In [1]:
```
!kaggle datasets download -d salader/dogs-vs-cats
```

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Dataset URL: https://www.kaggle.com/datasets/salader/dogs-vs-cats
License(s): unknown
Downloading dogs-vs-cats.zip to c:\Forgetube
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 63%|██████     | 689M/1.06G [00:38<00:22, 18.5MB/s]
 63%|██████     | 692M/1.06G [00:39<00:23, 18.0MB/s]
 64%|██████▏    | 696M/1.06G [00:39<00:21, 19.0MB/s]
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 64%|██████▏    | 703M/1.06G [00:39<00:21, 19.1MB/s]
 65%|██████▏    | 707M/1.06G [00:39<00:20, 19.8MB/s]
 65%|██████▏    | 711M/1.06G [00:40<00:19, 20.1MB/s]
 66%|██████▏    | 714M/1.06G [00:40<00:20, 19.4MB/s]
 66%|██████▏    | 718M/1.06G [00:40<00:20, 18.8MB/s]
 66%|██████▏    | 720M/1.06G [00:40<00:23, 16.5MB/s]
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 67%|██████▏    | 727M/1.06G [00:41<00:21, 17.9MB/s]
 67%|██████▏    | 731M/1.06G [00:41<00:19, 18.8MB/s]
 67%|██████▏    | 735M/1.06G [00:41<00:19, 19.3MB/s]
 68%|██████▏    | 738M/1.06G [00:41<00:17, 21.3MB/s]
 68%|██████▏    | 741M/1.06G [00:41<00:17, 21.4MB/s]
 68%|██████▏    | 744M/1.06G [00:41<00:17, 20.2MB/s]
 68%|██████▏    | 746M/1.06G [00:42<00:19, 18.3MB/s]
 69%|██████▎    | 750M/1.06G [00:42<00:18, 19.2MB/s]
 69%|██████▎    | 753M/1.06G [00:42<00:18, 18.7MB/s]
 69%|██████▎    | 757M/1.06G [00:42<00:17, 19.4MB/s]
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 71%|██████▍    | 778M/1.06G [00:43<00:15, 21.1MB/s]
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 72%|██████▍    | 786M/1.06G [00:44<00:17, 18.6MB/s]
 72%|██████▍    | 790M/1.06G [00:44<00:16, 19.4MB/s]
 73%|██████▍    | 793M/1.06G [00:44<00:14, 21.3MB/s]
 73%|██████▍    | 796M/1.06G [00:44<00:14, 21.4MB/s]
 73%|██████▍    | 799M/1.06G [00:44<00:16, 18.8MB/s]
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 74%|██████▌    | 810M/1.06G [00:45<00:14, 20.2MB/s]
 74%|██████▌    | 812M/1.06G [00:45<00:15, 18.5MB/s]
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 81%|████████   | 881M/1.06G [00:49<00:11, 19.3MB/s]
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 90%|█████████  | 982M/1.06G [00:54<00:05, 21.6MB/s]
 90%|█████████  | 985M/1.06G [00:54<00:05, 18.8MB/s]
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 96%|█████████▏| 1.02G/1.06G [00:57<00:02, 21.4MB/s]
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100%|█████████▍| 1.06G/1.06G [01:00<00:00, 18.9MB/s]
```

In [4]:
```
import zipfile
zip_ref = zipfile.ZipFile('dogs-vs-cats.zip', 'r')
zip_ref.extractall('/forgetube/data')
zip_ref.close()
```

In [6]:
```
pip install -q tensorflow
```

```
Note: you may need to restart the kernel to use updated packages.
```

In [7]:
```
import tensorflow
from tensorflow import keras
from keras import Sequential
from keras.layers import Dense,Flatten
from keras.applications.vgg16 import VGG16

