\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param # Connected to

==================================================================================================

input\_10 (InputLayer) [(None, 224, 224, 3 0 []

)]

zero\_padding2d\_2 (ZeroPadding2 (None, 230, 230, 3) 0 ['input\_10[0][0]']

D)

conv1/conv (Conv2D) (None, 112, 112, 64 9408 ['zero\_padding2d\_2[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]']

)

zero\_padding2d\_3 (ZeroPadding2 (None, 114, 114, 64 0 ['conv1/relu[0][0]']

D) )

pool1 (MaxPooling2D) (None, 56, 56, 64) 0 ['zero\_padding2d\_3[0][0]']

conv2\_block1\_0\_bn (BatchNormal (None, 56, 56, 64) 256 ['pool1[0][0]']

ization)

conv2\_block1\_0\_relu (Activatio (None, 56, 56, 64) 0 ['conv2\_block1\_0\_bn[0][0]']

n)

conv2\_block1\_1\_conv (Conv2D) (None, 56, 56, 128) 8192 ['conv2\_block1\_0\_relu[0][0]']

conv2\_block1\_1\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block1\_1\_conv[0][0]']

ization)

conv2\_block1\_1\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block1\_1\_bn[0][0]']

n)

conv2\_block1\_2\_conv (Conv2D) (None, 56, 56, 32) 36864 ['conv2\_block1\_1\_relu[0][0]']

conv2\_block1\_concat (Concatena (None, 56, 56, 96) 0 ['pool1[0][0]',

te) 'conv2\_block1\_2\_conv[0][0]']

conv2\_block2\_0\_bn (BatchNormal (None, 56, 56, 96) 384 ['conv2\_block1\_concat[0][0]']

ization)

conv2\_block2\_0\_relu (Activatio (None, 56, 56, 96) 0 ['conv2\_block2\_0\_bn[0][0]']

n)

conv2\_block2\_1\_conv (Conv2D) (None, 56, 56, 128) 12288 ['conv2\_block2\_0\_relu[0][0]']

conv2\_block2\_1\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block2\_1\_conv[0][0]']

ization)

conv2\_block2\_1\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block2\_1\_bn[0][0]']

n)

conv2\_block2\_2\_conv (Conv2D) (None, 56, 56, 32) 36864 ['conv2\_block2\_1\_relu[0][0]']

conv2\_block2\_concat (Concatena (None, 56, 56, 128) 0 ['conv2\_block1\_concat[0][0]',

te) 'conv2\_block2\_2\_conv[0][0]']

conv2\_block3\_0\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block2\_concat[0][0]']

ization)

conv2\_block3\_0\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block3\_0\_bn[0][0]']

n)

conv2\_block3\_1\_conv (Conv2D) (None, 56, 56, 128) 16384 ['conv2\_block3\_0\_relu[0][0]']

conv2\_block3\_1\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block3\_1\_conv[0][0]']

ization)

conv2\_block3\_1\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block3\_1\_bn[0][0]']

n)

conv2\_block3\_2\_conv (Conv2D) (None, 56, 56, 32) 36864 ['conv2\_block3\_1\_relu[0][0]']

conv2\_block3\_concat (Concatena (None, 56, 56, 160) 0 ['conv2\_block2\_concat[0][0]',

te) 'conv2\_block3\_2\_conv[0][0]']

conv2\_block4\_0\_bn (BatchNormal (None, 56, 56, 160) 640 ['conv2\_block3\_concat[0][0]']

ization)

conv2\_block4\_0\_relu (Activatio (None, 56, 56, 160) 0 ['conv2\_block4\_0\_bn[0][0]']

n)

conv2\_block4\_1\_conv (Conv2D) (None, 56, 56, 128) 20480 ['conv2\_block4\_0\_relu[0][0]']

conv2\_block4\_1\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block4\_1\_conv[0][0]']

ization)

conv2\_block4\_1\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block4\_1\_bn[0][0]']

n)

conv2\_block4\_2\_conv (Conv2D) (None, 56, 56, 32) 36864 ['conv2\_block4\_1\_relu[0][0]']

conv2\_block4\_concat (Concatena (None, 56, 56, 192) 0 ['conv2\_block3\_concat[0][0]',

te) 'conv2\_block4\_2\_conv[0][0]']

conv2\_block5\_0\_bn (BatchNormal (None, 56, 56, 192) 768 ['conv2\_block4\_concat[0][0]']

ization)

conv2\_block5\_0\_relu (Activatio (None, 56, 56, 192) 0 ['conv2\_block5\_0\_bn[0][0]']

n)

conv2\_block5\_1\_conv (Conv2D) (None, 56, 56, 128) 24576 ['conv2\_block5\_0\_relu[0][0]']

conv2\_block5\_1\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block5\_1\_conv[0][0]']

ization)

conv2\_block5\_1\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block5\_1\_bn[0][0]']

n)

conv2\_block5\_2\_conv (Conv2D) (None, 56, 56, 32) 36864 ['conv2\_block5\_1\_relu[0][0]']

conv2\_block5\_concat (Concatena (None, 56, 56, 224) 0 ['conv2\_block4\_concat[0][0]',

te) 'conv2\_block5\_2\_conv[0][0]']

conv2\_block6\_0\_bn (BatchNormal (None, 56, 56, 224) 896 ['conv2\_block5\_concat[0][0]']

ization)

conv2\_block6\_0\_relu (Activatio (None, 56, 56, 224) 0 ['conv2\_block6\_0\_bn[0][0]']

n)

conv2\_block6\_1\_conv (Conv2D) (None, 56, 56, 128) 28672 ['conv2\_block6\_0\_relu[0][0]']

conv2\_block6\_1\_bn (BatchNormal (None, 56, 56, 128) 512 ['conv2\_block6\_1\_conv[0][0]']

ization)

conv2\_block6\_1\_relu (Activatio (None, 56, 56, 128) 0 ['conv2\_block6\_1\_bn[0][0]']

n)

conv2\_block6\_2\_conv (Conv2D) (None, 56, 56, 32) 36864 ['conv2\_block6\_1\_relu[0][0]']

conv2\_block6\_concat (Concatena (None, 56, 56, 256) 0 ['conv2\_block5\_concat[0][0]',

te) 'conv2\_block6\_2\_conv[0][0]']

pool2\_bn (BatchNormalization) (None, 56, 56, 256) 1024 ['conv2\_block6\_concat[0][0]']

pool2\_relu (Activation) (None, 56, 56, 256) 0 ['pool2\_bn[0][0]']

pool2\_conv (Conv2D) (None, 56, 56, 128) 32768 ['pool2\_relu[0][0]']

pool2\_pool (AveragePooling2D) (None, 28, 28, 128) 0 ['pool2\_conv[0][0]']

conv3\_block1\_0\_bn (BatchNormal (None, 28, 28, 128) 512 ['pool2\_pool[0][0]']

ization)

conv3\_block1\_0\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block1\_0\_bn[0][0]']

n)

conv3\_block1\_1\_conv (Conv2D) (None, 28, 28, 128) 16384 ['conv3\_block1\_0\_relu[0][0]']

conv3\_block1\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block1\_1\_conv[0][0]']

ization)

conv3\_block1\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block1\_1\_bn[0][0]']

n)

conv3\_block1\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block1\_1\_relu[0][0]']

