

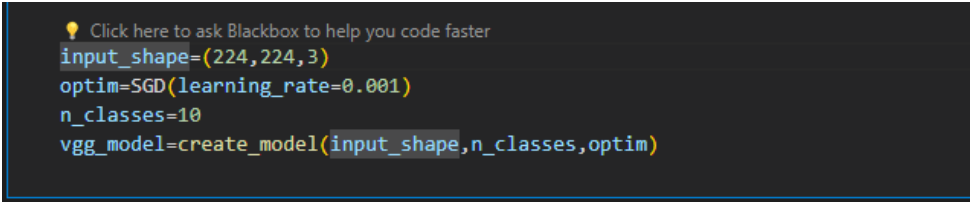
Model Optimization and Tuning Phase Template

Date	15 April 2024
Team ID	Team-738165
Project Title	Neural Network Ahoy: Cutting-Edge Ship Classification for Maritime Mastery
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
VGG16	 <pre> input_shape=(224,224,3) optim=SGD(learning_rate=0.001) n_classes=10 vgg_model=create_model(input_shape,n_classes,optim) </pre> <p>input_size: Input size of image</p> <p>optim: optimizer function with SGD and learning rate of model</p> <p>n_classes: number of classes to be classified</p> <p>vgg_model: variable to save model</p>

```
Click here to ask Blackbox to help you code faster
from keras.callbacks import ModelCheckpoint
cp=ModelCheckpoint('best1.hdf5',monitor='val_loss',verbose=1,save_best_only=True)
```

```
Click here to ask Blackbox to help you code faster
epoch=18
history=vgg_model.fit_generator(generator=train_set,
                                steps_per_epoch=train_set.n//train_set.batch_size,
                                validation_steps=validation_set.n//validation_set.batch_size,
                                validation_data=validation_set,
                                callbacks=[cp],
                                epochs=epoch)
```

cp: parameters to be used in callback function with name to save the model, the metric to monitor, verbose and which model to save.

epoch: the number of epoch to run

generator: the dataset to use.

steps_per_epoch: number of batches of data to be used per epoch in training.

validation_steps: number of batches of data to be used for validation per epoch in training.

Callback: to save best model

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
VGG16	VGG16 is selected due to its efficiency in image classification; this is possible because of its simplicity and high performance. It has achieved impressive results in competitions such as ImageNet Large Scale Visual Recognition Challenge with a total of 16 weight layers consisting of 13 convolution layers and 3 fully connected ones. This model, though the lightest among architectures, learns complex features so well that it becomes an ideal option for creating models that can be trusted to work even under difficult conditions.