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

Layer (type) Output Shape Param # Connected to

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

input\_3 (InputLayer) [(None, 224, 224, 3 0 []

)]

Conv1 (Conv2D) (None, 112, 112, 32 864 ['input\_3[0][0]']

)

bn\_Conv1 (BatchNormalization) (None, 112, 112, 32 128 ['Conv1[0][0]']

)

Conv1\_relu (ReLU) (None, 112, 112, 32 0 ['bn\_Conv1[0][0]']

)

expanded\_conv\_depthwise (Depth (None, 112, 112, 32 288 ['Conv1\_relu[0][0]']

wiseConv2D) )

expanded\_conv\_depthwise\_BN (Ba (None, 112, 112, 32 128 ['expanded\_conv\_depthwise[0][0]']

tchNormalization) )

expanded\_conv\_depthwise\_relu ( (None, 112, 112, 32 0 ['expanded\_conv\_depthwise\_BN[0][0

ReLU) ) ]']

expanded\_conv\_project (Conv2D) (None, 112, 112, 16 512 ['expanded\_conv\_depthwise\_relu[0]

) [0]']

expanded\_conv\_project\_BN (Batc (None, 112, 112, 16 64 ['expanded\_conv\_project[0][0]']

hNormalization) )

block\_1\_expand (Conv2D) (None, 112, 112, 96 1536 ['expanded\_conv\_project\_BN[0][0]'

) ]

block\_1\_expand\_BN (BatchNormal (None, 112, 112, 96 384 ['block\_1\_expand[0][0]']

ization) )

block\_1\_expand\_relu (ReLU) (None, 112, 112, 96 0 ['block\_1\_expand\_BN[0][0]']

)

block\_1\_pad (ZeroPadding2D) (None, 113, 113, 96 0 ['block\_1\_expand\_relu[0][0]']

)

block\_1\_depthwise (DepthwiseCo (None, 56, 56, 96) 864 ['block\_1\_pad[0][0]']

nv2D)

block\_1\_depthwise\_BN (BatchNor (None, 56, 56, 96) 384 ['block\_1\_depthwise[0][0]']

malization)

block\_1\_depthwise\_relu (ReLU) (None, 56, 56, 96) 0 ['block\_1\_depthwise\_BN[0][0]']

block\_1\_project (Conv2D) (None, 56, 56, 24) 2304 ['block\_1\_depthwise\_relu[0][0]']

block\_1\_project\_BN (BatchNorma (None, 56, 56, 24) 96 ['block\_1\_project[0][0]']

lization)

block\_2\_expand (Conv2D) (None, 56, 56, 144) 3456 ['block\_1\_project\_BN[0][0]']

block\_2\_expand\_BN (BatchNormal (None, 56, 56, 144) 576 ['block\_2\_expand[0][0]']

ization)

block\_2\_expand\_relu (ReLU) (None, 56, 56, 144) 0 ['block\_2\_expand\_BN[0][0]']

block\_2\_depthwise (DepthwiseCo (None, 56, 56, 144) 1296 ['block\_2\_expand\_relu[0][0]']

nv2D)

block\_2\_depthwise\_BN (BatchNor (None, 56, 56, 144) 576 ['block\_2\_depthwise[0][0]']

malization)

block\_2\_depthwise\_relu (ReLU) (None, 56, 56, 144) 0 ['block\_2\_depthwise\_BN[0][0]']

block\_2\_project (Conv2D) (None, 56, 56, 24) 3456 ['block\_2\_depthwise\_relu[0][0]']

block\_2\_project\_BN (BatchNorma (None, 56, 56, 24) 96 ['block\_2\_project[0][0]']

lization)

block\_2\_add (Add) (None, 56, 56, 24) 0 ['block\_1\_project\_BN[0][0]',

'block\_2\_project\_BN[0][0]']

block\_3\_expand (Conv2D) (None, 56, 56, 144) 3456 ['block\_2\_add[0][0]']