conv3\_block1\_concat (Concatena (None, 28, 28, 160) 0 ['pool2\_pool[0][0]',

te) 'conv3\_block1\_2\_conv[0][0]']

conv3\_block2\_0\_bn (BatchNormal (None, 28, 28, 160) 640 ['conv3\_block1\_concat[0][0]']

ization)

conv3\_block2\_0\_relu (Activatio (None, 28, 28, 160) 0 ['conv3\_block2\_0\_bn[0][0]']

n)

conv3\_block2\_1\_conv (Conv2D) (None, 28, 28, 128) 20480 ['conv3\_block2\_0\_relu[0][0]']

conv3\_block2\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block2\_1\_conv[0][0]']

ization)

conv3\_block2\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block2\_1\_bn[0][0]']

n)

conv3\_block2\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block2\_1\_relu[0][0]']

conv3\_block2\_concat (Concatena (None, 28, 28, 192) 0 ['conv3\_block1\_concat[0][0]',

te) 'conv3\_block2\_2\_conv[0][0]']

conv3\_block3\_0\_bn (BatchNormal (None, 28, 28, 192) 768 ['conv3\_block2\_concat[0][0]']

ization)

conv3\_block3\_0\_relu (Activatio (None, 28, 28, 192) 0 ['conv3\_block3\_0\_bn[0][0]']

n)

conv3\_block3\_1\_conv (Conv2D) (None, 28, 28, 128) 24576 ['conv3\_block3\_0\_relu[0][0]']

conv3\_block3\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block3\_1\_conv[0][0]']

ization)

conv3\_block3\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block3\_1\_bn[0][0]']

n)

conv3\_block3\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block3\_1\_relu[0][0]']

conv3\_block3\_concat (Concatena (None, 28, 28, 224) 0 ['conv3\_block2\_concat[0][0]',

te) 'conv3\_block3\_2\_conv[0][0]']

conv3\_block4\_0\_bn (BatchNormal (None, 28, 28, 224) 896 ['conv3\_block3\_concat[0][0]']

ization)

conv3\_block4\_0\_relu (Activatio (None, 28, 28, 224) 0 ['conv3\_block4\_0\_bn[0][0]']

n)

conv3\_block4\_1\_conv (Conv2D) (None, 28, 28, 128) 28672 ['conv3\_block4\_0\_relu[0][0]']

conv3\_block4\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block4\_1\_conv[0][0]']

ization)

conv3\_block4\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block4\_1\_bn[0][0]']

n)

conv3\_block4\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block4\_1\_relu[0][0]']

conv3\_block4\_concat (Concatena (None, 28, 28, 256) 0 ['conv3\_block3\_concat[0][0]',

te) 'conv3\_block4\_2\_conv[0][0]']

conv3\_block5\_0\_bn (BatchNormal (None, 28, 28, 256) 1024 ['conv3\_block4\_concat[0][0]']

ization)

conv3\_block5\_0\_relu (Activatio (None, 28, 28, 256) 0 ['conv3\_block5\_0\_bn[0][0]']

n)

conv3\_block5\_1\_conv (Conv2D) (None, 28, 28, 128) 32768 ['conv3\_block5\_0\_relu[0][0]']

conv3\_block5\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block5\_1\_conv[0][0]']

ization)

conv3\_block5\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block5\_1\_bn[0][0]']

n)

conv3\_block5\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block5\_1\_relu[0][0]']

conv3\_block5\_concat (Concatena (None, 28, 28, 288) 0 ['conv3\_block4\_concat[0][0]',

te) 'conv3\_block5\_2\_conv[0][0]']

conv3\_block6\_0\_bn (BatchNormal (None, 28, 28, 288) 1152 ['conv3\_block5\_concat[0][0]']

ization)

conv3\_block6\_0\_relu (Activatio (None, 28, 28, 288) 0 ['conv3\_block6\_0\_bn[0][0]']

n)

conv3\_block6\_1\_conv (Conv2D) (None, 28, 28, 128) 36864 ['conv3\_block6\_0\_relu[0][0]']

conv3\_block6\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block6\_1\_conv[0][0]']

ization)

conv3\_block6\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block6\_1\_bn[0][0]']

n)

conv3\_block6\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block6\_1\_relu[0][0]']

conv3\_block6\_concat (Concatena (None, 28, 28, 320) 0 ['conv3\_block5\_concat[0][0]',

te) 'conv3\_block6\_2\_conv[0][0]']

conv3\_block7\_0\_bn (BatchNormal (None, 28, 28, 320) 1280 ['conv3\_block6\_concat[0][0]']

ization)

conv3\_block7\_0\_relu (Activatio (None, 28, 28, 320) 0 ['conv3\_block7\_0\_bn[0][0]']

n)

conv3\_block7\_1\_conv (Conv2D) (None, 28, 28, 128) 40960 ['conv3\_block7\_0\_relu[0][0]']

conv3\_block7\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block7\_1\_conv[0][0]']

ization)

conv3\_block7\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block7\_1\_bn[0][0]']

n)

conv3\_block7\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block7\_1\_relu[0][0]']

conv3\_block7\_concat (Concatena (None, 28, 28, 352) 0 ['conv3\_block6\_concat[0][0]',

te) 'conv3\_block7\_2\_conv[0][0]']

conv3\_block8\_0\_bn (BatchNormal (None, 28, 28, 352) 1408 ['conv3\_block7\_concat[0][0]']

ization)

conv3\_block8\_0\_relu (Activatio (None, 28, 28, 352) 0 ['conv3\_block8\_0\_bn[0][0]']

n)

conv3\_block8\_1\_conv (Conv2D) (None, 28, 28, 128) 45056 ['conv3\_block8\_0\_relu[0][0]']

conv3\_block8\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block8\_1\_conv[0][0]']

ization)

conv3\_block8\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block8\_1\_bn[0][0]']

n)

conv3\_block8\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block8\_1\_relu[0][0]']

conv3\_block8\_concat (Concatena (None, 28, 28, 384) 0 ['conv3\_block7\_concat[0][0]',

te) 'conv3\_block8\_2\_conv[0][0]']

conv3\_block9\_0\_bn (BatchNormal (None, 28, 28, 384) 1536 ['conv3\_block8\_concat[0][0]']

ization)

conv3\_block9\_0\_relu (Activatio (None, 28, 28, 384) 0 ['conv3\_block9\_0\_bn[0][0]']

n)

conv3\_block9\_1\_conv (Conv2D) (None, 28, 28, 128) 49152 ['conv3\_block9\_0\_relu[0][0]']

conv3\_block9\_1\_bn (BatchNormal (None, 28, 28, 128) 512 ['conv3\_block9\_1\_conv[0][0]']

ization)

conv3\_block9\_1\_relu (Activatio (None, 28, 28, 128) 0 ['conv3\_block9\_1\_bn[0][0]']

n)

conv3\_block9\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block9\_1\_relu[0][0]']

conv3\_block9\_concat (Concatena (None, 28, 28, 416) 0 ['conv3\_block8\_concat[0][0]',

te) 'conv3\_block9\_2\_conv[0][0]']

conv3\_block10\_0\_bn (BatchNorma (None, 28, 28, 416) 1664 ['conv3\_block9\_concat[0][0]']

lization)

