

Model Optimization and Tuning Phase Template

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Team ID	SWTID1720085445
Project Name	Hydration Essentials: Classifying Water Bottle 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
Sequential	<pre>def create_cnn_model(input_shape, num_classes): model = Sequential([Conv2D(32, (3, 3), activation='relu', input_shape=input_shape), MaxPooling2D((2, 2)), Conv2D(64, (3, 3), activation='relu'), MaxPooling2D((2, 2)), Conv2D(128, (3, 3), activation='relu'), MaxPooling2D((2, 2)), Flatten(), Dense(128, activation='relu'), Dense(num_classes, activation='softmax')]) return model</pre>

Random Search	<pre> tuner = RandomSearch(build_model, objective='val_accuracy', max_trials=5, # Number of hyperparameter combinations to try executions_per_trial=1, directory='my_tuning_dir', # Directory to save logs and checkpoints project_name='cnn_tuning' # Name for the tuning project) # Perform hyperparameter search tuner.search(X_train, y_train, epochs=10, validation_data=(X_test, y_test)) </pre>
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Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Sequential	represents a linear stack of layers. It is a straightforward way to create neural networks where each layer has exactly one input tensor and one output tensor.