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

Layer (type) Output Shape Param # Connected to

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

input\_2 (InputLayer) [(None, 224, 224, 3 0 []

)]

block1\_conv1 (Conv2D) (None, 111, 111, 32 864 ['input\_2[0][0]']

)

block1\_conv1\_bn (BatchNormaliz (None, 111, 111, 32 128 ['block1\_conv1[0][0]']

ation) )

block1\_conv1\_act (Activation) (None, 111, 111, 32 0 ['block1\_conv1\_bn[0][0]']

)

block1\_conv2 (Conv2D) (None, 109, 109, 64 18432 ['block1\_conv1\_act[0][0]']

)

block1\_conv2\_bn (BatchNormaliz (None, 109, 109, 64 256 ['block1\_conv2[0][0]']

ation) )

block1\_conv2\_act (Activation) (None, 109, 109, 64 0 ['block1\_conv2\_bn[0][0]']

)

block2\_sepconv1 (SeparableConv (None, 109, 109, 12 8768 ['block1\_conv2\_act[0][0]']

2D) 8)

block2\_sepconv1\_bn (BatchNorma (None, 109, 109, 12 512 ['block2\_sepconv1[0][0]']

lization) 8)

block2\_sepconv2\_act (Activatio (None, 109, 109, 12 0 ['block2\_sepconv1\_bn[0][0]']

n) 8)

block2\_sepconv2 (SeparableConv (None, 109, 109, 12 17536 ['block2\_sepconv2\_act[0][0]']

2D) 8)

block2\_sepconv2\_bn (BatchNorma (None, 109, 109, 12 512 ['block2\_sepconv2[0][0]']

lization) 8)

conv2d\_4 (Conv2D) (None, 55, 55, 128) 8192 ['block1\_conv2\_act[0][0]']

block2\_pool (MaxPooling2D) (None, 55, 55, 128) 0 ['block2\_sepconv2\_bn[0][0]']

batch\_normalization\_4 (BatchNo (None, 55, 55, 128) 512 ['conv2d\_4[0][0]']

rmalization)

add\_12 (Add) (None, 55, 55, 128) 0 ['block2\_pool[0][0]',

'batch\_normalization\_4[0][0]']

block3\_sepconv1\_act (Activatio (None, 55, 55, 128) 0 ['add\_12[0][0]']

n)

block3\_sepconv1 (SeparableConv (None, 55, 55, 256) 33920 ['block3\_sepconv1\_act[0][0]']

2D)

block3\_sepconv1\_bn (BatchNorma (None, 55, 55, 256) 1024 ['block3\_sepconv1[0][0]']

lization)

block3\_sepconv2\_act (Activatio (None, 55, 55, 256) 0 ['block3\_sepconv1\_bn[0][0]']

n)

block3\_sepconv2 (SeparableConv (None, 55, 55, 256) 67840 ['block3\_sepconv2\_act[0][0]']

2D)

block3\_sepconv2\_bn (BatchNorma (None, 55, 55, 256) 1024 ['block3\_sepconv2[0][0]']

lization)

conv2d\_5 (Conv2D) (None, 28, 28, 256) 32768 ['add\_12[0][0]']

block3\_pool (MaxPooling2D) (None, 28, 28, 256) 0 ['block3\_sepconv2\_bn[0][0]']

batch\_normalization\_5 (BatchNo (None, 28, 28, 256) 1024 ['conv2d\_5[0][0]']

rmalization)

add\_13 (Add) (None, 28, 28, 256) 0 ['block3\_pool[0][0]',

'batch\_normalization\_5[0][0]']

block4\_sepconv1\_act (Activatio (None, 28, 28, 256) 0 ['add\_13[0][0]']

n)

block4\_sepconv1 (SeparableConv (None, 28, 28, 728) 188672 ['block4\_sepconv1\_act[0][0]']

2D)

block4\_sepconv1\_bn (BatchNorma (None, 28, 28, 728) 2912 ['block4\_sepconv1[0][0]']

lization)

block4\_sepconv2\_act (Activatio (None, 28, 28, 728) 0 ['block4\_sepconv1\_bn[0][0]']

n)

block4\_sepconv2 (SeparableConv (None, 28, 28, 728) 536536 ['block4\_sepconv2\_act[0][0]']

