Layer	Output Shape	Param #	Connected to
conv5_block7_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block7_1_relu[0][0]
conv5_block7_concat (Concatenat	(None, 8, 8, 736)	0	conv5_block6_concat[0][0] conv5_block7_2_conv[0][0]
conv5_block8_0_bn (BatchNormali	(None, 8, 8, 736)	2944	conv5_block7_concat[0][0]
conv5_block8_0_relu (Activation	(None, 8, 8, 736)	0	conv5_block8_0_bn[0][0]
conv5_block8_1_conv (Conv2D)	(None, 8, 8, 128)	94208	conv5_block8_0_relu[0][0]
conv5_block8_1_bn (BatchNormali	(None, 8, 8, 128)	512	conv5_block8_1_conv[0][0]
conv5_block8_1_relu (Activation	(None, 8, 8, 128)	0	conv5_block8_1_bn[0][0]
conv5_block8_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block8_1_relu[0][0]
conv5_block8_concat (Concatenat	(None, 8, 8, 768)	0	conv5_block7_concat[0][0] conv5_block8_2_conv[0][0]
conv5_block9_0_bn (BatchNormali	(None, 8, 8, 768)	3072	conv5_block8_concat[0][0]
conv5_block9_0_relu (Activation	(None, 8, 8, 768)	0	conv5_block9_0_bn[0][0]
conv5_block9_1_conv (Conv2D)	(None, 8, 8, 128)	98304	conv5_block9_0_relu[0][0]
conv5_block9_1_bn (BatchNormali	(None, 8, 8, 128)	512	conv5_block9_1_conv[0][0]
conv5_block9_1_relu (Activation	(None, 8, 8, 128)	0	conv5_block9_1_bn[0][0]
conv5_block9_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block9_1_relu[0][0]
conv5_block9_concat (Concatenat	(None, 8, 8, 800)	0	conv5_block8_concat[0][0] conv5_block9_2_conv[0][0]
conv5_block10_0_bn (BatchNormal	(None, 8, 8, 800)	3200	conv5_block9_concat[0][0]
conv5_block10_0_relu (Activatio	(None, 8, 8, 800)	0	conv5_block10_0_bn[0][0]
conv5_block10_1_conv (Conv2D)	(None, 8, 8, 128)	102400	conv5_block10_0_relu[0][0]
conv5_block10_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block10_1_conv[0][0]
conv5_block10_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block10_1_bn[0][0]
conv5_block10_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block10_1_relu[0][0]
conv5_block10_concat (Concatena	(None, 8, 8, 832)	0	conv5_block9_concat[0][0] conv5_block10_2_conv[0][0]
conv5_block11_0_bn (BatchNormal	(None, 8, 8, 832)	3328	conv5_block10_concat[0][0]
conv5_block11_0_relu (Activatio	(None, 8, 8, 832)	0	conv5_block11_0_bn[0][0]
conv5_block11_1_conv (Conv2D)	(None, 8, 8, 128)	106496	conv5_block11_0_relu[0][0]
conv5_block11_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block11_1_conv[0][0]
conv5_block11_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block11_1_bn[0][0]
conv5_block11_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block11_1_relu[0][0]
conv5_block11_concat (Concatena	(None, 8, 8, 864)	0	conv5_block10_concat[0][0] conv5_block11_2_conv[0][0]
conv5_block12_0_bn (BatchNormal	(None, 8, 8, 864)	3456	conv5_block11_concat[0][0]
conv5_block12_0_relu (Activatio	(None, 8, 8, 864)	0	conv5_block12_0_bn[0][0]
conv5_block12_1_conv (Conv2D)	(None, 8, 8, 128)	110592	conv5_block12_0_relu[0][0]
conv5_block12_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block12_1_conv[0][0]
conv5_block12_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block12_1_bn[0][0]
conv5_block12_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block12_1_relu[0][0]
conv5_block12_concat (Concatena	(None, 8, 8, 896)	0	conv5_block11_concat[0][0] conv5_block12_2_conv[0][0]
conv5_block13_0_bn (BatchNormal	(None, 8, 8, 896)	3584	conv5_block12_concat[0][0]
conv5_block13_0_relu (Activatio	(None, 8, 8, 896)	0	conv5_block13_0_bn[0][0]
conv5_block13_1_conv (Conv2D)	(None, 8, 8, 128)	114688	conv5_block13_0_relu[0][0]
conv5_block13_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block13_1_conv[0][0]
conv5_block13_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block13_1_bn[0][0]
conv5_block13_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block13_1_relu[0][0]
conv5_block13_concat (Concatena	(None, 8, 8, 928)	0	conv5_block12_concat[0][0] conv5_block13_2_conv[0][0]
conv5_block14_0_bn (BatchNormal	(None, 8, 8, 928)	3712	conv5_block13_concat[0][0]
conv5_block14_0_relu (Activatio	(None, 8, 8, 928)	0	conv5_block14_0_bn[0][0]
conv5_block14_1_conv (Conv2D)	(None, 8, 8, 128)	118784	conv5_block14_0_relu[0][0]
conv5_block14_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block14_1_conv[0][0]
conv5_block14_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block14_1_bn[0][0]
conv5_block14_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block14_1_relu[0][0]
conv5_block14_concat (Concatena	(None, 8, 8, 960)	0	conv5_block13_concat[0][0] conv5_block14_2_conv[0][0]
conv5_block15_0_bn (BatchNormal	(None, 8, 8, 960)	3840	conv5_block14_concat[0][0]
conv5_block15_0_relu (Activatio	(None, 8, 8, 960)	0	conv5_block15_0_bn[0][0]
conv5_block15_1_conv (Conv2D)	(None, 8, 8, 128)	122880	conv5_block15_0_relu[0][0]
conv5_block15_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block15_1_conv[0][0]
conv5_block15_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block15_1_bn[0][0]
conv5_block15_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block15_1_relu[0][0]
conv5_block15_concat (Concatena	(None, 8, 8, 992)	0	conv5_block14_concat[0][0] conv5_block15_2_conv[0][0]
conv5_block16_0_bn (BatchNormal	(None, 8, 8, 992)	3968	conv5_block15_concat[0][0]
conv5_block16_0_relu (Activatio	(None, 8, 8, 992)	0	conv5_block16_0_bn[0][0]
conv5_block16_1_conv (Conv2D)	(None, 8, 8, 128)	126976	conv5_block16_0_relu[0][0]
conv5_block16_1_bn (BatchNormal	(None, 8, 8, 128)	512	conv5_block16_1_conv[0][0]
conv5_block16_1_relu (Activatio	(None, 8, 8, 128)	0	conv5_block16_1_bn[0][0]
conv5_block16_2_conv (Conv2D)	(None, 8, 8, 32)	36864	conv5_block16_1_relu[0][0]
conv5_block16_concat (Concatena	(None, 8, 8, 1024)	0	conv5_block15_concat[0][0] conv5_block16_2_conv[0][0]
bn (BatchNormalization)	(None, 8, 8, 1024)	4096	conv5_block16_concat[0][0]
relu (Activation)	(None, 8, 8, 1024)	0	bn[0][0]
avg_pool (GlobalAveragePooling2	(None, 1024)	0	relu[0][0]
fc1000 (Dense)	(None, 3)	3075	avg_pool[0][0]

```
==================================================================================================
Total params: 7,040,579
Trainable params: 6,956,931
Non-trainable params: 83,648
_____
Epoch 1/20
136/136 [==============================] - 131s 966ms/step - loss: 0.3334 - accuracy: 0.8877 - val_loss: 0.9879 - val_accuracy: 0.4641

Epoch 00001: val_accuracy improved from -inf to 0.46411, saving model to /content/drive/My Drive/COVID/Vanshika/Models/alexnet.h5
Epoch 2/20
136/136 [==============================] - 86s 634ms/step - loss: 0.1982 - accuracy: 0.9296 - val_loss: 5.4367 - val_accuracy: 0.4641

Epoch 00002: val_accuracy did not improve from 0.46411
Epoch 3/20
136/136 [==============================] - 85s 623ms/step - loss: 0.1491 - accuracy: 0.9427 - val_loss: 3.8530 - val_accuracy: 0.3995

Epoch 00003: val_accuracy did not improve from 0.46411
Epoch 4/20
136/136 [==============================] - 85s 622ms/step - loss: 0.1407 - accuracy: 0.9543 - val_loss: 2.7437 - val_accuracy: 0.3565

Epoch 00004: val_accuracy did not improve from 0.46411
Epoch 5/20
136/136 [==============================] - 84s 618ms/step - loss: 0.1301 - accuracy: 0.9585 - val_loss: 0.3113 - val_accuracy: 0.9187

Epoch 00005: val_accuracy improved from 0.46411 to 0.91866, saving model to /content/drive/My Drive/COVID/Vanshika/Models/alexnet.h5
Epoch 6/20
136/136 [==============================] - 84s 620ms/step - loss: 0.1182 - accuracy: 0.9662 - val_loss: 3.7317 - val_accuracy: 0.5072

Epoch 00006: val_accuracy did not improve from 0.91866
Epoch 7/20
136/136 [==============================] - 84s 616ms/step - loss: 0.0793 - accuracy: 0.9725 - val_loss: 2.8594 - val_accuracy: 0.3612

Epoch 00007: val_accuracy did not improve from 0.91866
Epoch 8/20
136/136 [==============================] - 84s 616ms/step - loss: 0.0831 - accuracy: 0.9690 - val_loss: 1.4791 - val_accuracy: 0.6316

Epoch 00008: val_accuracy did not improve from 0.91866
Epoch 9/20
136/136 [==============================] - 83s 613ms/step - loss: 0.0912 - accuracy: 0.9681 - val_loss: 5.8775 - val_accuracy: 0.4713

Epoch 00009: val_accuracy did not improve from 0.91866
Epoch 10/20
136/136 [==============================] - 83s 609ms/step - loss: 0.0701 - accuracy: 0.9755 - val_loss: 1.3981 - val_accuracy: 0.6220

Epoch 00010: val_accuracy did not improve from 0.91866
```

```
Epoch 11/20
136/136 [==============================] - 82s 605ms/step - loss: 0.0852 - accuracy: 0.9751 - val_loss: 1.8986 - val_accuracy: 0.4234

Epoch 00011: val_accuracy did not improve from 0.91866
Epoch 12/20
136/136 [==============================] - 83s 612ms/step - loss: 0.0919 - accuracy: 0.9692 - val_loss: 8.0671 - val_accuracy: 0.5000

Epoch 00012: val_accuracy did not improve from 0.91866
Epoch 13/20
136/136 [==============================] - 83s 608ms/step - loss: 0.0676 - accuracy: 0.9795 - val_loss: 3.4085 - val_accuracy: 0.5167

Epoch 00013: val_accuracy did not improve from 0.91866
Epoch 14/20
136/136 [==============================] - 83s 612ms/step - loss: 0.0841 - accuracy: 0.9729 - val_loss: 0.7199 - val_accuracy: 0.7297

Epoch 00014: val_accuracy did not improve from 0.91866
Epoch 15/20
136/136 [==============================] - 83s 610ms/step - loss: 0.0741 - accuracy: 0.9758 - val_loss: 0.2565 - val_accuracy: 0.9234

Epoch 00015: val_accuracy improved from 0.91866 to 0.92344, saving model to /content/drive/My Drive/COVID/Vanshika/Models/alexnet.h5
Epoch 16/20
136/136 [==============================] - 82s 604ms/step - loss: 0.0900 - accuracy: 0.9716 - val_loss: 4.4984 - val_accuracy: 0.4833

Epoch 00016: val_accuracy did not improve from 0.92344
Epoch 17/20
136/136 [==============================] - 83s 607ms/step - loss: 0.0771 - accuracy: 0.9748 - val_loss: 25.6873 - val_accuracy: 0.1220

Epoch 00017: val_accuracy did not improve from 0.92344
Epoch 18/20
136/136 [==============================] - 83s 607ms/step - loss: 0.0480 - accuracy: 0.9837 - val_loss: 0.1766 - val_accuracy: 0.9378

Epoch 00018: val_accuracy improved from 0.92344 to 0.93780, saving model to /content/drive/My Drive/COVID/Vanshika/Models/alexnet.h5
Epoch 19/20
136/136 [==============================] - 83s 607ms/step - loss: 0.0283 - accuracy: 0.9907 - val_loss: 0.2018 - val_accuracy: 0.9282

Epoch 00019: val_accuracy did not improve from 0.93780
Epoch 20/20
136/136 [==============================] - 82s 600ms/step - loss: 0.0736 - accuracy: 0.9754 - val_loss: 6.4332 - val_accuracy: 0.4641

Epoch 00020: val_accuracy did not improve from 0.93780
dict_keys(['val_loss', 'val_accuracy', 'loss', 'accuracy'])
```
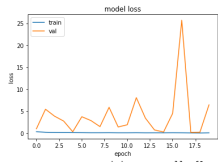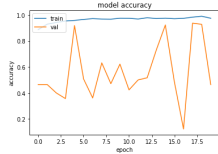
```
                  precision    recall  f1-score   support

       COVID-19       1.00      0.87      0.93        31
         Normal       0.97      0.91      0.94       193
Viral Pneumonia       0.90      0.98      0.94       194

       accuracy                           0.94       418
      macro avg       0.96      0.92      0.94       418
   weighted avg       0.94      0.94      0.94       418

Confusion Matrix
[[ 27   2   2]
 [  0 175  18]
 [  0   4 190]]
```