

Assignment 6.3

```
In [17]: from tensorflow.keras.applications.resnet50 import ResNet50, preprocess_input, decode_pr
from tensorflow.keras.preprocessing import image
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

from pathlib import Path
import os
```

```
In [18]: #instantiate the model
model = ResNet50(weights='imagenet')
```

```
In [19]: #understanding the model
model.summary()
```

Model: "resnet50"

Layer (type)	Output Shape	Param #	Connected to
=====			
input_3 (InputLayer)	(None, 224, 224, 3)	0	[]
conv1_pad (ZeroPadding2D)	(None, 230, 230, 3)	0	['input_3[0][0]']
conv1_conv (Conv2D)	(None, 112, 112, 64)	9472	['conv1_pad[0][0]']
conv1_bn (BatchNormalization)	(None, 112, 112, 64)	256	['conv1_conv[0][0]']
conv1_relu (Activation)	(None, 112, 112, 64)	0	['conv1_bn[0][0]']
pool1_pad (ZeroPadding2D)	(None, 114, 114, 64)	0	['conv1_relu[0][0]']
pool1_pool (MaxPooling2D)	(None, 56, 56, 64)	0	['pool1_pad[0][0]']

conv2_block1_1_conv (Conv2D)	(None, 56, 56, 64)	4160	['pool1_pool[0][0]']
conv2_block1_1_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 64)	256	['conv2_block1_1_conv
conv2_block1_1_relu (Activatio [0][0]'] n)	(None, 56, 56, 64)	0	['conv2_block1_1_bn[0]
conv2_block1_2_conv (Conv2D)	(None, 56, 56, 64)	36928	['conv2_block1_1_relu
conv2_block1_2_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 64)	256	['conv2_block1_2_conv
conv2_block1_2_relu (Activatio [0][0]'] n)	(None, 56, 56, 64)	0	['conv2_block1_2_bn[0]
conv2_block1_0_conv (Conv2D)	(None, 56, 56, 256)	16640	['pool1_pool[0][0]']
conv2_block1_3_conv (Conv2D)	(None, 56, 56, 256)	16640	['conv2_block1_2_relu
conv2_block1_0_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 256)	1024	['conv2_block1_0_conv
conv2_block1_3_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 256)	1024	['conv2_block1_3_conv
conv2_block1_add (Add) [0]', [0]']	(None, 56, 56, 256)	0	['conv2_block1_0_bn[0] 'conv2_block1_3_bn[0]
conv2_block1_out (Activation) [0][0]']	(None, 56, 56, 256)	0	['conv2_block1_add[0]
conv2_block2_1_conv (Conv2D)	(None, 56, 56, 64)	16448	['conv2_block1_out[0]

conv2_block2_1_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 64)	256	['conv2_block2_1_conv
conv2_block2_1_relu (Activatio [0]'] n)	(None, 56, 56, 64)	0	['conv2_block2_1_bn[0]
conv2_block2_2_conv (Conv2D) [0][0]']	(None, 56, 56, 64)	36928	['conv2_block2_1_relu
conv2_block2_2_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 64)	256	['conv2_block2_2_conv
conv2_block2_2_relu (Activatio [0]'] n)	(None, 56, 56, 64)	0	['conv2_block2_2_bn[0]
conv2_block2_3_conv (Conv2D) [0][0]']	(None, 56, 56, 256)	16640	['conv2_block2_2_relu
conv2_block2_3_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 256)	1024	['conv2_block2_3_conv
conv2_block2_add (Add) [0]', [0]']	(None, 56, 56, 256)	0	['conv2_block1_out[0] 'conv2_block2_3_bn[0]
conv2_block2_out (Activation) [0]']	(None, 56, 56, 256)	0	['conv2_block2_add[0]
conv2_block3_1_conv (Conv2D) [0]']	(None, 56, 56, 64)	16448	['conv2_block2_out[0]
conv2_block3_1_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 64)	256	['conv2_block3_1_conv
conv2_block3_1_relu (Activatio [0]'] n)	(None, 56, 56, 64)	0	['conv2_block3_1_bn[0]
conv2_block3_2_conv (Conv2D) [0][0]']	(None, 56, 56, 64)	36928	['conv2_block3_1_relu

conv2_block3_2_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 64)	256	['conv2_block3_2_conv
conv2_block3_2_relu (Activatio [0][0]'] n)	(None, 56, 56, 64)	0	['conv2_block3_2_bn[0]
conv2_block3_3_conv (Conv2D) [0][0]']	(None, 56, 56, 256)	16640	['conv2_block3_2_relu
conv2_block3_3_bn (BatchNormal [0][0]'] ization)	(None, 56, 56, 256)	1024	['conv2_block3_3_conv
conv2_block3_add (Add) [0]', [0]']	(None, 56, 56, 256)	0	['conv2_block2_out[0] 'conv2_block3_3_bn[0]
conv2_block3_out (Activation) [0]']	(None, 56, 56, 256)	0	['conv2_block3_add[0]
conv3_block1_1_conv (Conv2D) [0]']	(None, 28, 28, 128)	32896	['conv2_block3_out[0]
conv3_block1_1_bn (BatchNormal [0][0]'] ization)	(None, 28, 28, 128)	512	['conv3_block1_1_conv
conv3_block1_1_relu (Activatio [0]'] n)	(None, 28, 28, 128)	0	['conv3_block1_1_bn[0]
conv3_block1_2_conv (Conv2D) [0][0]']	(None, 28, 28, 128)	147584	['conv3_block1_1_relu
conv3_block1_2_bn (BatchNormal [0][0]'] ization)	(None, 28, 28, 128)	512	['conv3_block1_2_conv
conv3_block1_2_relu (Activatio [0]'] n)	(None, 28, 28, 128)	0	['conv3_block1_2_bn[0]