2D)

block4\_sepconv2\_bn (BatchNorma (None, 28, 28, 728) 2912 ['block4\_sepconv2[0][0]']

lization)

conv2d\_6 (Conv2D) (None, 14, 14, 728) 186368 ['add\_13[0][0]']

block4\_pool (MaxPooling2D) (None, 14, 14, 728) 0 ['block4\_sepconv2\_bn[0][0]']

batch\_normalization\_6 (BatchNo (None, 14, 14, 728) 2912 ['conv2d\_6[0][0]']

rmalization)

add\_14 (Add) (None, 14, 14, 728) 0 ['block4\_pool[0][0]',

'batch\_normalization\_6[0][0]']

block5\_sepconv1\_act (Activatio (None, 14, 14, 728) 0 ['add\_14[0][0]']

n)

block5\_sepconv1 (SeparableConv (None, 14, 14, 728) 536536 ['block5\_sepconv1\_act[0][0]']

2D)

block5\_sepconv1\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block5\_sepconv1[0][0]']

lization)

block5\_sepconv2\_act (Activatio (None, 14, 14, 728) 0 ['block5\_sepconv1\_bn[0][0]']

n)

block5\_sepconv2 (SeparableConv (None, 14, 14, 728) 536536 ['block5\_sepconv2\_act[0][0]']

2D)

block5\_sepconv2\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block5\_sepconv2[0][0]']

lization)

block5\_sepconv3\_act (Activatio (None, 14, 14, 728) 0 ['block5\_sepconv2\_bn[0][0]']

n)

block5\_sepconv3 (SeparableConv (None, 14, 14, 728) 536536 ['block5\_sepconv3\_act[0][0]']

2D)

block5\_sepconv3\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block5\_sepconv3[0][0]']

lization)

add\_15 (Add) (None, 14, 14, 728) 0 ['block5\_sepconv3\_bn[0][0]',

'add\_14[0][0]']

block6\_sepconv1\_act (Activatio (None, 14, 14, 728) 0 ['add\_15[0][0]']

n)

block6\_sepconv1 (SeparableConv (None, 14, 14, 728) 536536 ['block6\_sepconv1\_act[0][0]']

2D)

block6\_sepconv1\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block6\_sepconv1[0][0]']

lization)

block6\_sepconv2\_act (Activatio (None, 14, 14, 728) 0 ['block6\_sepconv1\_bn[0][0]']

n)

block6\_sepconv2 (SeparableConv (None, 14, 14, 728) 536536 ['block6\_sepconv2\_act[0][0]']

2D)

block6\_sepconv2\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block6\_sepconv2[0][0]']

lization)

block6\_sepconv3\_act (Activatio (None, 14, 14, 728) 0 ['block6\_sepconv2\_bn[0][0]']

n)

block6\_sepconv3 (SeparableConv (None, 14, 14, 728) 536536 ['block6\_sepconv3\_act[0][0]']

2D)

block6\_sepconv3\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block6\_sepconv3[0][0]']

lization)

add\_16 (Add) (None, 14, 14, 728) 0 ['block6\_sepconv3\_bn[0][0]',

'add\_15[0][0]']

block7\_sepconv1\_act (Activatio (None, 14, 14, 728) 0 ['add\_16[0][0]']

n)

block7\_sepconv1 (SeparableConv (None, 14, 14, 728) 536536 ['block7\_sepconv1\_act[0][0]']

2D)

block7\_sepconv1\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block7\_sepconv1[0][0]']

lization)

block7\_sepconv2\_act (Activatio (None, 14, 14, 728) 0 ['block7\_sepconv1\_bn[0][0]']

n)

block7\_sepconv2 (SeparableConv (None, 14, 14, 728) 536536 ['block7\_sepconv2\_act[0][0]']

2D)

block7\_sepconv2\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block7\_sepconv2[0][0]']

lization)

block7\_sepconv3\_act (Activatio (None, 14, 14, 728) 0 ['block7\_sepconv2\_bn[0][0]']

n)

block7\_sepconv3 (SeparableConv (None, 14, 14, 728) 536536 ['block7\_sepconv3\_act[0][0]']

2D)

block7\_sepconv3\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block7\_sepconv3[0][0]']

lization)

add\_17 (Add) (None, 14, 14, 728) 0 ['block7\_sepconv3\_bn[0][0]',

'add\_16[0][0]']

block8\_sepconv1\_act (Activatio (None, 14, 14, 728) 0 ['add\_17[0][0]']

n)

block8\_sepconv1 (SeparableConv (None, 14, 14, 728) 536536 ['block8\_sepconv1\_act[0][0]']

2D)

block8\_sepconv1\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block8\_sepconv1[0][0]']

lization)

block8\_sepconv2\_act (Activatio (None, 14, 14, 728) 0 ['block8\_sepconv1\_bn[0][0]']

n)

block8\_sepconv2 (SeparableConv (None, 14, 14, 728) 536536 ['block8\_sepconv2\_act[0][0]']

2D)

block8\_sepconv2\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block8\_sepconv2[0][0]']

lization)

block8\_sepconv3\_act (Activatio (None, 14, 14, 728) 0 ['block8\_sepconv2\_bn[0][0]']

n)

block8\_sepconv3 (SeparableConv (None, 14, 14, 728) 536536 ['block8\_sepconv3\_act[0][0]']

2D)

block8\_sepconv3\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block8\_sepconv3[0][0]']

lization)

add\_18 (Add) (None, 14, 14, 728) 0 ['block8\_sepconv3\_bn[0][0]',

'add\_17[0][0]']

block9\_sepconv1\_act (Activatio (None, 14, 14, 728) 0 ['add\_18[0][0]']

n)

block9\_sepconv1 (SeparableConv (None, 14, 14, 728) 536536 ['block9\_sepconv1\_act[0][0]']

2D)

block9\_sepconv1\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block9\_sepconv1[0][0]']

lization)

block9\_sepconv2\_act (Activatio (None, 14, 14, 728) 0 ['block9\_sepconv1\_bn[0][0]']

n)

block9\_sepconv2 (SeparableConv (None, 14, 14, 728) 536536 ['block9\_sepconv2\_act[0][0]']

2D)

block9\_sepconv2\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block9\_sepconv2[0][0]']

lization)

block9\_sepconv3\_act (Activatio (None, 14, 14, 728) 0 ['block9\_sepconv2\_bn[0][0]']

n)

block9\_sepconv3 (SeparableConv (None, 14, 14, 728) 536536 ['block9\_sepconv3\_act[0][0]']

2D)

block9\_sepconv3\_bn (BatchNorma (None, 14, 14, 728) 2912 ['block9\_sepconv3[0][0]']

lization)

add\_19 (Add) (None, 14, 14, 728) 0 ['block9\_sepconv3\_bn[0][0]',

'add\_18[0][0]']

block10\_sepconv1\_act (Activati (None, 14, 14, 728) 0 ['add\_19[0][0]']

on)

block10\_sepconv1 (SeparableCon (None, 14, 14, 728) 536536 ['block10\_sepconv1\_act[0][0]']

v2D)

block10\_sepconv1\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block10\_sepconv1[0][0]']

alization)

block10\_sepconv2\_act (Activati (None, 14, 14, 728) 0 ['block10\_sepconv1\_bn[0][0]']

on)

block10\_sepconv2 (SeparableCon (None, 14, 14, 728) 536536 ['block10\_sepconv2\_act[0][0]']

v2D)

block10\_sepconv2\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block10\_sepconv2[0][0]']

alization)

block10\_sepconv3\_act (Activati (None, 14, 14, 728) 0 ['block10\_sepconv2\_bn[0][0]']

on)

block10\_sepconv3 (SeparableCon (None, 14, 14, 728) 536536 ['block10\_sepconv3\_act[0][0]']

v2D)

block10\_sepconv3\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block10\_sepconv3[0][0]']

alization)

add\_20 (Add) (None, 14, 14, 728) 0 ['block10\_sepconv3\_bn[0][0]',

'add\_19[0][0]']

block11\_sepconv1\_act (Activati (None, 14, 14, 728) 0 ['add\_20[0][0]']

on)

block11\_sepconv1 (SeparableCon (None, 14, 14, 728) 536536 ['block11\_sepconv1\_act[0][0]']

v2D)

block11\_sepconv1\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block11\_sepconv1[0][0]']

alization)

block11\_sepconv2\_act (Activati (None, 14, 14, 728) 0 ['block11\_sepconv1\_bn[0][0]']

on)

block11\_sepconv2 (SeparableCon (None, 14, 14, 728) 536536 ['block11\_sepconv2\_act[0][0]']

v2D)

block11\_sepconv2\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block11\_sepconv2[0][0]']

alization)

block11\_sepconv3\_act (Activati (None, 14, 14, 728) 0 ['block11\_sepconv2\_bn[0][0]']

on)

block11\_sepconv3 (SeparableCon (None, 14, 14, 728) 536536 ['block11\_sepconv3\_act[0][0]']

v2D)

block11\_sepconv3\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block11\_sepconv3[0][0]']

alization)

add\_21 (Add) (None, 14, 14, 728) 0 ['block11\_sepconv3\_bn[0][0]',

'add\_20[0][0]']

block12\_sepconv1\_act (Activati (None, 14, 14, 728) 0 ['add\_21[0][0]']

on)

block12\_sepconv1 (SeparableCon (None, 14, 14, 728) 536536 ['block12\_sepconv1\_act[0][0]']

v2D)

block12\_sepconv1\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block12\_sepconv1[0][0]']

alization)

block12\_sepconv2\_act (Activati (None, 14, 14, 728) 0 ['block12\_sepconv1\_bn[0][0]']

on)

block12\_sepconv2 (SeparableCon (None, 14, 14, 728) 536536 ['block12\_sepconv2\_act[0][0]']

v2D)

block12\_sepconv2\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block12\_sepconv2[0][0]']

alization)

block12\_sepconv3\_act (Activati (None, 14, 14, 728) 0 ['block12\_sepconv2\_bn[0][0]']

on)

block12\_sepconv3 (SeparableCon (None, 14, 14, 728) 536536 ['block12\_sepconv3\_act[0][0]']

v2D)

block12\_sepconv3\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block12\_sepconv3[0][0]']

alization)

add\_22 (Add) (None, 14, 14, 728) 0 ['block12\_sepconv3\_bn[0][0]',

'add\_21[0][0]']

block13\_sepconv1\_act (Activati (None, 14, 14, 728) 0 ['add\_22[0][0]']

on)

block13\_sepconv1 (SeparableCon (None, 14, 14, 728) 536536 ['block13\_sepconv1\_act[0][0]']

v2D)

block13\_sepconv1\_bn (BatchNorm (None, 14, 14, 728) 2912 ['block13\_sepconv1[0][0]']

alization)

block13\_sepconv2\_act (Activati (None, 14, 14, 728) 0 ['block13\_sepconv1\_bn[0][0]']

on)

block13\_sepconv2 (SeparableCon (None, 14, 14, 1024 752024 ['block13\_sepconv2\_act[0][0]']

v2D) )

block13\_sepconv2\_bn (BatchNorm (None, 14, 14, 1024 4096 ['block13\_sepconv2[0][0]']

alization) )

conv2d\_7 (Conv2D) (None, 7, 7, 1024) 745472 ['add\_22[0][0]']

block13\_pool (MaxPooling2D) (None, 7, 7, 1024) 0 ['block13\_sepconv2\_bn[0][0]']

batch\_normalization\_7 (BatchNo (None, 7, 7, 1024) 4096 ['conv2d\_7[0][0]']

rmalization)

add\_23 (Add) (None, 7, 7, 1024) 0 ['block13\_pool[0][0]',

'batch\_normalization\_7[0][0]']

block14\_sepconv1 (SeparableCon (None, 7, 7, 1536) 1582080 ['add\_23[0][0]']

v2D)

block14\_sepconv1\_bn (BatchNorm (None, 7, 7, 1536) 6144 ['block14\_sepconv1[0][0]']

alization)

block14\_sepconv1\_act (Activati (None, 7, 7, 1536) 0 ['block14\_sepconv1\_bn[0][0]']

on)

block14\_sepconv2 (SeparableCon (None, 7, 7, 2048) 3159552 ['block14\_sepconv1\_act[0][0]']

v2D)

block14\_sepconv2\_bn (BatchNorm (None, 7, 7, 2048) 8192 ['block14\_sepconv2[0][0]']

alization)

block14\_sepconv2\_act (Activati (None, 7, 7, 2048) 0 ['block14\_sepconv2\_bn[0][0]']

on)

flatten (Flatten) (None, 100352) 0 ['block14\_sepconv2\_act[0][0]']

dense (Dense) (None, 1) 100353 ['flatten[0][0]']

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

Total params: 20,961,833

Trainable params: 100,353

Non-trainable params: 20,861,480

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Epoch 1/100

17/17 [==============================] - 93s 5s/step - loss: 2.1491 - accuracy: 0.6276 - val\_loss: 1.3102 - val\_accuracy: 0.6940 - lr: 0.0010

Epoch 2/100

17/17 [==============================] - 8s 445ms/step - loss: 0.5909 - accuracy: 0.8268 - val\_loss: 0.7234 - val\_accuracy: 0.7761 - lr: 0.0010

Epoch 3/100

17/17 [==============================] - 9s 512ms/step - loss: 0.3226 - accuracy: 0.8901 - val\_loss: 0.8157 - val\_accuracy: 0.7313 - lr: 0.0010

Epoch 4/100

17/17 [==============================] - 8s 447ms/step - loss: 0.1680 - accuracy: 0.9330 - val\_loss: 0.5332 - val\_accuracy: 0.7910 - lr: 0.0010

Epoch 5/100

17/17 [==============================] - 8s 441ms/step - loss: 0.0620 - accuracy: 0.9795 - val\_loss: 0.4879 - val\_accuracy: 0.7836 - lr: 0.0010

Epoch 6/100

17/17 [==============================] - 8s 434ms/step - loss: 0.0347 - accuracy: 0.9926 - val\_loss: 0.4891 - val\_accuracy: 0.7985 - lr: 0.0010

Epoch 7/100

17/17 [==============================] - 8s 440ms/step - loss: 0.0159 - accuracy: 1.0000 - val\_loss: 0.4941 - val\_accuracy: 0.7761 - lr: 0.0010

Epoch 8/100

17/17 [==============================] - 8s 449ms/step - loss: 0.0108 - accuracy: 1.0000 - val\_loss: 0.4636 - val\_accuracy: 0.8134 - lr: 0.0010

Epoch 9/100

17/17 [==============================] - 8s 442ms/step - loss: 0.0081 - accuracy: 1.0000 - val\_loss: 0.4535 - val\_accuracy: 0.7985 - lr: 0.0010

Epoch 10/100

17/17 [==============================] - 7s 433ms/step - loss: 0.0068 - accuracy: 1.0000 - val\_loss: 0.4578 - val\_accuracy: 0.8060 - lr: 0.0010

Epoch 11/100

17/17 [==============================] - 7s 435ms/step - loss: 0.0061 - accuracy: 1.0000 - val\_loss: 0.4590 - val\_accuracy: 0.8060 - lr: 0.0010

Epoch 12/100

17/17 [==============================] - 8s 439ms/step - loss: 0.0055 - accuracy: 1.0000 - val\_loss: 0.4568 - val\_accuracy: 0.7985 - lr: 0.0010

Epoch 13/100

17/17 [==============================] - 8s 453ms/step - loss: 0.0051 - accuracy: 1.0000 - val\_loss: 0.4581 - val\_accuracy: 0.7985 - lr: 1.0000e-04

Epoch 14/100

17/17 [==============================] - 7s 441ms/step - loss: 0.0050 - accuracy: 1.0000 - val\_loss: 0.4600 - val\_accuracy: 0.7985 - lr: 1.0000e-04

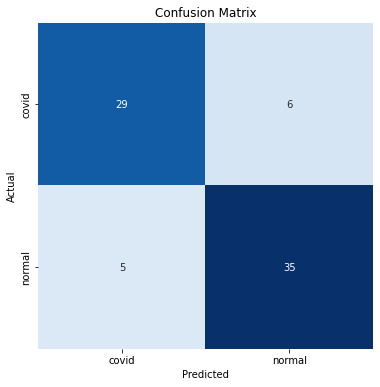
INFO:tensorflow:Assets written to: /content/drive/MyDrive/CTxceptionSplit0.9noAug/assets

Test Loss: 0.42029

Test Accuracy: 85.33%

/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 0.85 0.83 0.84 35

normal 0.85 0.88 0.86 40

accuracy 0.85 75

macro avg 0.85 0.85 0.85 75

weighted avg 0.85 0.85 0.85 75