conv3\_block10\_0\_relu (Activati (None, 28, 28, 416) 0 ['conv3\_block10\_0\_bn[0][0]']

on)

conv3\_block10\_1\_conv (Conv2D) (None, 28, 28, 128) 53248 ['conv3\_block10\_0\_relu[0][0]']

conv3\_block10\_1\_bn (BatchNorma (None, 28, 28, 128) 512 ['conv3\_block10\_1\_conv[0][0]']

lization)

conv3\_block10\_1\_relu (Activati (None, 28, 28, 128) 0 ['conv3\_block10\_1\_bn[0][0]']

on)

conv3\_block10\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block10\_1\_relu[0][0]']

conv3\_block10\_concat (Concaten (None, 28, 28, 448) 0 ['conv3\_block9\_concat[0][0]',

ate) 'conv3\_block10\_2\_conv[0][0]']

conv3\_block11\_0\_bn (BatchNorma (None, 28, 28, 448) 1792 ['conv3\_block10\_concat[0][0]']

lization)

conv3\_block11\_0\_relu (Activati (None, 28, 28, 448) 0 ['conv3\_block11\_0\_bn[0][0]']

on)

conv3\_block11\_1\_conv (Conv2D) (None, 28, 28, 128) 57344 ['conv3\_block11\_0\_relu[0][0]']

conv3\_block11\_1\_bn (BatchNorma (None, 28, 28, 128) 512 ['conv3\_block11\_1\_conv[0][0]']

lization)

conv3\_block11\_1\_relu (Activati (None, 28, 28, 128) 0 ['conv3\_block11\_1\_bn[0][0]']

on)

conv3\_block11\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block11\_1\_relu[0][0]']

conv3\_block11\_concat (Concaten (None, 28, 28, 480) 0 ['conv3\_block10\_concat[0][0]',

ate) 'conv3\_block11\_2\_conv[0][0]']

conv3\_block12\_0\_bn (BatchNorma (None, 28, 28, 480) 1920 ['conv3\_block11\_concat[0][0]']

lization)

conv3\_block12\_0\_relu (Activati (None, 28, 28, 480) 0 ['conv3\_block12\_0\_bn[0][0]']

on)

conv3\_block12\_1\_conv (Conv2D) (None, 28, 28, 128) 61440 ['conv3\_block12\_0\_relu[0][0]']

conv3\_block12\_1\_bn (BatchNorma (None, 28, 28, 128) 512 ['conv3\_block12\_1\_conv[0][0]']

lization)

conv3\_block12\_1\_relu (Activati (None, 28, 28, 128) 0 ['conv3\_block12\_1\_bn[0][0]']

on)

conv3\_block12\_2\_conv (Conv2D) (None, 28, 28, 32) 36864 ['conv3\_block12\_1\_relu[0][0]']

conv3\_block12\_concat (Concaten (None, 28, 28, 512) 0 ['conv3\_block11\_concat[0][0]',

ate) 'conv3\_block12\_2\_conv[0][0]']

pool3\_bn (BatchNormalization) (None, 28, 28, 512) 2048 ['conv3\_block12\_concat[0][0]']

pool3\_relu (Activation) (None, 28, 28, 512) 0 ['pool3\_bn[0][0]']

pool3\_conv (Conv2D) (None, 28, 28, 256) 131072 ['pool3\_relu[0][0]']

pool3\_pool (AveragePooling2D) (None, 14, 14, 256) 0 ['pool3\_conv[0][0]']

conv4\_block1\_0\_bn (BatchNormal (None, 14, 14, 256) 1024 ['pool3\_pool[0][0]']

ization)

conv4\_block1\_0\_relu (Activatio (None, 14, 14, 256) 0 ['conv4\_block1\_0\_bn[0][0]']

n)

conv4\_block1\_1\_conv (Conv2D) (None, 14, 14, 128) 32768 ['conv4\_block1\_0\_relu[0][0]']

conv4\_block1\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block1\_1\_conv[0][0]']

ization)

conv4\_block1\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block1\_1\_bn[0][0]']

n)

conv4\_block1\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block1\_1\_relu[0][0]']

conv4\_block1\_concat (Concatena (None, 14, 14, 288) 0 ['pool3\_pool[0][0]',

te) 'conv4\_block1\_2\_conv[0][0]']

conv4\_block2\_0\_bn (BatchNormal (None, 14, 14, 288) 1152 ['conv4\_block1\_concat[0][0]']

ization)

conv4\_block2\_0\_relu (Activatio (None, 14, 14, 288) 0 ['conv4\_block2\_0\_bn[0][0]']

n)

conv4\_block2\_1\_conv (Conv2D) (None, 14, 14, 128) 36864 ['conv4\_block2\_0\_relu[0][0]']

conv4\_block2\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block2\_1\_conv[0][0]']

ization)

conv4\_block2\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block2\_1\_bn[0][0]']

n)

conv4\_block2\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block2\_1\_relu[0][0]']

conv4\_block2\_concat (Concatena (None, 14, 14, 320) 0 ['conv4\_block1\_concat[0][0]',

te) 'conv4\_block2\_2\_conv[0][0]']

conv4\_block3\_0\_bn (BatchNormal (None, 14, 14, 320) 1280 ['conv4\_block2\_concat[0][0]']

ization)

conv4\_block3\_0\_relu (Activatio (None, 14, 14, 320) 0 ['conv4\_block3\_0\_bn[0][0]']

n)

conv4\_block3\_1\_conv (Conv2D) (None, 14, 14, 128) 40960 ['conv4\_block3\_0\_relu[0][0]']

conv4\_block3\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block3\_1\_conv[0][0]']

ization)

conv4\_block3\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block3\_1\_bn[0][0]']

n)

conv4\_block3\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block3\_1\_relu[0][0]']

conv4\_block3\_concat (Concatena (None, 14, 14, 352) 0 ['conv4\_block2\_concat[0][0]',

te) 'conv4\_block3\_2\_conv[0][0]']

conv4\_block4\_0\_bn (BatchNormal (None, 14, 14, 352) 1408 ['conv4\_block3\_concat[0][0]']

ization)

conv4\_block4\_0\_relu (Activatio (None, 14, 14, 352) 0 ['conv4\_block4\_0\_bn[0][0]']

n)

conv4\_block4\_1\_conv (Conv2D) (None, 14, 14, 128) 45056 ['conv4\_block4\_0\_relu[0][0]']

conv4\_block4\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block4\_1\_conv[0][0]']

ization)

conv4\_block4\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block4\_1\_bn[0][0]']

n)

conv4\_block4\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block4\_1\_relu[0][0]']

conv4\_block4\_concat (Concatena (None, 14, 14, 384) 0 ['conv4\_block3\_concat[0][0]',

te) 'conv4\_block4\_2\_conv[0][0]']

conv4\_block5\_0\_bn (BatchNormal (None, 14, 14, 384) 1536 ['conv4\_block4\_concat[0][0]']

ization)

conv4\_block5\_0\_relu (Activatio (None, 14, 14, 384) 0 ['conv4\_block5\_0\_bn[0][0]']

n)

conv4\_block5\_1\_conv (Conv2D) (None, 14, 14, 128) 49152 ['conv4\_block5\_0\_relu[0][0]']

conv4\_block5\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block5\_1\_conv[0][0]']

ization)