base_mdl = VGG16(
    weights='imagenet',
    include_top = False,
    input_shape=(150,150,3)
)
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/v
gg16/vgg16_weights_tf_dim_ordering_tf_kernels_notop.h5
58889256/58889256 ━━━━━━━━━━━━━━━━━━━━ 6s 0us/step
```

In [8]:
```
base_mdl.summary()
```

Model: "vgg16"

Layer (type)	Output Shape	Param #
input_layer (InputLayer)	(None, 150, 150, 3)	0
block1_conv1 (Conv2D)	(None, 150, 150, 64)	1,792
block1_conv2 (Conv2D)	(None, 150, 150, 64)	36,928
block1_pool (MaxPooling2D)	(None, 75, 75, 64)	0
block2_conv1 (Conv2D)	(None, 75, 75, 128)	73,856
block2_conv2 (Conv2D)	(None, 75, 75, 128)	147,584
block2_pool (MaxPooling2D)	(None, 37, 37, 128)	0
block3_conv1 (Conv2D)	(None, 37, 37, 256)	295,168
block3_conv2 (Conv2D)	(None, 37, 37, 256)	590,080
block3_conv3 (Conv2D)	(None, 37, 37, 256)	590,080
block3_pool (MaxPooling2D)	(None, 18, 18, 256)	0
block4_conv1 (Conv2D)	(None, 18, 18, 512)	1,180,160
block4_conv2 (Conv2D)	(None, 18, 18, 512)	2,359,808
block4_conv3 (Conv2D)	(None, 18, 18, 512)	2,359,808
block4_pool (MaxPooling2D)	(None, 9, 9, 512)	0
block5_conv1 (Conv2D)	(None, 9, 9, 512)	2,359,808
block5_conv2 (Conv2D)	(None, 9, 9, 512)	2,359,808
block5_conv3 (Conv2D)	(None, 9, 9, 512)	2,359,808
block5_pool (MaxPooling2D)	(None, 4, 4, 512)	0

Total params: 14,714,688 (56.13 MB)

Trainable params: 14,714,688 (56.13 MB)

Non-trainable params: 0 (0.00 B)

In [10]:
```
mdl = Sequential()
```

```
mdl.add(base_mdl)
mdl.add(Flatten())
mdl.add(Dense(256,activation='relu'))
mdl.add(Dense(1,activation='sigmoid'))
mdl.summary()
```

Model: "sequential_1"

Layer (type)	Output Shape	Param #
vgg16 (Functional)	(None, 4, 4, 512)	14,714,688
flatten (Flatten)	(None, 8192)	0
dense (Dense)	(None, 256)	2,097,408
dense_1 (Dense)	(None, 1)	257

Total params: 16,812,353 (64.13 MB)

Trainable params: 16,812,353 (64.13 MB)

Non-trainable params: 0 (0.00 B)

In [11]:
```
base_mdl.trainable = False
```

In [14]:
```
train_ds = keras.utils.image_dataset_from_directory(
    directory = 'data/train',
    labels='inferred',
    label_mode = 'int',
    batch_size=32,
    image_size=(150,150)
)

validation_ds = keras.utils.image_dataset_from_directory(
    directory = 'data/test',
    labels='inferred',
    label_mode = 'int',
    batch_size=32,
    image_size=(150,150)
)
```

```
Found 20000 files belonging to 2 classes.
Found 5000 files belonging to 2 classes.
```

In [15]:
```
def process(image,label):
    image = tensorflow.cast(image/255. ,tensorflow.float32)
    return image,label

train_ds = train_ds.map(process)
validation_ds = validation_ds.map(process)
```

In [17]:
```
mdl.compile(optimizer='adam',loss='binary_crossentropy',metrics=['accuracy'])
```

In [18]:
```
history = mdl.fit(train_ds,epochs=10,validation_data=validation_ds)
```

```
Epoch 1/10
271/625 ━━━━━━━━━━━━━━━━━━━━ 4:46 810ms/step - accuracy: 0.7963 - loss: 0.5038
```

```
---------------------------------------------------------------------------
KeyboardInterrupt                         Traceback (most recent call last)
Cell In[18], line 1
----> 1 history = mdl.fit(train_ds,epochs=10,validation_data=validation_ds)

File ~\AppData\Roaming\Python\Python312\site-packages\keras\src\utils\traceback_utils.py:117, in filter_traceback.<locals>.error_handler(*args, **kwargs)
    115 filtered_tb = None
    116 try:
--> 117     return fn(*args, **kwargs)
    118 except Exception as e:
    119     filtered_tb = _process_traceback_frames(e.__traceback__)

File ~\AppData\Roaming\Python\Python312\site-packages\keras\src\backend\tensorflow\trainer.py:371, in TensorFlowTrainer.fit(self, x, y, batch_size, epochs, verbose, callbacks, validation_split, validation_data, shuffle, class_weight, sample_weight, initial_epoch, steps_per_epoch, validation_steps, validation_batch_size, validation_freq)
    369 for step, iterator in epoch_iterator:
    370     callbacks.on_train_batch_begin(step)
--> 371     logs = self.train_function(iterator)
    372     callbacks.on_train_batch_end(step, logs)
    373     if self.stop_training:

File ~\AppData\Roaming\Python\Python312\site-packages\keras\src\backend\tensorflow\trainer.py:219, in TensorFlowTrainer._make_function.<locals>.function(iterator)
    215 def function(iterator):
    216     if isinstance(
    217         iterator, (tf.data.Iterator, tf.distribute.DistributedIterator)
    218     ):
--> 219         opt_outputs = multi_step_on_iterator(iterator)
    220         if not opt_outputs.has_value():
    221             raise StopIteration