conv3_block1_0_conv (Conv2D)	(None, 28, 28, 512)	131584	['conv2_block3_out[0][0]']
conv3_block1_3_conv (Conv2D)	(None, 28, 28, 512)	66048	['conv3_block1_2_relu[0][0]']
conv3_block1_0_bn (BatchNormal ization)	(None, 28, 28, 512)	2048	['conv3_block1_0_conv[0][0]']
conv3_block1_3_bn (BatchNormal ization)	(None, 28, 28, 512)	2048	['conv3_block1_3_conv[0][0]']
conv3_block1_add (Add)	(None, 28, 28, 512)	0	['conv3_block1_0_bn[0][0]', 'conv3_block1_3_bn[0][0]']
conv3_block1_out (Activation)	(None, 28, 28, 512)	0	['conv3_block1_add[0][0]']
conv3_block2_1_conv (Conv2D)	(None, 28, 28, 128)	65664	['conv3_block1_out[0][0]']
conv3_block2_1_bn (BatchNormal ization)	(None, 28, 28, 128)	512	['conv3_block2_1_conv[0][0]']
conv3_block2_1_relu (Activatio n)	(None, 28, 28, 128)	0	['conv3_block2_1_bn[0][0]']
conv3_block2_2_conv (Conv2D)	(None, 28, 28, 128)	147584	['conv3_block2_1_relu[0][0]']
conv3_block2_2_bn (BatchNormal ization)	(None, 28, 28, 128)	512	['conv3_block2_2_conv[0][0]']
conv3_block2_2_relu (Activatio n)	(None, 28, 28, 128)	0	['conv3_block2_2_bn[0][0]']
conv3_block2_3_conv (Conv2D)	(None, 28, 28, 512)	66048	['conv3_block2_2_relu[0][0]']

conv3_block2_3_bn (BatchNormal [0][0]' ization)	(None, 28, 28, 512)	2048	['conv3_block2_3_conv
conv3_block2_add (Add) [0]', [0]']	(None, 28, 28, 512)	0	['conv3_block1_out[0] 'conv3_block2_3_bn[0]
conv3_block2_out (Activation) [0]']	(None, 28, 28, 512)	0	['conv3_block2_add[0]
conv3_block3_1_conv (Conv2D) [0]']	(None, 28, 28, 128)	65664	['conv3_block2_out[0]
conv3_block3_1_bn (BatchNormal [0][0]' ization)	(None, 28, 28, 128)	512	['conv3_block3_1_conv
conv3_block3_1_relu (Activatio [0]'] n)	(None, 28, 28, 128)	0	['conv3_block3_1_bn[0]
conv3_block3_2_conv (Conv2D) [0][0]']	(None, 28, 28, 128)	147584	['conv3_block3_1_relu
conv3_block3_2_bn (BatchNormal [0][0]' ization)	(None, 28, 28, 128)	512	['conv3_block3_2_conv
conv3_block3_2_relu (Activatio [0]'] n)	(None, 28, 28, 128)	0	['conv3_block3_2_bn[0]
conv3_block3_3_conv (Conv2D) [0][0]']	(None, 28, 28, 512)	66048	['conv3_block3_2_relu
conv3_block3_3_bn (BatchNormal [0][0]' ization)	(None, 28, 28, 512)	2048	['conv3_block3_3_conv
conv3_block3_add (Add) [0]', [0]']	(None, 28, 28, 512)	0	['conv3_block2_out[0] 'conv3_block3_3_bn[0]
conv3_block3_out (Activation) [0]']	(None, 28, 28, 512)	0	['conv3_block3_add[0]

conv3_block4_1_conv (Conv2D)	(None, 28, 28, 128)	65664	['conv3_block3_out[0][0]']
conv3_block4_1_bn (BatchNormal ization)	(None, 28, 28, 128)	512	['conv3_block4_1_conv [0][0]']
conv3_block4_1_relu (Activatio n)	(None, 28, 28, 128)	0	['conv3_block4_1_bn[0][0]']
conv3_block4_2_conv (Conv2D)	(None, 28, 28, 128)	147584	['conv3_block4_1_relu [0][0]']
conv3_block4_2_bn (BatchNormal ization)	(None, 28, 28, 128)	512	['conv3_block4_2_conv [0][0]']
conv3_block4_2_relu (Activatio n)	(None, 28, 28, 128)	0	['conv3_block4_2_bn[0][0]']
conv3_block4_3_conv (Conv2D)	(None, 28, 28, 512)	66048	['conv3_block4_2_relu [0][0]']
conv3_block4_3_bn (BatchNormal ization)	(None, 28, 28, 512)	2048	['conv3_block4_3_conv [0][0]']
conv3_block4_add (Add)	(None, 28, 28, 512)	0	['conv3_block3_out[0][0]', 'conv3_block4_3_bn[0][0]']
conv3_block4_out (Activation)	(None, 28, 28, 512)	0	['conv3_block4_add[0][0]']
conv4_block1_1_conv (Conv2D)	(None, 14, 14, 256)	131328	['conv3_block4_out[0][0]']
conv4_block1_1_bn (BatchNormal ization)	(None, 14, 14, 256)	1024	['conv4_block1_1_conv [0][0]']
conv4_block1_1_relu (Activatio n)	(None, 14, 14, 256)	0	['conv4_block1_1_bn[0][0]']