conv4\_block5\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block5\_1\_bn[0][0]']

n)

conv4\_block5\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block5\_1\_relu[0][0]']

conv4\_block5\_concat (Concatena (None, 14, 14, 416) 0 ['conv4\_block4\_concat[0][0]',

te) 'conv4\_block5\_2\_conv[0][0]']

conv4\_block6\_0\_bn (BatchNormal (None, 14, 14, 416) 1664 ['conv4\_block5\_concat[0][0]']

ization)

conv4\_block6\_0\_relu (Activatio (None, 14, 14, 416) 0 ['conv4\_block6\_0\_bn[0][0]']

n)

conv4\_block6\_1\_conv (Conv2D) (None, 14, 14, 128) 53248 ['conv4\_block6\_0\_relu[0][0]']

conv4\_block6\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block6\_1\_conv[0][0]']

ization)

conv4\_block6\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block6\_1\_bn[0][0]']

n)

conv4\_block6\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block6\_1\_relu[0][0]']

conv4\_block6\_concat (Concatena (None, 14, 14, 448) 0 ['conv4\_block5\_concat[0][0]',

te) 'conv4\_block6\_2\_conv[0][0]']

conv4\_block7\_0\_bn (BatchNormal (None, 14, 14, 448) 1792 ['conv4\_block6\_concat[0][0]']

ization)

conv4\_block7\_0\_relu (Activatio (None, 14, 14, 448) 0 ['conv4\_block7\_0\_bn[0][0]']

n)

conv4\_block7\_1\_conv (Conv2D) (None, 14, 14, 128) 57344 ['conv4\_block7\_0\_relu[0][0]']

conv4\_block7\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block7\_1\_conv[0][0]']

ization)

conv4\_block7\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block7\_1\_bn[0][0]']

n)

conv4\_block7\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block7\_1\_relu[0][0]']

conv4\_block7\_concat (Concatena (None, 14, 14, 480) 0 ['conv4\_block6\_concat[0][0]',

te) 'conv4\_block7\_2\_conv[0][0]']

conv4\_block8\_0\_bn (BatchNormal (None, 14, 14, 480) 1920 ['conv4\_block7\_concat[0][0]']

ization)

conv4\_block8\_0\_relu (Activatio (None, 14, 14, 480) 0 ['conv4\_block8\_0\_bn[0][0]']

n)

conv4\_block8\_1\_conv (Conv2D) (None, 14, 14, 128) 61440 ['conv4\_block8\_0\_relu[0][0]']

conv4\_block8\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block8\_1\_conv[0][0]']

ization)

conv4\_block8\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block8\_1\_bn[0][0]']

n)

conv4\_block8\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block8\_1\_relu[0][0]']

conv4\_block8\_concat (Concatena (None, 14, 14, 512) 0 ['conv4\_block7\_concat[0][0]',

te) 'conv4\_block8\_2\_conv[0][0]']

conv4\_block9\_0\_bn (BatchNormal (None, 14, 14, 512) 2048 ['conv4\_block8\_concat[0][0]']

ization)

conv4\_block9\_0\_relu (Activatio (None, 14, 14, 512) 0 ['conv4\_block9\_0\_bn[0][0]']

n)

conv4\_block9\_1\_conv (Conv2D) (None, 14, 14, 128) 65536 ['conv4\_block9\_0\_relu[0][0]']

conv4\_block9\_1\_bn (BatchNormal (None, 14, 14, 128) 512 ['conv4\_block9\_1\_conv[0][0]']

ization)

conv4\_block9\_1\_relu (Activatio (None, 14, 14, 128) 0 ['conv4\_block9\_1\_bn[0][0]']

n)

conv4\_block9\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block9\_1\_relu[0][0]']

conv4\_block9\_concat (Concatena (None, 14, 14, 544) 0 ['conv4\_block8\_concat[0][0]',

te) 'conv4\_block9\_2\_conv[0][0]']

conv4\_block10\_0\_bn (BatchNorma (None, 14, 14, 544) 2176 ['conv4\_block9\_concat[0][0]']

lization)

conv4\_block10\_0\_relu (Activati (None, 14, 14, 544) 0 ['conv4\_block10\_0\_bn[0][0]']

on)

conv4\_block10\_1\_conv (Conv2D) (None, 14, 14, 128) 69632 ['conv4\_block10\_0\_relu[0][0]']

conv4\_block10\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block10\_1\_conv[0][0]']

lization)

conv4\_block10\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block10\_1\_bn[0][0]']

on)

conv4\_block10\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block10\_1\_relu[0][0]']

conv4\_block10\_concat (Concaten (None, 14, 14, 576) 0 ['conv4\_block9\_concat[0][0]',

ate) 'conv4\_block10\_2\_conv[0][0]']

conv4\_block11\_0\_bn (BatchNorma (None, 14, 14, 576) 2304 ['conv4\_block10\_concat[0][0]']

lization)

conv4\_block11\_0\_relu (Activati (None, 14, 14, 576) 0 ['conv4\_block11\_0\_bn[0][0]']

on)

conv4\_block11\_1\_conv (Conv2D) (None, 14, 14, 128) 73728 ['conv4\_block11\_0\_relu[0][0]']

conv4\_block11\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block11\_1\_conv[0][0]']

lization)

conv4\_block11\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block11\_1\_bn[0][0]']

on)

conv4\_block11\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block11\_1\_relu[0][0]']

conv4\_block11\_concat (Concaten (None, 14, 14, 608) 0 ['conv4\_block10\_concat[0][0]',

ate) 'conv4\_block11\_2\_conv[0][0]']

conv4\_block12\_0\_bn (BatchNorma (None, 14, 14, 608) 2432 ['conv4\_block11\_concat[0][0]']

lization)

conv4\_block12\_0\_relu (Activati (None, 14, 14, 608) 0 ['conv4\_block12\_0\_bn[0][0]']

on)

conv4\_block12\_1\_conv (Conv2D) (None, 14, 14, 128) 77824 ['conv4\_block12\_0\_relu[0][0]']

conv4\_block12\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block12\_1\_conv[0][0]']

lization)

conv4\_block12\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block12\_1\_bn[0][0]']

on)

conv4\_block12\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block12\_1\_relu[0][0]']

conv4\_block12\_concat (Concaten (None, 14, 14, 640) 0 ['conv4\_block11\_concat[0][0]',

ate) 'conv4\_block12\_2\_conv[0][0]']

conv4\_block13\_0\_bn (BatchNorma (None, 14, 14, 640) 2560 ['conv4\_block12\_concat[0][0]']

lization)

conv4\_block13\_0\_relu (Activati (None, 14, 14, 640) 0 ['conv4\_block13\_0\_bn[0][0]']

on)

conv4\_block13\_1\_conv (Conv2D) (None, 14, 14, 128) 81920 ['conv4\_block13\_0\_relu[0][0]']

conv4\_block13\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block13\_1\_conv[0][0]']

lization)

conv4\_block13\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block13\_1\_bn[0][0]']

on)

conv4\_block13\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block13\_1\_relu[0][0]']

conv4\_block13\_concat (Concaten (None, 14, 14, 672) 0 ['conv4\_block12\_concat[0][0]',

ate) 'conv4\_block13\_2\_conv[0][0]']

