Model Optimization and Tuning Phase Template

Date	15 April 2024
Team ID	Team-738205
Project Title	Dog Breed Identification Using Transfer 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
VGG19	``` # ***************** vgg=VGG19(input_shape=Image_size, weights='imagenet', include_top=False) ``` input_shape: This parameter defines the shape of the input images that the VGG19 model will expect. It typically takes the form (height, width, channels). For example, if your images are 224x224 pixels with 3 color channels (RGB), you would specify input_shape= (224, 224, 3). weights='imagenet': This parameter specifies that you want to initialize the model with weights pre-trained on the ImageNet dataset. ImageNet is a large-scale dataset with millions of labeled images across thousands of classes. Pre-trained weights can provide a good starting point for training on your own dataset, especially when you have limited training data. include_top=False: This parameter determines whether to include the fully connected layers at the top of the network. By setting it to False, you're excluding these layers, which means you'll only get the convolutional base of the VGG19 model. This is useful when you're using the model for tasks like feature extraction or transfer learning, where you'll add your own custom layers on top of the pre-trained convolutional base. Include_top=False: This parameter determines whether to include the fully connected layers at the top of the network. By setting it to False, you're excluding these layers, which means you'll only get the convolutional base of the VGG19 model. This is useful when you're using the model for tasks like feature extraction or transfer learning, where you'll add your own custom layers on top of the pre-trained convolutional base.

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
VGG19	Hyperparameter tuning for VGG19, a deep convolutional neural network, is crucial for optimizing its performance in image classification tasks. Parameters like learning rate, batch size, and regularization are adjusted to enhance the model's ability to extract features effectively. VGG19's depth, with 19 layers, allows it to capture intricate spatial features in images through multiple convolutional and pooling layers. Its proven success in various image classification challenges justifies its selection as the final model. By fine-tuning hyperparameters, VGG19 can achieve higher accuracy and generalization on diverse datasets. Its robust architecture and extensive hyperparameter optimization make it a reliable choice for complex image recognition tasks, showcasing its capability to excel in demanding visual recognition applications.