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n)

conv4_block1_2_conv (Conv2D)      (None, 14, 14, 256)  590080      ['conv4_block1_1_relu
[0][0]']

conv4_block1_2_bn (BatchNormal      (None, 14, 14, 256)  1024      ['conv4_block1_2_conv
[0][0]']
ization)

conv4_block1_2_relu (Activatio      (None, 14, 14, 256)  0          ['conv4_block1_2_bn[0]
[0]']
n)

conv4_block1_0_conv (Conv2D)      (None, 14, 14, 1024  525312      ['conv3_block4_out[0]
[0]']
)

conv4_block1_3_conv (Conv2D)      (None, 14, 14, 1024  263168      ['conv4_block1_2_relu
[0][0]']
)

conv4_block1_0_bn (BatchNormal      (None, 14, 14, 1024  4096      ['conv4_block1_0_conv
[0][0]']
ization)
)

conv4_block1_3_bn (BatchNormal      (None, 14, 14, 1024  4096      ['conv4_block1_3_conv
[0][0]']
ization)
)

conv4_block1_add (Add)              (None, 14, 14, 1024  0          ['conv4_block1_0_bn[0]
[0]',
                                )
                                'conv4_block1_3_bn[0]
[0]']

conv4_block1_out (Activation)        (None, 14, 14, 1024  0          ['conv4_block1_add[0]
[0]']
)

conv4_block2_1_conv (Conv2D)      (None, 14, 14, 256)  262400      ['conv4_block1_out[0]
[0]']

conv4_block2_1_bn (BatchNormal      (None, 14, 14, 256)  1024      ['conv4_block2_1_conv
[0][0]']
ization)

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conv4_block2_1_relu (Activation)	(None, 14, 14, 256)	0	['conv4_block2_1_bn[0][0]']
conv4_block2_2_conv (Conv2D)	(None, 14, 14, 256)	590080	['conv4_block2_1_relu[0][0]']
conv4_block2_2_bn (BatchNormalization)	(None, 14, 14, 256)	1024	['conv4_block2_2_conv[0][0]']
conv4_block2_2_relu (Activation)	(None, 14, 14, 256)	0	['conv4_block2_2_bn[0][0]']
conv4_block2_3_conv (Conv2D)	(None, 14, 14, 1024)	263168	['conv4_block2_2_relu[0][0]']
conv4_block2_3_bn (BatchNormalization)	(None, 14, 14, 1024)	4096	['conv4_block2_3_conv[0][0]']
conv4_block2_add (Add)	(None, 14, 14, 1024)	0	['conv4_block1_out[0][0]', 'conv4_block2_3_bn[0][0]']
conv4_block2_out (Activation)	(None, 14, 14, 1024)	0	['conv4_block2_add[0][0]']
conv4_block3_1_conv (Conv2D)	(None, 14, 14, 256)	262400	['conv4_block2_out[0][0]']
conv4_block3_1_bn (BatchNormalization)	(None, 14, 14, 256)	1024	['conv4_block3_1_conv[0][0]']
conv4_block3_1_relu (Activation)	(None, 14, 14, 256)	0	['conv4_block3_1_bn[0][0]']
conv4_block3_2_conv (Conv2D)	(None, 14, 14, 256)	590080	['conv4_block3_1_relu[0][0]']

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conv4_block3_2_bn (BatchNormal (None, 14, 14, 256) 1024 ['conv4_block3_2_conv
[0][0]']
ization)

conv4_block3_2_relu (Activatio (None, 14, 14, 256) 0 ['conv4_block3_2_bn[0]
[0]']
n)

conv4_block3_3_conv (Conv2D) (None, 14, 14, 1024 263168 ['conv4_block3_2_relu
[0][0]']
)

conv4_block3_3_bn (BatchNormal (None, 14, 14, 1024 4096 ['conv4_block3_3_conv
[0][0]']
ization)
)

conv4_block3_add (Add) (None, 14, 14, 1024 0 ['conv4_block2_out[0]
[0]',
)
['conv4_block3_3_bn[0]
[0]']

conv4_block3_out (Activation) (None, 14, 14, 1024 0 ['conv4_block3_add[0]
[0]']
)

conv4_block4_1_conv (Conv2D) (None, 14, 14, 256) 262400 ['conv4_block3_out[0]
[0]']

conv4_block4_1_bn (BatchNormal (None, 14, 14, 256) 1024 ['conv4_block4_1_conv
[0][0]']
ization)

conv4_block4_1_relu (Activatio (None, 14, 14, 256) 0 ['conv4_block4_1_bn[0]
[0]']
n)

conv4_block4_2_conv (Conv2D) (None, 14, 14, 256) 590080 ['conv4_block4_1_relu
[0][0]']

conv4_block4_2_bn (BatchNormal (None, 14, 14, 256) 1024 ['conv4_block4_2_conv
[0][0]']
ization)

conv4_block4_2_relu (Activatio (None, 14, 14, 256) 0 ['conv4_block4_2_bn[0]
[0]']
n)

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conv4_block4_3_conv (Conv2D)      (None, 14, 14, 1024  263168      ['conv4_block4_2_relu
[0][0]']

)

conv4_block4_3_bn (BatchNormal      (None, 14, 14, 1024  4096      ['conv4_block4_3_conv
[0][0]']
ization)

)

conv4_block4_add (Add)              (None, 14, 14, 1024  0      ['conv4_block3_out[0]
[0]',
                                'conv4_block4_3_bn[0]
[0]']

)

conv4_block4_out (Activation)       (None, 14, 14, 1024  0      ['conv4_block4_add[0]
[0]']

)

conv4_block5_1_conv (Conv2D)       (None, 14, 14, 256)  262400      ['conv4_block4_out[0]
[0]']

conv4_block5_1_bn (BatchNormal      (None, 14, 14, 256)  1024      ['conv4_block5_1_conv
[0][0]']
ization)

conv4_block5_1_relu (Activatio      (None, 14, 14, 256)  0      ['conv4_block5_1_bn[0]
[0]']
n)

conv4_block5_2_conv (Conv2D)       (None, 14, 14, 256)  590080      ['conv4_block5_1_relu
[0][0]']

conv4_block5_2_bn (BatchNormal      (None, 14, 14, 256)  1024      ['conv4_block5_2_conv
[0][0]']
ization)

conv4_block5_2_relu (Activatio      (None, 14, 14, 256)  0      ['conv4_block5_2_bn[0]
[0]']
n)

conv4_block5_3_conv (Conv2D)       (None, 14, 14, 1024  263168      ['conv4_block5_2_relu
[0][0]']

)

conv4_block5_3_bn (BatchNormal      (None, 14, 14, 1024  4096      ['conv4_block5_3_conv
[0][0]']

```

```
ization)                                     )

conv4_block5_add (Add)                      (None, 14, 14, 1024  0                ['conv4_block4_out[0]
[0]',                                         )                    'conv4_block5_3_bn[0]
[0]']

conv4_block5_out (Activation)               (None, 14, 14, 1024  0                ['conv4_block5_add[0]
[0]']                                       )

conv4_block6_1_conv (Conv2D)               (None, 14, 14, 256)  262400          ['conv4_block5_out[0]
[0]']

conv4_block6_1_bn (BatchNormal              (None, 14, 14, 256)  1024            ['conv4_block6_1_conv
[0][0]']
ization)

conv4_block6_1_relu (Activatio             (None, 14, 14, 256)  0                ['conv4_block6_1_bn[0]
[0]']
n)

conv4_block6_2_conv (Conv2D)               (None, 14, 14, 256)  590080          ['conv4_block6_1_relu
[0][0]']

conv4_block6_2_bn (BatchNormal              (None, 14, 14, 256)  1024            ['conv4_block6_2_conv
[0][0]']
ization)

conv4_block6_2_relu (Activatio             (None, 14, 14, 256)  0                ['conv4_block6_2_bn[0]
[0]']
n)

conv4_block6_3_conv (Conv2D)               (None, 14, 14, 1024  263168          ['conv4_block6_2_relu
[0][0]']
                                           )

conv4_block6_3_bn (BatchNormal              (None, 14, 14, 1024  4096            ['conv4_block6_3_conv
[0][0]']
ization)                                   )

conv4_block6_add (Add)                     (None, 14, 14, 1024  0                ['conv4_block5_out[0]
[0]',                                         )                    'conv4_block6_3_bn[0]
[0]']
```

conv4_block6_out (Activation)	(None, 14, 14, 1024	0	['conv4_block6_add[0]
[0]']			
)		
conv5_block1_1_conv (Conv2D)	(None, 7, 7, 512)	524800	['conv4_block6_out[0]
[0]']			
conv5_block1_1_bn (BatchNormal	(None, 7, 7, 512)	2048	['conv5_block1_1_conv
[0][0]']			
ization)			
conv5_block1_1_relu (Activatio	(None, 7, 7, 512)	0	['conv5_block1_1_bn[0]
[0]']			
n)			
conv5_block1_2_conv (Conv2D)	(None, 7, 7, 512)	2359808	['conv5_block1_1_relu
[0][0]']			
conv5_block1_2_bn (BatchNormal	(None, 7, 7, 512)	2048	['conv5_block1_2_conv
[0][0]']			
ization)			
conv5_block1_2_relu (Activatio	(None, 7, 7, 512)	0	['conv5_block1_2_bn[0]
[0]']			
n)			
conv5_block1_0_conv (Conv2D)	(None, 7, 7, 2048)	2099200	['conv4_block6_out[0]
[0]']			
conv5_block1_3_conv (Conv2D)	(None, 7, 7, 2048)	1050624	['conv5_block1_2_relu
[0][0]']			
conv5_block1_0_bn (BatchNormal	(None, 7, 7, 2048)	8192	['conv5_block1_0_conv
[0][0]']			
ization)			
conv5_block1_3_bn (BatchNormal	(None, 7, 7, 2048)	8192	['conv5_block1_3_conv
[0][0]']			
ization)			
conv5_block1_add (Add)	(None, 7, 7, 2048)	0	['conv5_block1_0_bn[0]
[0]',			
			'conv5_block1_3_bn[0]
[0]']			
conv5_block1_out (Activation)	(None, 7, 7, 2048)	0	['conv5_block1_add[0]
[0]']			

conv5_block2_1_conv (Conv2D)	(None, 7, 7, 512)	1049088	['conv5_block1_out[0][0]']
conv5_block2_1_bn (BatchNormal ization)	(None, 7, 7, 512)	2048	['conv5_block2_1_conv [0][0]']
conv5_block2_1_relu (Activatio n)	(None, 7, 7, 512)	0	['conv5_block2_1_bn[0][0]']
conv5_block2_2_conv (Conv2D)	(None, 7, 7, 512)	2359808	['conv5_block2_1_relu [0][0]']
conv5_block2_2_bn (BatchNormal ization)	(None, 7, 7, 512)	2048	['conv5_block2_2_conv [0][0]']
conv5_block2_2_relu (Activatio n)	(None, 7, 7, 512)	0	['conv5_block2_2_bn[0][0]']
conv5_block2_3_conv (Conv2D)	(None, 7, 7, 2048)	1050624	['conv5_block2_2_relu [0][0]']
conv5_block2_3_bn (BatchNormal ization)	(None, 7, 7, 2048)	8192	['conv5_block2_3_conv [0][0]']
conv5_block2_add (Add)	(None, 7, 7, 2048)	0	['conv5_block1_out[0][0]', 'conv5_block2_3_bn[0][0]']
conv5_block2_out (Activation)	(None, 7, 7, 2048)	0	['conv5_block2_add[0][0]']
conv5_block3_1_conv (Conv2D)	(None, 7, 7, 512)	1049088	['conv5_block2_out[0][0]']
conv5_block3_1_bn (BatchNormal ization)	(None, 7, 7, 512)	2048	['conv5_block3_1_conv [0][0]']
conv5_block3_1_relu (Activatio n)	(None, 7, 7, 512)	0	['conv5_block3_1_bn[0][0]']

```

n)

conv5_block3_2_conv (Conv2D)      (None, 7, 7, 512)      2359808      ['conv5_block3_1_relu
[0][0]']

conv5_block3_2_bn (BatchNormal      (None, 7, 7, 512)      2048          ['conv5_block3_2_conv
[0][0]']
ization)

conv5_block3_2_relu (Activatio      (None, 7, 7, 512)      0              ['conv5_block3_2_bn[0]
[0]']
n)

conv5_block3_3_conv (Conv2D)      (None, 7, 7, 2048)     1050624      ['conv5_block3_2_relu
[0][0]']

conv5_block3_3_bn (BatchNormal      (None, 7, 7, 2048)     8192          ['conv5_block3_3_conv
[0][0]']
ization)

conv5_block3_add (Add)              (None, 7, 7, 2048)     0              ['conv5_block2_out[0]
[0]',
                                'conv5_block3_3_bn[0]
[0]']

conv5_block3_out (Activation)        (None, 7, 7, 2048)     0              ['conv5_block3_add[0]
[0]']

avg_pool (GlobalAveragePooling      (None, 2048)           0              ['conv5_block3_out[0]
[0]']
2D)

predictions (Dense)                 (None, 1000)           2049000      ['avg_pool[0][0]']

```

```

=====
=====
Total params: 25,636,712
Trainable params: 25,583,592
Non-trainable params: 53,120

```

```

In [20]: def process_image(img_path):
          img = image.load_img(img_path, target_size=(224, 224))
          img = image.img_to_array(img)
          img = np.expand_dims(img, axis=0)
          img = preprocess_input(img)
          return(img)

```

```
def predict_image(processed_img):
    preds = model.predict(processed_img)
    prediction = decode_predictions(preds, top=1)[0][0]
    _, description, probability = prediction
    return description, probability
```

```
In [21]: import pandas as pd
from IPython.display import Image, display

current_dir = Path(os.getcwd()).absolute()
images_dir = current_dir.joinpath('images')
images_dir.mkdir(parents=True, exist_ok=True)
```

```
In [23]: predictions_dir = current_dir.joinpath('results/predictions/resnet50')
predictions_dir.mkdir(parents=True, exist_ok=True)
predictions_dir
```

```
Out[23]: WindowsPath('C:/Users/aarti/DSC650-T302 Big Data (2241-1)/Week 6/results/predictions/resnet50')
```

```
In [25]: for root, dirs, pictures in os.walk(images_dir):
    for picture in pictures:
        image_path = Path(root).joinpath(picture)
        img = process_image(image_path)
        description, probability = predict_image(img)
        #writing predictions to text file in directory
        file_name = current_dir.joinpath('results/predictions/resnet50/Assignment_6-3_pr
        #open the file
        open_file = open(file_name, 'a')
        #write information to file
        open_file.write(str(image_path) + " -- Description : " + description + "-- Prob

        pic = mpimg.imread(image_path)
        plt.imshow(pic)
        plt.title(f'{picture}\nPrediction: {description:^}\nProbability: {probability:.3
        plt.show()

    #close file once all activities are completed
    open_file.close()
```

```
1/1 [=====] - 0s 399ms/step
```


3fc97f163d3a272a53e6c7c6b54cbee5.jpg

Prediction: king_penguin

Probability: 1.000

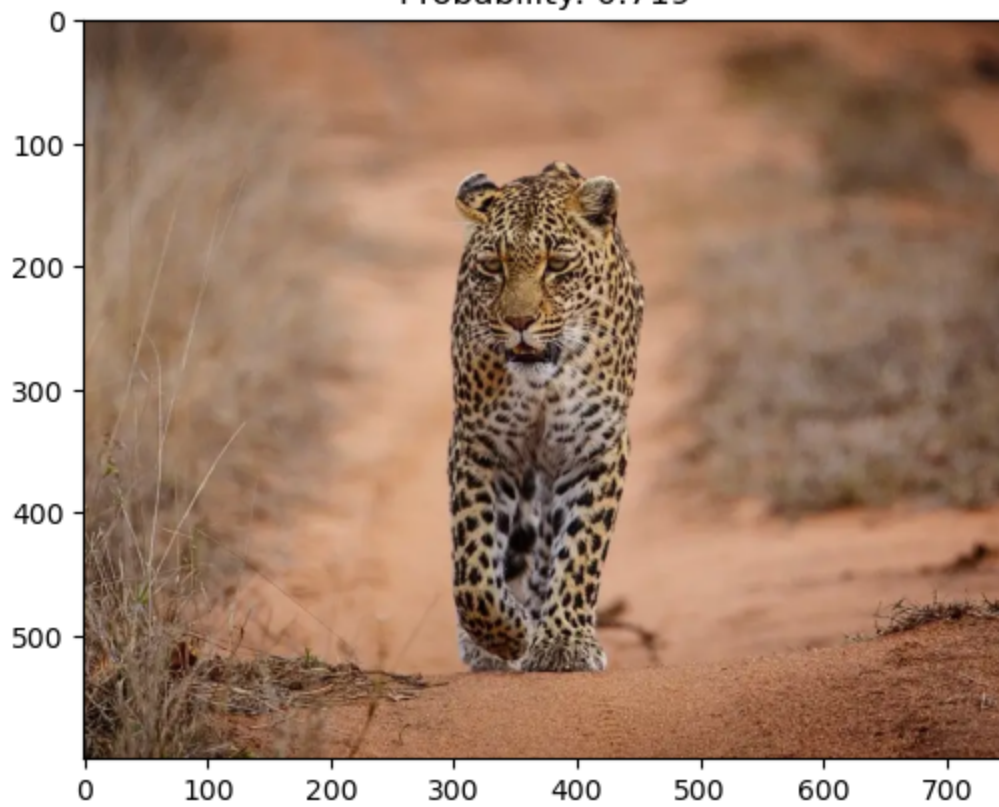


1/1 [=====] - 0s 417ms/step

62WpIVyX4AKxuNRTGKDi.webp

Prediction: leopard

Probability: 0.719

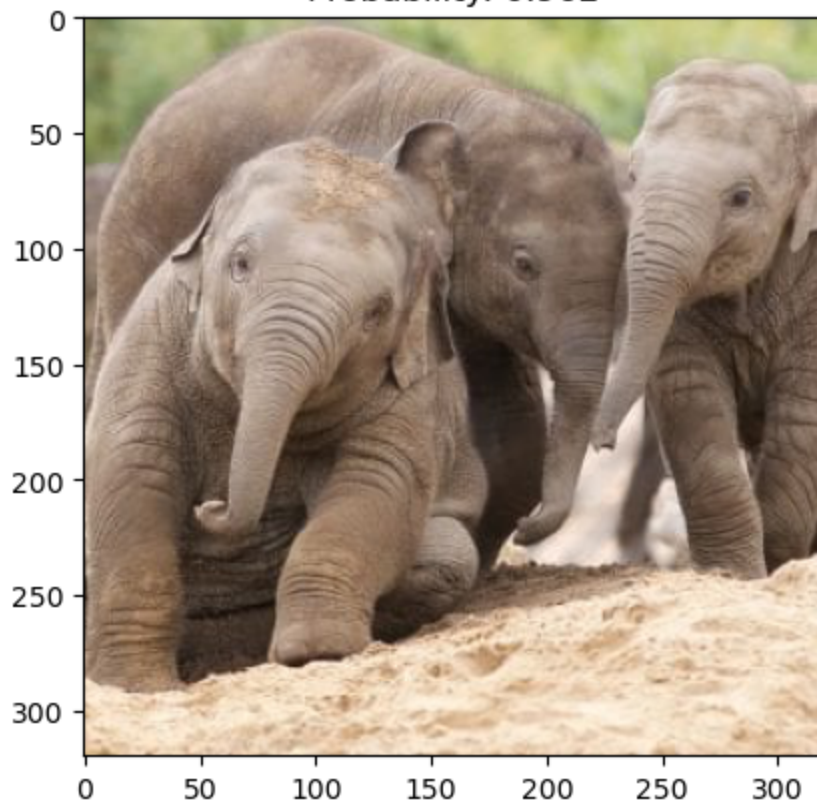


1/1 [=====] - 0s 425ms/step

ElephantsBirthday_06-1-320x320.jpg

Prediction: Indian_elephant

Probability: 0.962



1/1 [=====] - 0s 429ms/step

Giant_Panda_2004-03-2.jpg