block\_3\_expand\_BN (BatchNormal (None, 56, 56, 144) 576 ['block\_3\_expand[0][0]']

ization)

block\_3\_expand\_relu (ReLU) (None, 56, 56, 144) 0 ['block\_3\_expand\_BN[0][0]']

block\_3\_pad (ZeroPadding2D) (None, 57, 57, 144) 0 ['block\_3\_expand\_relu[0][0]']

block\_3\_depthwise (DepthwiseCo (None, 28, 28, 144) 1296 ['block\_3\_pad[0][0]']

nv2D)

block\_3\_depthwise\_BN (BatchNor (None, 28, 28, 144) 576 ['block\_3\_depthwise[0][0]']

malization)

block\_3\_depthwise\_relu (ReLU) (None, 28, 28, 144) 0 ['block\_3\_depthwise\_BN[0][0]']

block\_3\_project (Conv2D) (None, 28, 28, 32) 4608 ['block\_3\_depthwise\_relu[0][0]']

block\_3\_project\_BN (BatchNorma (None, 28, 28, 32) 128 ['block\_3\_project[0][0]']

lization)

block\_4\_expand (Conv2D) (None, 28, 28, 192) 6144 ['block\_3\_project\_BN[0][0]']

block\_4\_expand\_BN (BatchNormal (None, 28, 28, 192) 768 ['block\_4\_expand[0][0]']

ization)

block\_4\_expand\_relu (ReLU) (None, 28, 28, 192) 0 ['block\_4\_expand\_BN[0][0]']

block\_4\_depthwise (DepthwiseCo (None, 28, 28, 192) 1728 ['block\_4\_expand\_relu[0][0]']

nv2D)

block\_4\_depthwise\_BN (BatchNor (None, 28, 28, 192) 768 ['block\_4\_depthwise[0][0]']

malization)

block\_4\_depthwise\_relu (ReLU) (None, 28, 28, 192) 0 ['block\_4\_depthwise\_BN[0][0]']

block\_4\_project (Conv2D) (None, 28, 28, 32) 6144 ['block\_4\_depthwise\_relu[0][0]']

block\_4\_project\_BN (BatchNorma (None, 28, 28, 32) 128 ['block\_4\_project[0][0]']

lization)

block\_4\_add (Add) (None, 28, 28, 32) 0 ['block\_3\_project\_BN[0][0]',

'block\_4\_project\_BN[0][0]']

block\_5\_expand (Conv2D) (None, 28, 28, 192) 6144 ['block\_4\_add[0][0]']

block\_5\_expand\_BN (BatchNormal (None, 28, 28, 192) 768 ['block\_5\_expand[0][0]']

ization)

block\_5\_expand\_relu (ReLU) (None, 28, 28, 192) 0 ['block\_5\_expand\_BN[0][0]']

block\_5\_depthwise (DepthwiseCo (None, 28, 28, 192) 1728 ['block\_5\_expand\_relu[0][0]']

nv2D)

block\_5\_depthwise\_BN (BatchNor (None, 28, 28, 192) 768 ['block\_5\_depthwise[0][0]']

malization)

block\_5\_depthwise\_relu (ReLU) (None, 28, 28, 192) 0 ['block\_5\_depthwise\_BN[0][0]']

block\_5\_project (Conv2D) (None, 28, 28, 32) 6144 ['block\_5\_depthwise\_relu[0][0]']

block\_5\_project\_BN (BatchNorma (None, 28, 28, 32) 128 ['block\_5\_project[0][0]']

lization)

block\_5\_add (Add) (None, 28, 28, 32) 0 ['block\_4\_add[0][0]',

'block\_5\_project\_BN[0][0]']

block\_6\_expand (Conv2D) (None, 28, 28, 192) 6144 ['block\_5\_add[0][0]']

block\_6\_expand\_BN (BatchNormal (None, 28, 28, 192) 768 ['block\_6\_expand[0][0]']

ization)

block\_6\_expand\_relu (ReLU) (None, 28, 28, 192) 0 ['block\_6\_expand\_BN[0][0]']

block\_6\_pad (ZeroPadding2D) (None, 29, 29, 192) 0 ['block\_6\_expand\_relu[0][0]']

block\_6\_depthwise (DepthwiseCo (None, 14, 14, 192) 1728 ['block\_6\_pad[0][0]']

nv2D)

block\_6\_depthwise\_BN (BatchNor (None, 14, 14, 192) 768 ['block\_6\_depthwise[0][0]']

malization)

block\_6\_depthwise\_relu (ReLU) (None, 14, 14, 192) 0 ['block\_6\_depthwise\_BN[0][0]']

block\_6\_project (Conv2D) (None, 14, 14, 64) 12288 ['block\_6\_depthwise\_relu[0][0]']

block\_6\_project\_BN (BatchNorma (None, 14, 14, 64) 256 ['block\_6\_project[0][0]']

lization)

block\_7\_expand (Conv2D) (None, 14, 14, 384) 24576 ['block\_6\_project\_BN[0][0]']

block\_7\_expand\_BN (BatchNormal (None, 14, 14, 384) 1536 ['block\_7\_expand[0][0]']

ization)

block\_7\_expand\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_7\_expand\_BN[0][0]']

block\_7\_depthwise (DepthwiseCo (None, 14, 14, 384) 3456 ['block\_7\_expand\_relu[0][0]']

nv2D)

block\_7\_depthwise\_BN (BatchNor (None, 14, 14, 384) 1536 ['block\_7\_depthwise[0][0]']

malization)

block\_7\_depthwise\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_7\_depthwise\_BN[0][0]']

block\_7\_project (Conv2D) (None, 14, 14, 64) 24576 ['block\_7\_depthwise\_relu[0][0]']

block\_7\_project\_BN (BatchNorma (None, 14, 14, 64) 256 ['block\_7\_project[0][0]']

lization)

block\_7\_add (Add) (None, 14, 14, 64) 0 ['block\_6\_project\_BN[0][0]',

'block\_7\_project\_BN[0][0]']

block\_8\_expand (Conv2D) (None, 14, 14, 384) 24576 ['block\_7\_add[0][0]']

block\_8\_expand\_BN (BatchNormal (None, 14, 14, 384) 1536 ['block\_8\_expand[0][0]']

ization)

block\_8\_expand\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_8\_expand\_BN[0][0]']

block\_8\_depthwise (DepthwiseCo (None, 14, 14, 384) 3456 ['block\_8\_expand\_relu[0][0]']

nv2D)

block\_8\_depthwise\_BN (BatchNor (None, 14, 14, 384) 1536 ['block\_8\_depthwise[0][0]']

malization)

block\_8\_depthwise\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_8\_depthwise\_BN[0][0]']

block\_8\_project (Conv2D) (None, 14, 14, 64) 24576 ['block\_8\_depthwise\_relu[0][0]']

block\_8\_project\_BN (BatchNorma (None, 14, 14, 64) 256 ['block\_8\_project[0][0]']

lization)

block\_8\_add (Add) (None, 14, 14, 64) 0 ['block\_7\_add[0][0]',

'block\_8\_project\_BN[0][0]']

block\_9\_expand (Conv2D) (None, 14, 14, 384) 24576 ['block\_8\_add[0][0]']

block\_9\_expand\_BN (BatchNormal (None, 14, 14, 384) 1536 ['block\_9\_expand[0][0]']

ization)

block\_9\_expand\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_9\_expand\_BN[0][0]']

block\_9\_depthwise (DepthwiseCo (None, 14, 14, 384) 3456 ['block\_9\_expand\_relu[0][0]']

nv2D)

block\_9\_depthwise\_BN (BatchNor (None, 14, 14, 384) 1536 ['block\_9\_depthwise[0][0]']

malization)

block\_9\_depthwise\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_9\_depthwise\_BN[0][0]']

block\_9\_project (Conv2D) (None, 14, 14, 64) 24576 ['block\_9\_depthwise\_relu[0][0]']

block\_9\_project\_BN (BatchNorma (None, 14, 14, 64) 256 ['block\_9\_project[0][0]']

lization)

block\_9\_add (Add) (None, 14, 14, 64) 0 ['block\_8\_add[0][0]',

'block\_9\_project\_BN[0][0]']

block\_10\_expand (Conv2D) (None, 14, 14, 384) 24576 ['block\_9\_add[0][0]']

block\_10\_expand\_BN (BatchNorma (None, 14, 14, 384) 1536 ['block\_10\_expand[0][0]']

lization)

block\_10\_expand\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_10\_expand\_BN[0][0]']

block\_10\_depthwise (DepthwiseC (None, 14, 14, 384) 3456 ['block\_10\_expand\_relu[0][0]']

onv2D)

block\_10\_depthwise\_BN (BatchNo (None, 14, 14, 384) 1536 ['block\_10\_depthwise[0][0]']

rmalization)

block\_10\_depthwise\_relu (ReLU) (None, 14, 14, 384) 0 ['block\_10\_depthwise\_BN[0][0]']

block\_10\_project (Conv2D) (None, 14, 14, 96) 36864 ['block\_10\_depthwise\_relu[0][0]']

block\_10\_project\_BN (BatchNorm (None, 14, 14, 96) 384 ['block\_10\_project[0][0]']

alization)

block\_11\_expand (Conv2D) (None, 14, 14, 576) 55296 ['block\_10\_project\_BN[0][0]']

block\_11\_expand\_BN (BatchNorma (None, 14, 14, 576) 2304 ['block\_11\_expand[0][0]']

lization)

block\_11\_expand\_relu (ReLU) (None, 14, 14, 576) 0 ['block\_11\_expand\_BN[0][0]']

block\_11\_depthwise (DepthwiseC (None, 14, 14, 576) 5184 ['block\_11\_expand\_relu[0][0]']

onv2D)

block\_11\_depthwise\_BN (BatchNo (None, 14, 14, 576) 2304 ['block\_11\_depthwise[0][0]']

rmalization)

block\_11\_depthwise\_relu (ReLU) (None, 14, 14, 576) 0 ['block\_11\_depthwise\_BN[0][0]']

block\_11\_project (Conv2D) (None, 14, 14, 96) 55296 ['block\_11\_depthwise\_relu[0][0]']

block\_11\_project\_BN (BatchNorm (None, 14, 14, 96) 384 ['block\_11\_project[0][0]']

alization)

block\_11\_add (Add) (None, 14, 14, 96) 0 ['block\_10\_project\_BN[0][0]',

'block\_11\_project\_BN[0][0]']

block\_12\_expand (Conv2D) (None, 14, 14, 576) 55296 ['block\_11\_add[0][0]']

block\_12\_expand\_BN (BatchNorma (None, 14, 14, 576) 2304 ['block\_12\_expand[0][0]']

lization)

block\_12\_expand\_relu (ReLU) (None, 14, 14, 576) 0 ['block\_12\_expand\_BN[0][0]']

block\_12\_depthwise (DepthwiseC (None, 14, 14, 576) 5184 ['block\_12\_expand\_relu[0][0]']

onv2D)

block\_12\_depthwise\_BN (BatchNo (None, 14, 14, 576) 2304 ['block\_12\_depthwise[0][0]']

rmalization)

block\_12\_depthwise\_relu (ReLU) (None, 14, 14, 576) 0 ['block\_12\_depthwise\_BN[0][0]']

block\_12\_project (Conv2D) (None, 14, 14, 96) 55296 ['block\_12\_depthwise\_relu[0][0]']

block\_12\_project\_BN (BatchNorm (None, 14, 14, 96) 384 ['block\_12\_project[0][0]']

alization)

block\_12\_add (Add) (None, 14, 14, 96) 0 ['block\_11\_add[0][0]',

'block\_12\_project\_BN[0][0]']

block\_13\_expand (Conv2D) (None, 14, 14, 576) 55296 ['block\_12\_add[0][0]']

block\_13\_expand\_BN (BatchNorma (None, 14, 14, 576) 2304 ['block\_13\_expand[0][0]']

lization)

block\_13\_expand\_relu (ReLU) (None, 14, 14, 576) 0 ['block\_13\_expand\_BN[0][0]']

block\_13\_pad (ZeroPadding2D) (None, 15, 15, 576) 0 ['block\_13\_expand\_relu[0][0]']

block\_13\_depthwise (DepthwiseC (None, 7, 7, 576) 5184 ['block\_13\_pad[0][0]']

onv2D)

block\_13\_depthwise\_BN (BatchNo (None, 7, 7, 576) 2304 ['block\_13\_depthwise[0][0]']

rmalization)

block\_13\_depthwise\_relu (ReLU) (None, 7, 7, 576) 0 ['block\_13\_depthwise\_BN[0][0]']

block\_13\_project (Conv2D) (None, 7, 7, 160) 92160 ['block\_13\_depthwise\_relu[0][0]']

block\_13\_project\_BN (BatchNorm (None, 7, 7, 160) 640 ['block\_13\_project[0][0]']

alization)

block\_14\_expand (Conv2D) (None, 7, 7, 960) 153600 ['block\_13\_project\_BN[0][0]']

block\_14\_expand\_BN (BatchNorma (None, 7, 7, 960) 3840 ['block\_14\_expand[0][0]']

lization)

block\_14\_expand\_relu (ReLU) (None, 7, 7, 960) 0 ['block\_14\_expand\_BN[0][0]']

block\_14\_depthwise (DepthwiseC (None, 7, 7, 960) 8640 ['block\_14\_expand\_relu[0][0]']

onv2D)

block\_14\_depthwise\_BN (BatchNo (None, 7, 7, 960) 3840 ['block\_14\_depthwise[0][0]']

rmalization)

block\_14\_depthwise\_relu (ReLU) (None, 7, 7, 960) 0 ['block\_14\_depthwise\_BN[0][0]']

block\_14\_project (Conv2D) (None, 7, 7, 160) 153600 ['block\_14\_depthwise\_relu[0][0]']

block\_14\_project\_BN (BatchNorm (None, 7, 7, 160) 640 ['block\_14\_project[0][0]']

alization)

block\_14\_add (Add) (None, 7, 7, 160) 0 ['block\_13\_project\_BN[0][0]',

'block\_14\_project\_BN[0][0]']

block\_15\_expand (Conv2D) (None, 7, 7, 960) 153600 ['block\_14\_add[0][0]']

block\_15\_expand\_BN (BatchNorma (None, 7, 7, 960) 3840 ['block\_15\_expand[0][0]']

lization)

block\_15\_expand\_relu (ReLU) (None, 7, 7, 960) 0 ['block\_15\_expand\_BN[0][0]']

block\_15\_depthwise (DepthwiseC (None, 7, 7, 960) 8640 ['block\_15\_expand\_relu[0][0]']

onv2D)

block\_15\_depthwise\_BN (BatchNo (None, 7, 7, 960) 3840 ['block\_15\_depthwise[0][0]']

rmalization)

block\_15\_depthwise\_relu (ReLU) (None, 7, 7, 960) 0 ['block\_15\_depthwise\_BN[0][0]']

block\_15\_project (Conv2D) (None, 7, 7, 160) 153600 ['block\_15\_depthwise\_relu[0][0]']

block\_15\_project\_BN (BatchNorm (None, 7, 7, 160) 640 ['block\_15\_project[0][0]']

alization)

block\_15\_add (Add) (None, 7, 7, 160) 0 ['block\_14\_add[0][0]',

'block\_15\_project\_BN[0][0]']

block\_16\_expand (Conv2D) (None, 7, 7, 960) 153600 ['block\_15\_add[0][0]']

block\_16\_expand\_BN (BatchNorma (None, 7, 7, 960) 3840 ['block\_16\_expand[0][0]']

lization)

block\_16\_expand\_relu (ReLU) (None, 7, 7, 960) 0 ['block\_16\_expand\_BN[0][0]']

block\_16\_depthwise (DepthwiseC (None, 7, 7, 960) 8640 ['block\_16\_expand\_relu[0][0]']

onv2D)

block\_16\_depthwise\_BN (BatchNo (None, 7, 7, 960) 3840 ['block\_16\_depthwise[0][0]']

rmalization)

block\_16\_depthwise\_relu (ReLU) (None, 7, 7, 960) 0 ['block\_16\_depthwise\_BN[0][0]']

block\_16\_project (Conv2D) (None, 7, 7, 320) 307200 ['block\_16\_depthwise\_relu[0][0]']

block\_16\_project\_BN (BatchNorm (None, 7, 7, 320) 1280 ['block\_16\_project[0][0]']

alization)

Conv\_1 (Conv2D) (None, 7, 7, 1280) 409600 ['block\_16\_project\_BN[0][0]']

Conv\_1\_bn (BatchNormalization) (None, 7, 7, 1280) 5120 ['Conv\_1[0][0]']

out\_relu (ReLU) (None, 7, 7, 1280) 0 ['Conv\_1\_bn[0][0]']

flatten (Flatten) (None, 62720) 0 ['out\_relu[0][0]']

dense (Dense) (None, 1) 62721 ['flatten[0][0]']

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

Total params: 2,320,705

Trainable params: 62,721

Non-trainable params: 2,257,984

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Epoch 1/100

55/55 [==============================] - 380s 7s/step - loss: 0.4566 - accuracy: 0.9130 - val\_loss: 0.1224 - val\_accuracy: 0.9654 - lr: 0.0010

Epoch 2/100

55/55 [==============================] - 47s 859ms/step - loss: 0.0249 - accuracy: 0.9931 - val\_loss: 0.0993 - val\_accuracy: 0.9770 - lr: 0.0010

Epoch 3/100

55/55 [==============================] - 47s 867ms/step - loss: 0.0102 - accuracy: 0.9960 - val\_loss: 0.1470 - val\_accuracy: 0.9700 - lr: 0.0010

Epoch 4/100

55/55 [==============================] - 47s 862ms/step - loss: 5.5586e-04 - accuracy: 1.0000 - val\_loss: 0.1318 - val\_accuracy: 0.9700 - lr: 0.0010

Epoch 5/100

55/55 [==============================] - 47s 859ms/step - loss: 2.4079e-04 - accuracy: 1.0000 - val\_loss: 0.1284 - val\_accuracy: 0.9700 - lr: 0.0010

Epoch 6/100

55/55 [==============================] - 47s 862ms/step - loss: 1.4213e-04 - accuracy: 1.0000 - val\_loss: 0.1284 - val\_accuracy: 0.9700 - lr: 1.0000e-04

Epoch 7/100

55/55 [==============================] - 47s 860ms/step - loss: 1.3275e-04 - accuracy: 1.0000 - val\_loss: 0.1284 - val\_accuracy: 0.9700 - lr: 1.0000e-04

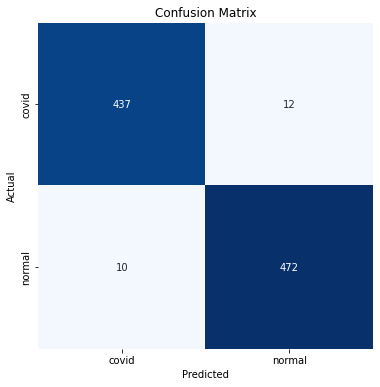
INFO:tensorflow:Assets written to: /content/drive/MyDrive/MobileNetV2Split0.7noAug/assets

Test Loss: 0.16039

Test Accuracy: 97.64%

/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 0.98 0.97 0.98 449

normal 0.98 0.98 0.98 482

accuracy 0.98 931

macro avg 0.98 0.98 0.98 931

weighted avg 0.98 0.98 0.98 931