conv4\_block14\_0\_bn (BatchNorma (None, 14, 14, 672) 2688 ['conv4\_block13\_concat[0][0]']

lization)

conv4\_block14\_0\_relu (Activati (None, 14, 14, 672) 0 ['conv4\_block14\_0\_bn[0][0]']

on)

conv4\_block14\_1\_conv (Conv2D) (None, 14, 14, 128) 86016 ['conv4\_block14\_0\_relu[0][0]']

conv4\_block14\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block14\_1\_conv[0][0]']

lization)

conv4\_block14\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block14\_1\_bn[0][0]']

on)

conv4\_block14\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block14\_1\_relu[0][0]']

conv4\_block14\_concat (Concaten (None, 14, 14, 704) 0 ['conv4\_block13\_concat[0][0]',

ate) 'conv4\_block14\_2\_conv[0][0]']

conv4\_block15\_0\_bn (BatchNorma (None, 14, 14, 704) 2816 ['conv4\_block14\_concat[0][0]']

lization)

conv4\_block15\_0\_relu (Activati (None, 14, 14, 704) 0 ['conv4\_block15\_0\_bn[0][0]']

on)

conv4\_block15\_1\_conv (Conv2D) (None, 14, 14, 128) 90112 ['conv4\_block15\_0\_relu[0][0]']

conv4\_block15\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block15\_1\_conv[0][0]']

lization)

conv4\_block15\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block15\_1\_bn[0][0]']

on)

conv4\_block15\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block15\_1\_relu[0][0]']

conv4\_block15\_concat (Concaten (None, 14, 14, 736) 0 ['conv4\_block14\_concat[0][0]',

ate) 'conv4\_block15\_2\_conv[0][0]']

conv4\_block16\_0\_bn (BatchNorma (None, 14, 14, 736) 2944 ['conv4\_block15\_concat[0][0]']

lization)

conv4\_block16\_0\_relu (Activati (None, 14, 14, 736) 0 ['conv4\_block16\_0\_bn[0][0]']

on)

conv4\_block16\_1\_conv (Conv2D) (None, 14, 14, 128) 94208 ['conv4\_block16\_0\_relu[0][0]']

conv4\_block16\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block16\_1\_conv[0][0]']

lization)

conv4\_block16\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block16\_1\_bn[0][0]']

on)

conv4\_block16\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block16\_1\_relu[0][0]']

conv4\_block16\_concat (Concaten (None, 14, 14, 768) 0 ['conv4\_block15\_concat[0][0]',

ate) 'conv4\_block16\_2\_conv[0][0]']

conv4\_block17\_0\_bn (BatchNorma (None, 14, 14, 768) 3072 ['conv4\_block16\_concat[0][0]']

lization)

conv4\_block17\_0\_relu (Activati (None, 14, 14, 768) 0 ['conv4\_block17\_0\_bn[0][0]']

on)

conv4\_block17\_1\_conv (Conv2D) (None, 14, 14, 128) 98304 ['conv4\_block17\_0\_relu[0][0]']

conv4\_block17\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block17\_1\_conv[0][0]']

lization)

conv4\_block17\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block17\_1\_bn[0][0]']

on)

conv4\_block17\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block17\_1\_relu[0][0]']

conv4\_block17\_concat (Concaten (None, 14, 14, 800) 0 ['conv4\_block16\_concat[0][0]',

ate) 'conv4\_block17\_2\_conv[0][0]']

conv4\_block18\_0\_bn (BatchNorma (None, 14, 14, 800) 3200 ['conv4\_block17\_concat[0][0]']

lization)

conv4\_block18\_0\_relu (Activati (None, 14, 14, 800) 0 ['conv4\_block18\_0\_bn[0][0]']

on)

conv4\_block18\_1\_conv (Conv2D) (None, 14, 14, 128) 102400 ['conv4\_block18\_0\_relu[0][0]']

conv4\_block18\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block18\_1\_conv[0][0]']

lization)

conv4\_block18\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block18\_1\_bn[0][0]']

on)

conv4\_block18\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block18\_1\_relu[0][0]']

conv4\_block18\_concat (Concaten (None, 14, 14, 832) 0 ['conv4\_block17\_concat[0][0]',

ate) 'conv4\_block18\_2\_conv[0][0]']

conv4\_block19\_0\_bn (BatchNorma (None, 14, 14, 832) 3328 ['conv4\_block18\_concat[0][0]']

lization)

conv4\_block19\_0\_relu (Activati (None, 14, 14, 832) 0 ['conv4\_block19\_0\_bn[0][0]']

on)

conv4\_block19\_1\_conv (Conv2D) (None, 14, 14, 128) 106496 ['conv4\_block19\_0\_relu[0][0]']

conv4\_block19\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block19\_1\_conv[0][0]']

lization)

conv4\_block19\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block19\_1\_bn[0][0]']

on)

conv4\_block19\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block19\_1\_relu[0][0]']

conv4\_block19\_concat (Concaten (None, 14, 14, 864) 0 ['conv4\_block18\_concat[0][0]',

ate) 'conv4\_block19\_2\_conv[0][0]']

conv4\_block20\_0\_bn (BatchNorma (None, 14, 14, 864) 3456 ['conv4\_block19\_concat[0][0]']

lization)

conv4\_block20\_0\_relu (Activati (None, 14, 14, 864) 0 ['conv4\_block20\_0\_bn[0][0]']

on)

conv4\_block20\_1\_conv (Conv2D) (None, 14, 14, 128) 110592 ['conv4\_block20\_0\_relu[0][0]']

conv4\_block20\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block20\_1\_conv[0][0]']

lization)

conv4\_block20\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block20\_1\_bn[0][0]']

on)

conv4\_block20\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block20\_1\_relu[0][0]']

conv4\_block20\_concat (Concaten (None, 14, 14, 896) 0 ['conv4\_block19\_concat[0][0]',

ate) 'conv4\_block20\_2\_conv[0][0]']

conv4\_block21\_0\_bn (BatchNorma (None, 14, 14, 896) 3584 ['conv4\_block20\_concat[0][0]']

lization)

conv4\_block21\_0\_relu (Activati (None, 14, 14, 896) 0 ['conv4\_block21\_0\_bn[0][0]']

on)

conv4\_block21\_1\_conv (Conv2D) (None, 14, 14, 128) 114688 ['conv4\_block21\_0\_relu[0][0]']

conv4\_block21\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block21\_1\_conv[0][0]']

lization)

conv4\_block21\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block21\_1\_bn[0][0]']

on)

conv4\_block21\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block21\_1\_relu[0][0]']

conv4\_block21\_concat (Concaten (None, 14, 14, 928) 0 ['conv4\_block20\_concat[0][0]',

ate) 'conv4\_block21\_2\_conv[0][0]']

conv4\_block22\_0\_bn (BatchNorma (None, 14, 14, 928) 3712 ['conv4\_block21\_concat[0][0]']

lization)

conv4\_block22\_0\_relu (Activati (None, 14, 14, 928) 0 ['conv4\_block22\_0\_bn[0][0]']

on)

conv4\_block22\_1\_conv (Conv2D) (None, 14, 14, 128) 118784 ['conv4\_block22\_0\_relu[0][0]']

conv4\_block22\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block22\_1\_conv[0][0]']

lization)

conv4\_block22\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block22\_1\_bn[0][0]']

on)

