



## **Model Development Phase Template**

Date	22 March 2024
Team ID	738171
Project Title	Neural Networks Ahoy: Cutting-Edge Ship Classification for Maritime Mastery
Maximum Marks	10 Marks

## **Initial Model Training Code (5 marks):**

```
[ ] from tensorflow.keras.preprocessing.image import ImageDataGenerator

[ ] train_datagen = ImageDataGenerator(rescale=1./255,zoom_range=0.2,shear_range=0.2)
    test_datagen = ImageDataGenerator(rescale=1./255)

[ ] train = train_datagen.flow_from_directory("/content/D:/SmartBridge/Ship Classification/input/train",target_size=(224,224),batch_size=5000)
#test = test_datagen.flow_from_directory(Testpath,target_size=(224,224),batch_size=5000)#
Found 6252 images belonging to 5 classes.
```

## Model Validation and Evaluation Report (5 marks):

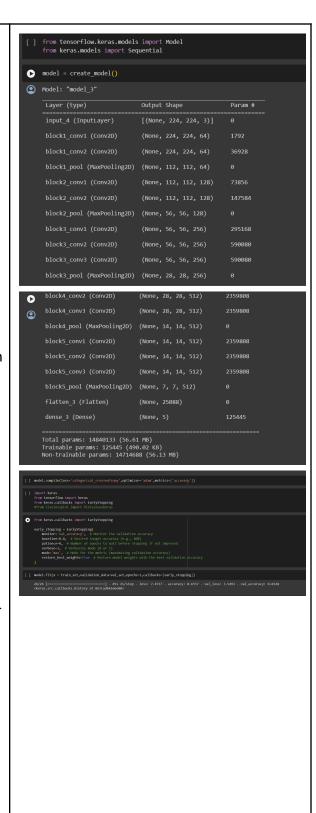
Model	Summary	Training and Validation Performance Metrics
VGG16	The VGG16 model is a convolutional neural network (CNN) architecture proposed by the Visual Geometry Group (VGG) at the University of Oxford. It gained significant popularity due to its simplicity and effectiveness in image classification tasks let's adapt the analogy for ship classification in maritime mastery:1)Input Layer: Imagine this as the ship's deck where we lay out our radar images. Just like	[ ] from tensorflow.keras.applications.vgg16 import VGG16 from tensorflow.keras.layers import Dense,Flatten from tensorflow.keras.models import Model  • def transfer_learning():     base_model = VGG16(include_top = False,input_shape = (224,224,3))     thr=149     for layers in base_model.layers[thr]:         layers.trainable = False         for layers in base_model.layers[thr:]:         layers.trainable = False         return base_model  [ ] def create_model():         model-Sequential()         vgg=transfer_learning()         model.add(vgg)         model.add(vgg)         model.add(vgg)         model.add(vgg)         model.add(vgg)         return base_model  [ ] from tensorflow.keras.models import Model         from tensorflow.keras.models import Model         from tensorflow.keras.models import Model         from keras.models import Sequential





a chef's table, it's where we prepare our ingredients, but in this case, our ingredients are radar images of ships. These radar images are usually in a specific size, like spreading them out on a big radar screen that's 224x224 pixels big.

- 1. Convolutional Blocks: These are like different rooms in the ship where our experts are stationed. Each block is like a room where our experts analyze parts of the radar image closely. They're looking for important features, like the shape and size of ships, and they squash down the less important details. Just like VGG16, our ship classifier might have 5 blocks, and each one of these rooms does this process a couple of times before moving on.
- 2. Fully Connected Layers: Now we've gathered all the important details about the ship from the radar images. These layers are like the control room of the ship. Our experts gather all the important features they found and mix them together to get a complete understanding of what kind of ship it might be. Finally, they give us an idea of what type of ship is in the radar image.
- Activation Function: This is like our ship classifier's captain. They check if the ship classification is good or







- not. They ensure everything's running smoothly and the classification is accurate.
- 4. Dropout: Sometimes, there might be too many experts analyzing the radar images, and things could get a bit chaotic. Dropout is like giving some of our experts a break for a while. It helps prevent the ship classification process from becoming too complex and making mistakes.
- 5. Optimizer and Loss Function:
  These are like our ship
  classifier's navigators. They
  work to make sure our ship
  classification is getting better
  and better. They adjust
  things to ensure our
  classification is accurate and
  aligns with what we want.

In summary, just like a recipe in a kitchen, our ship classification model follows a structured process to analyze radar images and classify ships accurately in maritime scenarios.