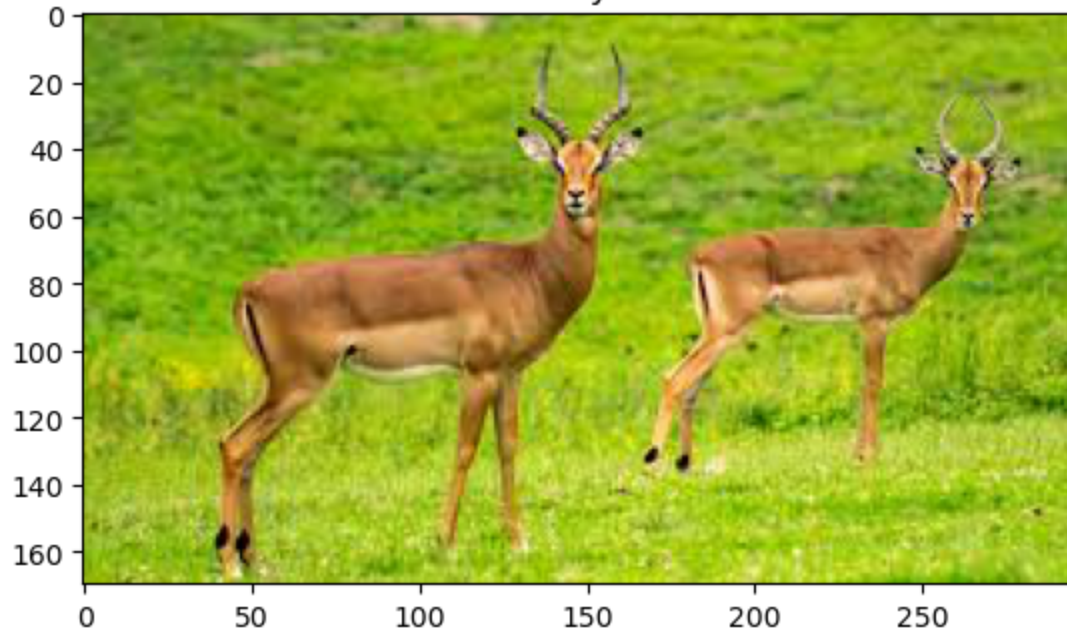
Prediction: giant_panda

Probability: 1.000



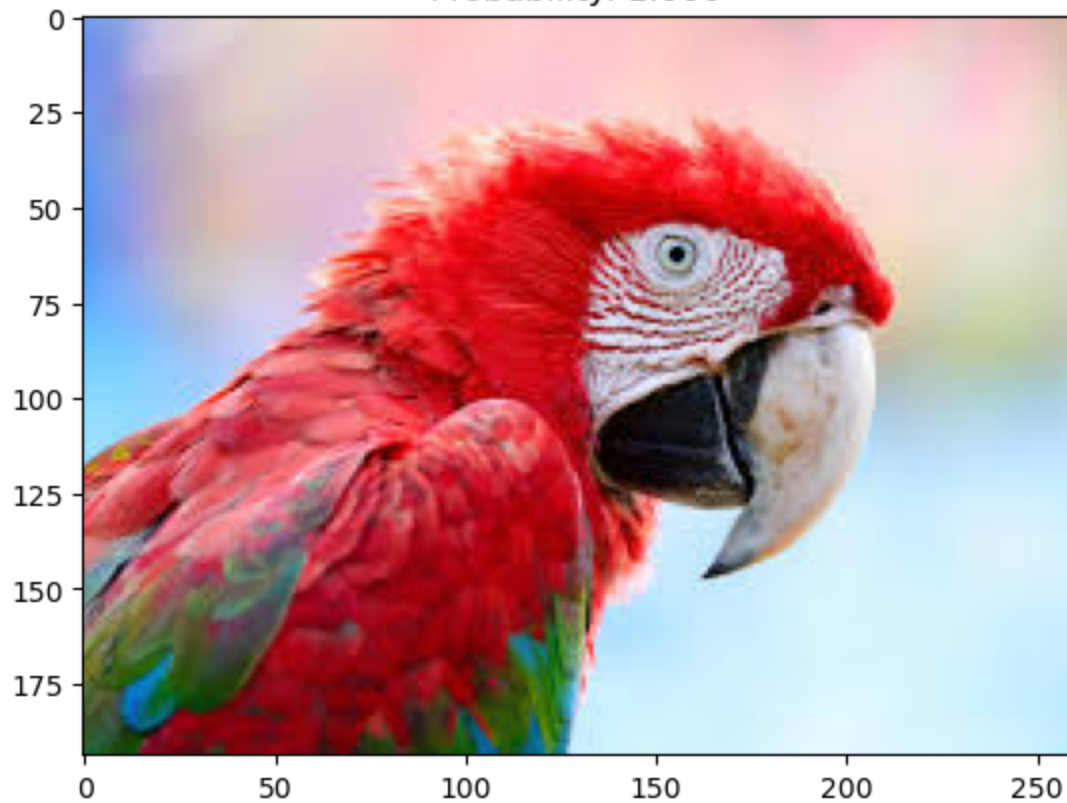
1/1 [=====] - 0s 432ms/step

images.jpeg
Prediction: gazelle
Probability: 0.512



1/1 [=====] - 0s 441ms/step

images_bird.jpeg
Prediction: macaw
Probability: 1.000

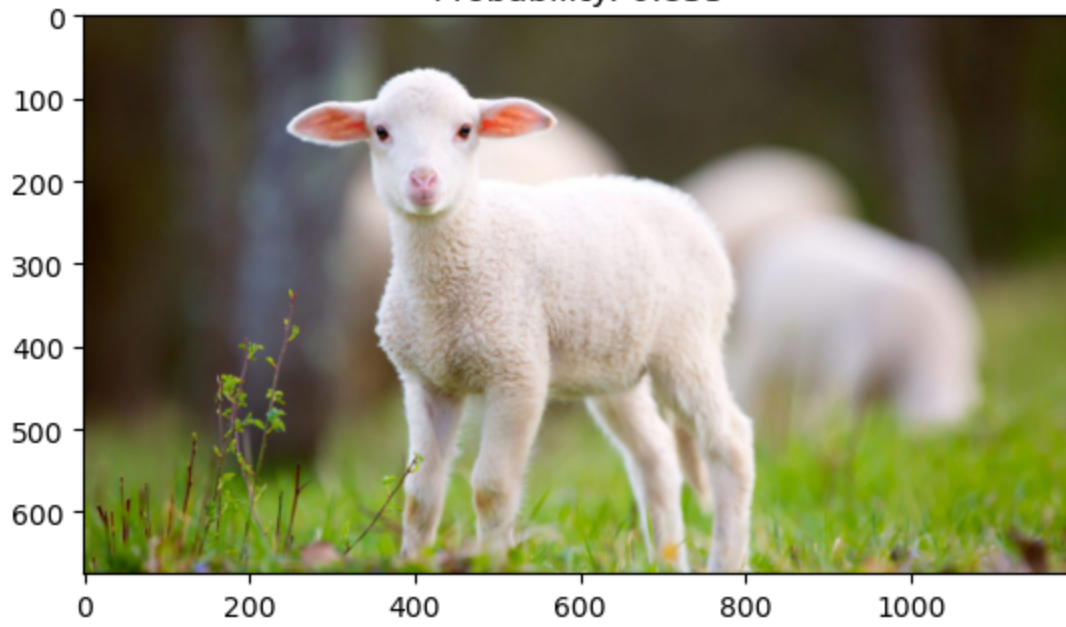


1/1 [=====] - 0s 449ms/step

lamb-iStock-665494268.jpg

Prediction: ram

Probability: 0.855

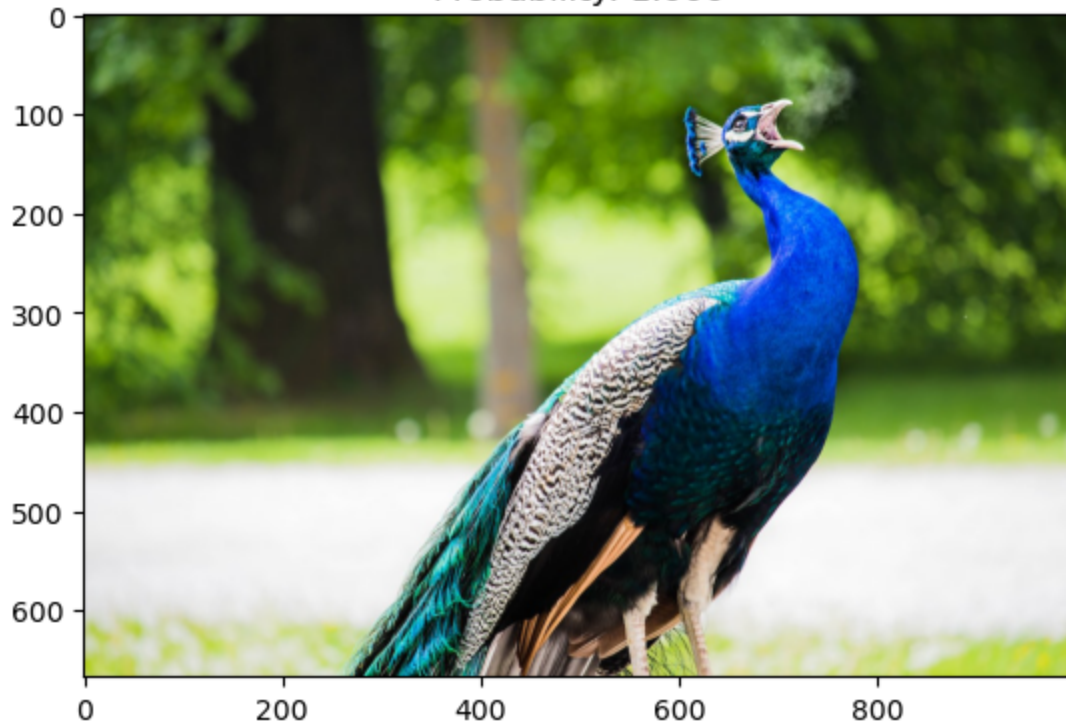


1/1 [=====] - 0s 494ms/step

photo-1566650554919-44ec6bbe2518.jpeg

