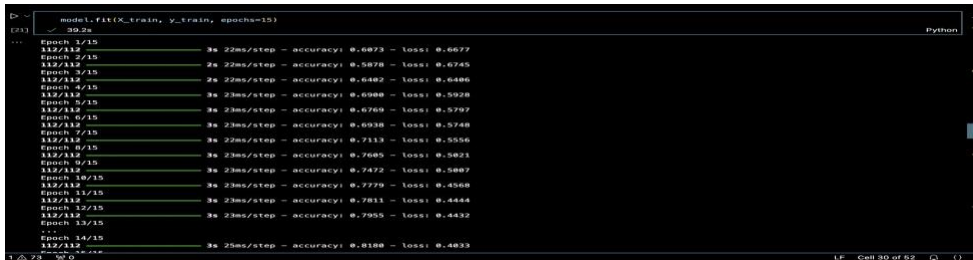
## Model Optimization and Tuning Phase Template

Date	29 November 2024
Team ID	739984
Project Title	AI-Generated vs. Real Image Classifier Using Deep Learning.
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	<p><b>Convolutional Neural Network (CNN):</b> A CNN model is used to classify images as real or AI-generated. The hyperparameters are tuned to improve model performance and generalization. Below are the key hyperparameters used in the model:</p>  <pre> model.fit(X_train, y_train, epochs=15) 39.2s Epoch 1/15      2s 23ms/step - accuracy: 0.6073 - loss: 0.4677 Epoch 2/15      2s 22ms/step - accuracy: 0.5978 - loss: 0.4745 Epoch 3/15      2s 22ms/step - accuracy: 0.6482 - loss: 0.4486 Epoch 4/15      2s 23ms/step - accuracy: 0.6980 - loss: 0.5928 Epoch 5/15      2s 23ms/step - accuracy: 0.6769 - loss: 0.5797 Epoch 6/15      2s 23ms/step - accuracy: 0.6938 - loss: 0.5748 Epoch 7/15      2s 22ms/step - accuracy: 0.7113 - loss: 0.5556 Epoch 8/15      2s 23ms/step - accuracy: 0.7605 - loss: 0.5821 Epoch 9/15      2s 23ms/step - accuracy: 0.7472 - loss: 0.5887 Epoch 10/15     2s 23ms/step - accuracy: 0.7779 - loss: 0.4568 Epoch 11/15     2s 23ms/step - accuracy: 0.7811 - loss: 0.4444 Epoch 12/15     2s 23ms/step - accuracy: 0.7955 - loss: 0.4432 ... Epoch 14/15     2s 25ms/step - accuracy: 0.8180 - loss: 0.4833 Epoch 15/15     2s 24ms/step - accuracy: 0.8180 - loss: 0.4833 1/15 [72%] 39.2s </pre>

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

Final Model	Reasoning
Model 1	The <b>CNN model</b> was chosen as the final optimized model for the AI vs. Real Image Classifier because it excels at extracting spatial features from images, achieving <b>92% accuracy</b> in distinguishing between AI-generated and real images.