conv4\_block22\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block22\_1\_relu[0][0]']

conv4\_block22\_concat (Concaten (None, 14, 14, 960) 0 ['conv4\_block21\_concat[0][0]',

ate) 'conv4\_block22\_2\_conv[0][0]']

conv4\_block23\_0\_bn (BatchNorma (None, 14, 14, 960) 3840 ['conv4\_block22\_concat[0][0]']

lization)

conv4\_block23\_0\_relu (Activati (None, 14, 14, 960) 0 ['conv4\_block23\_0\_bn[0][0]']

on)

conv4\_block23\_1\_conv (Conv2D) (None, 14, 14, 128) 122880 ['conv4\_block23\_0\_relu[0][0]']

conv4\_block23\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block23\_1\_conv[0][0]']

lization)

conv4\_block23\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block23\_1\_bn[0][0]']

on)

conv4\_block23\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block23\_1\_relu[0][0]']

conv4\_block23\_concat (Concaten (None, 14, 14, 992) 0 ['conv4\_block22\_concat[0][0]',

ate) 'conv4\_block23\_2\_conv[0][0]']

conv4\_block24\_0\_bn (BatchNorma (None, 14, 14, 992) 3968 ['conv4\_block23\_concat[0][0]']

lization)

conv4\_block24\_0\_relu (Activati (None, 14, 14, 992) 0 ['conv4\_block24\_0\_bn[0][0]']

on)

conv4\_block24\_1\_conv (Conv2D) (None, 14, 14, 128) 126976 ['conv4\_block24\_0\_relu[0][0]']

conv4\_block24\_1\_bn (BatchNorma (None, 14, 14, 128) 512 ['conv4\_block24\_1\_conv[0][0]']

lization)

conv4\_block24\_1\_relu (Activati (None, 14, 14, 128) 0 ['conv4\_block24\_1\_bn[0][0]']

on)

conv4\_block24\_2\_conv (Conv2D) (None, 14, 14, 32) 36864 ['conv4\_block24\_1\_relu[0][0]']

conv4\_block24\_concat (Concaten (None, 14, 14, 1024 0 ['conv4\_block23\_concat[0][0]',

ate) ) 'conv4\_block24\_2\_conv[0][0]']

pool4\_bn (BatchNormalization) (None, 14, 14, 1024 4096 ['conv4\_block24\_concat[0][0]']

)

pool4\_relu (Activation) (None, 14, 14, 1024 0 ['pool4\_bn[0][0]']

)

pool4\_conv (Conv2D) (None, 14, 14, 512) 524288 ['pool4\_relu[0][0]']

pool4\_pool (AveragePooling2D) (None, 7, 7, 512) 0 ['pool4\_conv[0][0]']

conv5\_block1\_0\_bn (BatchNormal (None, 7, 7, 512) 2048 ['pool4\_pool[0][0]']

ization)

conv5\_block1\_0\_relu (Activatio (None, 7, 7, 512) 0 ['conv5\_block1\_0\_bn[0][0]']

n)

conv5\_block1\_1\_conv (Conv2D) (None, 7, 7, 128) 65536 ['conv5\_block1\_0\_relu[0][0]']

conv5\_block1\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block1\_1\_conv[0][0]']

ization)

conv5\_block1\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block1\_1\_bn[0][0]']

n)

conv5\_block1\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block1\_1\_relu[0][0]']

conv5\_block1\_concat (Concatena (None, 7, 7, 544) 0 ['pool4\_pool[0][0]',

te) 'conv5\_block1\_2\_conv[0][0]']

conv5\_block2\_0\_bn (BatchNormal (None, 7, 7, 544) 2176 ['conv5\_block1\_concat[0][0]']

ization)

conv5\_block2\_0\_relu (Activatio (None, 7, 7, 544) 0 ['conv5\_block2\_0\_bn[0][0]']

n)

conv5\_block2\_1\_conv (Conv2D) (None, 7, 7, 128) 69632 ['conv5\_block2\_0\_relu[0][0]']

conv5\_block2\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block2\_1\_conv[0][0]']

ization)

conv5\_block2\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block2\_1\_bn[0][0]']

n)

conv5\_block2\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block2\_1\_relu[0][0]']

conv5\_block2\_concat (Concatena (None, 7, 7, 576) 0 ['conv5\_block1\_concat[0][0]',

te) 'conv5\_block2\_2\_conv[0][0]']

conv5\_block3\_0\_bn (BatchNormal (None, 7, 7, 576) 2304 ['conv5\_block2\_concat[0][0]']

ization)

conv5\_block3\_0\_relu (Activatio (None, 7, 7, 576) 0 ['conv5\_block3\_0\_bn[0][0]']

n)

conv5\_block3\_1\_conv (Conv2D) (None, 7, 7, 128) 73728 ['conv5\_block3\_0\_relu[0][0]']

conv5\_block3\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block3\_1\_conv[0][0]']

ization)

conv5\_block3\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block3\_1\_bn[0][0]']

n)

conv5\_block3\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block3\_1\_relu[0][0]']

conv5\_block3\_concat (Concatena (None, 7, 7, 608) 0 ['conv5\_block2\_concat[0][0]',

te) 'conv5\_block3\_2\_conv[0][0]']

conv5\_block4\_0\_bn (BatchNormal (None, 7, 7, 608) 2432 ['conv5\_block3\_concat[0][0]']

ization)

conv5\_block4\_0\_relu (Activatio (None, 7, 7, 608) 0 ['conv5\_block4\_0\_bn[0][0]']

n)

conv5\_block4\_1\_conv (Conv2D) (None, 7, 7, 128) 77824 ['conv5\_block4\_0\_relu[0][0]']

conv5\_block4\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block4\_1\_conv[0][0]']

ization)

conv5\_block4\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block4\_1\_bn[0][0]']

n)

conv5\_block4\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block4\_1\_relu[0][0]']

conv5\_block4\_concat (Concatena (None, 7, 7, 640) 0 ['conv5\_block3\_concat[0][0]',

te) 'conv5\_block4\_2\_conv[0][0]']

conv5\_block5\_0\_bn (BatchNormal (None, 7, 7, 640) 2560 ['conv5\_block4\_concat[0][0]']

ization)

conv5\_block5\_0\_relu (Activatio (None, 7, 7, 640) 0 ['conv5\_block5\_0\_bn[0][0]']

n)

conv5\_block5\_1\_conv (Conv2D) (None, 7, 7, 128) 81920 ['conv5\_block5\_0\_relu[0][0]']

conv5\_block5\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block5\_1\_conv[0][0]']

ization)

conv5\_block5\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block5\_1\_bn[0][0]']

n)

conv5\_block5\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block5\_1\_relu[0][0]']

conv5\_block5\_concat (Concatena (None, 7, 7, 672) 0 ['conv5\_block4\_concat[0][0]',

te) 'conv5\_block5\_2\_conv[0][0]']

conv5\_block6\_0\_bn (BatchNormal (None, 7, 7, 672) 2688 ['conv5\_block5\_concat[0][0]']

ization)

conv5\_block6\_0\_relu (Activatio (None, 7, 7, 672) 0 ['conv5\_block6\_0\_bn[0][0]']

n)

conv5\_block6\_1\_conv (Conv2D) (None, 7, 7, 128) 86016 ['conv5\_block6\_0\_relu[0][0]']

conv5\_block6\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block6\_1\_conv[0][0]']

ization)

conv5\_block6\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block6\_1\_bn[0][0]']

n)

conv5\_block6\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block6\_1\_relu[0][0]']

conv5\_block6\_concat (Concatena (None, 7, 7, 704) 0 ['conv5\_block5\_concat[0][0]',

te) 'conv5\_block6\_2\_conv[0][0]']

conv5\_block7\_0\_bn (BatchNormal (None, 7, 7, 704) 2816 ['conv5\_block6\_concat[0][0]']

ization)

conv5\_block7\_0\_relu (Activatio (None, 7, 7, 704) 0 ['conv5\_block7\_0\_bn[0][0]']

n)

conv5\_block7\_1\_conv (Conv2D) (None, 7, 7, 128) 90112 ['conv5\_block7\_0\_relu[0][0]']

conv5\_block7\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block7\_1\_conv[0][0]']

ization)

conv5\_block7\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block7\_1\_bn[0][0]']

n)

conv5\_block7\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block7\_1\_relu[0][0]']

conv5\_block7\_concat (Concatena (None, 7, 7, 736) 0 ['conv5\_block6\_concat[0][0]',

te) 'conv5\_block7\_2\_conv[0][0]']

conv5\_block8\_0\_bn (BatchNormal (None, 7, 7, 736) 2944 ['conv5\_block7\_concat[0][0]']

ization)

conv5\_block8\_0\_relu (Activatio (None, 7, 7, 736) 0 ['conv5\_block8\_0\_bn[0][0]']

n)

conv5\_block8\_1\_conv (Conv2D) (None, 7, 7, 128) 94208 ['conv5\_block8\_0\_relu[0][0]']

conv5\_block8\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block8\_1\_conv[0][0]']

ization)

conv5\_block8\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block8\_1\_bn[0][0]']

n)

conv5\_block8\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block8\_1\_relu[0][0]']

conv5\_block8\_concat (Concatena (None, 7, 7, 768) 0 ['conv5\_block7\_concat[0][0]',

te) 'conv5\_block8\_2\_conv[0][0]']

conv5\_block9\_0\_bn (BatchNormal (None, 7, 7, 768) 3072 ['conv5\_block8\_concat[0][0]']

ization)

conv5\_block9\_0\_relu (Activatio (None, 7, 7, 768) 0 ['conv5\_block9\_0\_bn[0][0]']

n)

conv5\_block9\_1\_conv (Conv2D) (None, 7, 7, 128) 98304 ['conv5\_block9\_0\_relu[0][0]']

conv5\_block9\_1\_bn (BatchNormal (None, 7, 7, 128) 512 ['conv5\_block9\_1\_conv[0][0]']

ization)

conv5\_block9\_1\_relu (Activatio (None, 7, 7, 128) 0 ['conv5\_block9\_1\_bn[0][0]']

n)

conv5\_block9\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block9\_1\_relu[0][0]']

conv5\_block9\_concat (Concatena (None, 7, 7, 800) 0 ['conv5\_block8\_concat[0][0]',

te) 'conv5\_block9\_2\_conv[0][0]']

conv5\_block10\_0\_bn (BatchNorma (None, 7, 7, 800) 3200 ['conv5\_block9\_concat[0][0]']

lization)

conv5\_block10\_0\_relu (Activati (None, 7, 7, 800) 0 ['conv5\_block10\_0\_bn[0][0]']

on)

conv5\_block10\_1\_conv (Conv2D) (None, 7, 7, 128) 102400 ['conv5\_block10\_0\_relu[0][0]']

conv5\_block10\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block10\_1\_conv[0][0]']

lization)

conv5\_block10\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block10\_1\_bn[0][0]']

on)

conv5\_block10\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block10\_1\_relu[0][0]']

conv5\_block10\_concat (Concaten (None, 7, 7, 832) 0 ['conv5\_block9\_concat[0][0]',

ate) 'conv5\_block10\_2\_conv[0][0]']

conv5\_block11\_0\_bn (BatchNorma (None, 7, 7, 832) 3328 ['conv5\_block10\_concat[0][0]']

lization)

conv5\_block11\_0\_relu (Activati (None, 7, 7, 832) 0 ['conv5\_block11\_0\_bn[0][0]']

on)

conv5\_block11\_1\_conv (Conv2D) (None, 7, 7, 128) 106496 ['conv5\_block11\_0\_relu[0][0]']

conv5\_block11\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block11\_1\_conv[0][0]']

lization)

conv5\_block11\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block11\_1\_bn[0][0]']

on)

conv5\_block11\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block11\_1\_relu[0][0]']

conv5\_block11\_concat (Concaten (None, 7, 7, 864) 0 ['conv5\_block10\_concat[0][0]',

ate) 'conv5\_block11\_2\_conv[0][0]']

conv5\_block12\_0\_bn (BatchNorma (None, 7, 7, 864) 3456 ['conv5\_block11\_concat[0][0]']

lization)

conv5\_block12\_0\_relu (Activati (None, 7, 7, 864) 0 ['conv5\_block12\_0\_bn[0][0]']

on)

conv5\_block12\_1\_conv (Conv2D) (None, 7, 7, 128) 110592 ['conv5\_block12\_0\_relu[0][0]']

conv5\_block12\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block12\_1\_conv[0][0]']

lization)

conv5\_block12\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block12\_1\_bn[0][0]']

on)

conv5\_block12\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block12\_1\_relu[0][0]']

conv5\_block12\_concat (Concaten (None, 7, 7, 896) 0 ['conv5\_block11\_concat[0][0]',

ate) 'conv5\_block12\_2\_conv[0][0]']

conv5\_block13\_0\_bn (BatchNorma (None, 7, 7, 896) 3584 ['conv5\_block12\_concat[0][0]']

lization)

conv5\_block13\_0\_relu (Activati (None, 7, 7, 896) 0 ['conv5\_block13\_0\_bn[0][0]']

on)

conv5\_block13\_1\_conv (Conv2D) (None, 7, 7, 128) 114688 ['conv5\_block13\_0\_relu[0][0]']

conv5\_block13\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block13\_1\_conv[0][0]']

lization)

conv5\_block13\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block13\_1\_bn[0][0]']

on)

conv5\_block13\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block13\_1\_relu[0][0]']

conv5\_block13\_concat (Concaten (None, 7, 7, 928) 0 ['conv5\_block12\_concat[0][0]',

ate) 'conv5\_block13\_2\_conv[0][0]']

conv5\_block14\_0\_bn (BatchNorma (None, 7, 7, 928) 3712 ['conv5\_block13\_concat[0][0]']

lization)

conv5\_block14\_0\_relu (Activati (None, 7, 7, 928) 0 ['conv5\_block14\_0\_bn[0][0]']

on)

conv5\_block14\_1\_conv (Conv2D) (None, 7, 7, 128) 118784 ['conv5\_block14\_0\_relu[0][0]']

conv5\_block14\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block14\_1\_conv[0][0]']

lization)

conv5\_block14\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block14\_1\_bn[0][0]']

on)

conv5\_block14\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block14\_1\_relu[0][0]']

conv5\_block14\_concat (Concaten (None, 7, 7, 960) 0 ['conv5\_block13\_concat[0][0]',

ate) 'conv5\_block14\_2\_conv[0][0]']

conv5\_block15\_0\_bn (BatchNorma (None, 7, 7, 960) 3840 ['conv5\_block14\_concat[0][0]']

lization)

conv5\_block15\_0\_relu (Activati (None, 7, 7, 960) 0 ['conv5\_block15\_0\_bn[0][0]']

on)

conv5\_block15\_1\_conv (Conv2D) (None, 7, 7, 128) 122880 ['conv5\_block15\_0\_relu[0][0]']

conv5\_block15\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block15\_1\_conv[0][0]']

lization)

conv5\_block15\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block15\_1\_bn[0][0]']

on)

conv5\_block15\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block15\_1\_relu[0][0]']

conv5\_block15\_concat (Concaten (None, 7, 7, 992) 0 ['conv5\_block14\_concat[0][0]',

ate) 'conv5\_block15\_2\_conv[0][0]']

conv5\_block16\_0\_bn (BatchNorma (None, 7, 7, 992) 3968 ['conv5\_block15\_concat[0][0]']

lization)

conv5\_block16\_0\_relu (Activati (None, 7, 7, 992) 0 ['conv5\_block16\_0\_bn[0][0]']

on)

conv5\_block16\_1\_conv (Conv2D) (None, 7, 7, 128) 126976 ['conv5\_block16\_0\_relu[0][0]']

conv5\_block16\_1\_bn (BatchNorma (None, 7, 7, 128) 512 ['conv5\_block16\_1\_conv[0][0]']

lization)

conv5\_block16\_1\_relu (Activati (None, 7, 7, 128) 0 ['conv5\_block16\_1\_bn[0][0]']

on)

conv5\_block16\_2\_conv (Conv2D) (None, 7, 7, 32) 36864 ['conv5\_block16\_1\_relu[0][0]']

conv5\_block16\_concat (Concaten (None, 7, 7, 1024) 0 ['conv5\_block15\_concat[0][0]',

ate) 'conv5\_block16\_2\_conv[0][0]']

bn (BatchNormalization) (None, 7, 7, 1024) 4096 ['conv5\_block16\_concat[0][0]']

relu (Activation) (None, 7, 7, 1024) 0 ['bn[0][0]']

flatten\_4 (Flatten) (None, 50176) 0 ['relu[0][0]']

dense\_4 (Dense) (None, 1) 50177 ['flatten\_4[0][0]']

==================================================================================================

Total params: 7,087,681

Trainable params: 50,177

Non-trainable params: 7,037,504

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Epoch 1/100

17/17 [==============================] - 18s 555ms/step - loss: 2.7870 - accuracy: 0.5885 - val\_loss: 1.7544 - val\_accuracy: 0.6119 - lr: 0.0010

Epoch 2/100

17/17 [==============================] - 5s 281ms/step - loss: 0.6915 - accuracy: 0.8007 - val\_loss: 0.5709 - val\_accuracy: 0.8060 - lr: 0.0010

Epoch 3/100

17/17 [==============================] - 5s 289ms/step - loss: 0.1833 - accuracy: 0.9236 - val\_loss: 0.4274 - val\_accuracy: 0.8209 - lr: 0.0010

Epoch 4/100

17/17 [==============================] - 5s 277ms/step - loss: 0.0935 - accuracy: 0.9683 - val\_loss: 0.3872 - val\_accuracy: 0.8806 - lr: 0.0010

Epoch 5/100

17/17 [==============================] - 5s 271ms/step - loss: 0.0445 - accuracy: 0.9963 - val\_loss: 0.3912 - val\_accuracy: 0.8582 - lr: 0.0010

Epoch 6/100

17/17 [==============================] - 5s 274ms/step - loss: 0.0374 - accuracy: 0.9981 - val\_loss: 0.3962 - val\_accuracy: 0.8582 - lr: 0.0010

Epoch 7/100

17/17 [==============================] - 5s 282ms/step - loss: 0.0221 - accuracy: 1.0000 - val\_loss: 0.3367 - val\_accuracy: 0.9104 - lr: 0.0010

Epoch 8/100

17/17 [==============================] - 5s 273ms/step - loss: 0.0148 - accuracy: 1.0000 - val\_loss: 0.3495 - val\_accuracy: 0.8806 - lr: 0.0010

Epoch 9/100

17/17 [==============================] - 5s 276ms/step - loss: 0.0118 - accuracy: 1.0000 - val\_loss: 0.3518 - val\_accuracy: 0.8955 - lr: 0.0010

Epoch 10/100

17/17 [==============================] - 5s 271ms/step - loss: 0.0109 - accuracy: 1.0000 - val\_loss: 0.3547 - val\_accuracy: 0.8881 - lr: 0.0010

Epoch 11/100

17/17 [==============================] - 5s 278ms/step - loss: 0.0096 - accuracy: 1.0000 - val\_loss: 0.3503 - val\_accuracy: 0.9030 - lr: 1.0000e-04

Epoch 12/100

17/17 [==============================] - 5s 293ms/step - loss: 0.0087 - accuracy: 1.0000 - val\_loss: 0.3506 - val\_accuracy: 0.9030 - lr: 1.0000e-04

INFO:tensorflow:Assets written to: /content/drive/MyDrive/CTDenseNet121Split0.9noAug/assets

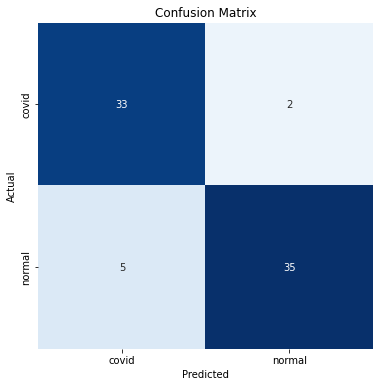
Test Loss: 0.19470

Test Accuracy: 90.67%

WARNING:tensorflow:5 out of the last 13 calls to <function Model.make\_predict\_function.<locals>.predict\_function at 0x7f26ca287f80> triggered tf.function retracing. Tracing is expensive and the excessive number of tracings could be due to (1) creating @tf.function repeatedly in a loop, (2) passing tensors with different shapes, (3) passing Python objects instead of tensors. For (1), please define your @tf.function outside of the loop. For (2), @tf.function has experimental\_relax\_shapes=True option that relaxes argument shapes that can avoid unnecessary retracing. For (3), please refer to <https://www.tensorflow.org/guide/function#controlling_retracing> and <https://www.tensorflow.org/api_docs/python/tf/function> for more details.

/usr/local/lib/python3.7/dist-packages/ipykernel\_launcher.py:123: DeprecationWarning: `np.int` is a deprecated alias for the builtin `int`. To silence this warning, use `int` by itself. Doing this will not modify any behavior and is safe. When replacing `np.int`, you may wish to use e.g. `np.int64` or `np.int32` to specify the precision. If you wish to review your current use, check the release note link for additional information.

Deprecated in NumPy 1.20; for more details and guidance: <https://numpy.org/devdocs/release/1.20.0-notes.html#deprecations>



Classification Report:

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precision recall f1-score support

covid 0.87 0.94 0.90 35

normal 0.95 0.88 0.91 40

accuracy 0.91 75

macro avg 0.91 0.91 0.91 75

weighted avg 0.91 0.91 0.91 75