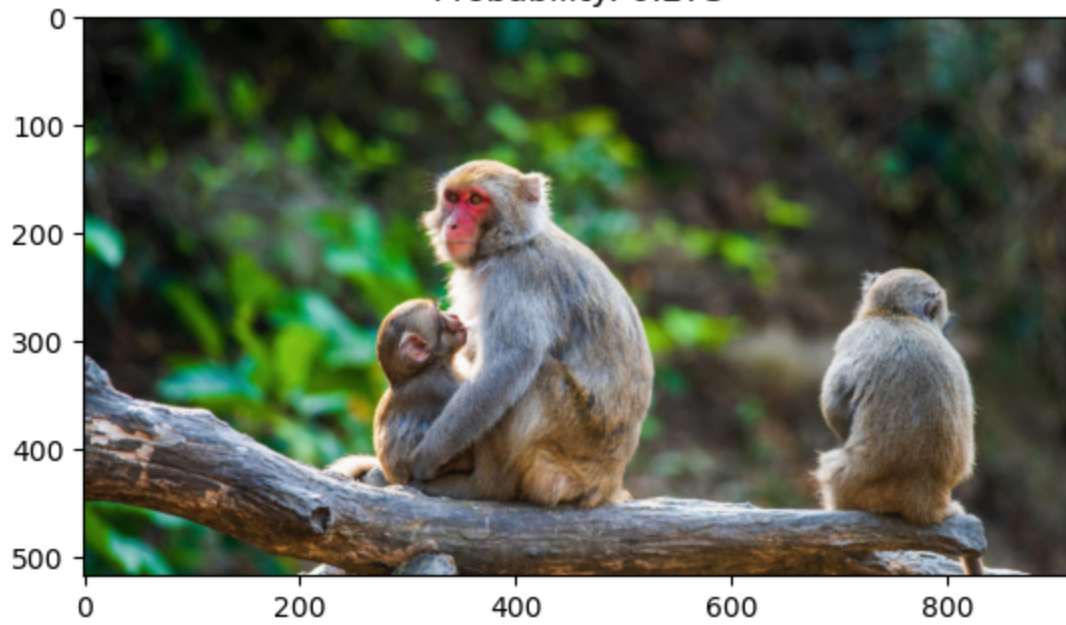
Prediction: peacock

Probability: 1.000



1/1 [=====] - 0s 452ms/step

Rhesus_Macaque.jpg
Prediction: mongoose
Probability: 0.273



1/1 [=====] - 1s 587ms/step

shutterstock_2233169475.jpg
Prediction: Arctic_fox
Probability: 0.968



```
In [26]: #save the model
model.save('results/Assignment_6-3_resnet50_model.h5')
```

WARNING:tensorflow:Compiled the loaded model, but the compiled metrics have yet to be built. `model.compile_metrics` will be empty until you train or evaluate the model.