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\util\traceback_utils.py:150, in filter_traceback.<locals>.error_handler(*args, **kwargs)
    148 filtered_tb = None
    149 try:
--> 150   return fn(*args, **kwargs)
    151 except Exception as e:
    152   filtered_tb = _process_traceback_frames(e.__traceback__)

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\polymorphic_function\polymorphic_function.py:833, in Function.__call__(self, *args, **kwds)
    830 compiler = "xla" if self._jit_compile else "nonXla"
    832 with OptionalXlaContext(self._jit_compile):
--> 833   result = self._call(*args, **kwds)
    835 new_tracing_count = self.experimental_get_tracing_count()
    836 without_tracing = (tracing_count == new_tracing_count)

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\polymorphic_function\polymorphic_function.py:878, in Function._call(self, *args, **kwds)
    875 self._lock.release()
    876 # In this case we have not created variables on the first call. So we can
    877 # run the first trace but we should fail if variables are created.
```

```
--> 878 results = tracing_compilation.call_function(
    879     args, kwds, self._variable_creation_config
    880 )
    881 if self._created_variables:
    882   raise ValueError("Creating variables on a non-first call to a function"
    883                    " decorated with tf.function.")

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\polymorphic_function\tracing_compilation.py:139, in call_function(args, kwargs, tracing_options)
    137 bound_args = function.function_type.bind(*args, **kwargs)
    138 flat_inputs = function.function_type.unpack_inputs(bound_args)
--> 139 return function._call_flat(  # pylint: disable=protected-access
    140     flat_inputs, captured_inputs=function.captured_inputs
    141 )

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\polymorphic_function\concrete_function.py:1322, in ConcreteFunction._call_flat(self, tensor_inputs, captured_inputs)
   1318 possible_gradient_type = gradients_util.PossibleTapeGradientTypes(args)
   1319 if (possible_gradient_type == gradients_util.POSSIBLE_GRADIENT_TYPES_NONE
   1320     and executing_eagerly):
   1321   # No tape is watching; skip to running the function.
-> 1322   return self._inference_function.call_preflattened(args)
   1323 forward_backward = self._select_forward_and_backward_functions(
   1324     args,
   1325     possible_gradient_type,
   1326     executing_eagerly)
   1327 forward_function, args_with_tangents = forward_backward.forward()

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\polymorphic_function\atomic_function.py:216, in AtomicFunction.call_preflattened(self, args)
    214 def call_preflattened(self, args: Sequence[core.Tensor]) -> Any:
    215   """Calls with flattened tensor inputs and returns the structured output."""
--> 216   flat_outputs = self.call_flat(*args)
    217   return self.function_type.pack_output(flat_outputs)

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\polymorphic_function\atomic_function.py:251, in AtomicFunction.call_flat(self, *args)
    249 with record.stop_recording():
    250   if self._bound_context.executing_eagerly():
--> 251     outputs = self._bound_context.call_function(
    252         self.name,
    253         list(args),
    254         len(self.function_type.flat_outputs),
    255     )
    256   else:
    257     outputs = make_call_op_in_graph(
    258         self,
    259         list(args),
    260         self._bound_context.function_call_options.as_attrs(),
    261     )

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\contex
```

```
t.py:1683, in Context.call_function(self, name, tensor_inputs, num_outputs)
   1681 cancellation_context = cancellation.context()
   1682 if cancellation_context is None:
-> 1683   outputs = execute.execute(
   1684       name.decode("utf-8"),
   1685       num_outputs=num_outputs,
   1686       inputs=tensor_inputs,
   1687       attrs=attrs,
   1688       ctx=self,
   1689   )
   1690 else:
   1691   outputs = execute.execute_with_cancellation(
   1692       name.decode("utf-8"),
   1693       num_outputs=num_outputs,
   (...)
   1697       cancellation_manager=cancellation_context,
   1698   )

File ~\AppData\Roaming\Python\Python312\site-packages\tensorflow\python\eager\execut
e.py:53, in quick_execute(op_name, num_outputs, inputs, attrs, ctx, name)
     51 try:
     52   ctx.ensure_initialized()
---> 53   tensors = pywrap_tfe.TFE_Py_Execute(ctx._handle, device_name, op_name,
     54                                       inputs, attrs, num_outputs)
     55 except core._NotOkStatusException as e:
     56   if name is not None:

KeyboardInterrupt:
```

In [ ]: