Deep Learning, Spring 2020
Assignment 5 - Part 2

Git Repository Link:
https://github.com/wassam21/BSCS17028_COVID19_DLSpring2020

1.1. VGG16 without Focal Loss:

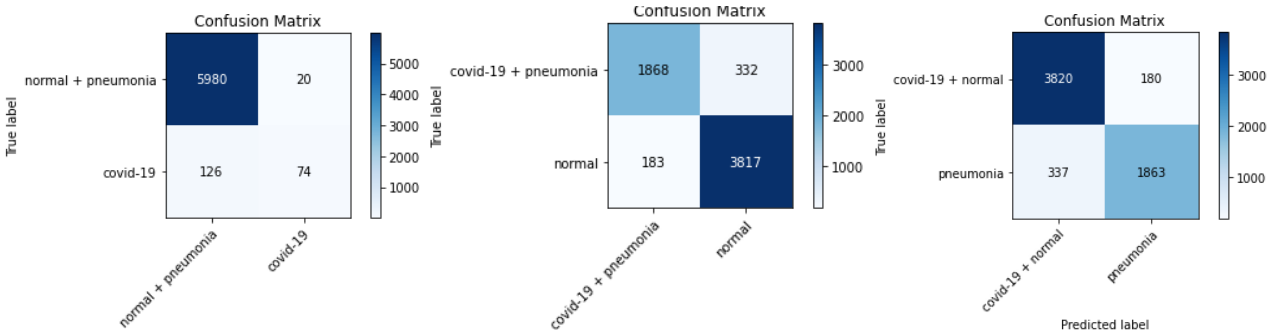
1.1.1. Experimental Setup:

Learning Rate:	0.001
Batch Size:	128
Momentum:	0.9
Training Accuracy:	89.24%
Validation Accuracy:	90.92%
Training F1 Score:	[0.50340136 0.93680206 0.87815225]
Validation F1 Score:	[0.5 0.9495695 0.9103139]

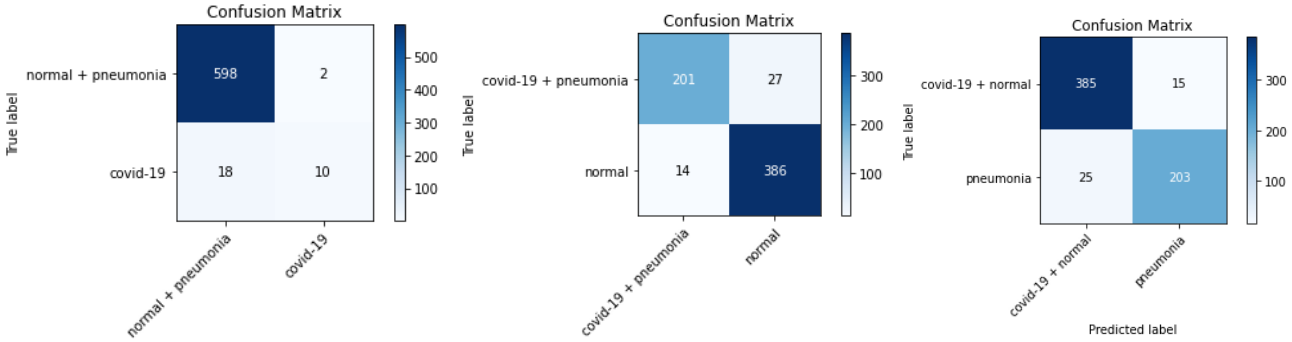
1.1.2. Error and Accuracy Curves:

1.1.3. Confusion Matrix:

Training Confusion Matrix



Validation Confusion Matrix



1.2. VGG16 with Focal Loss:

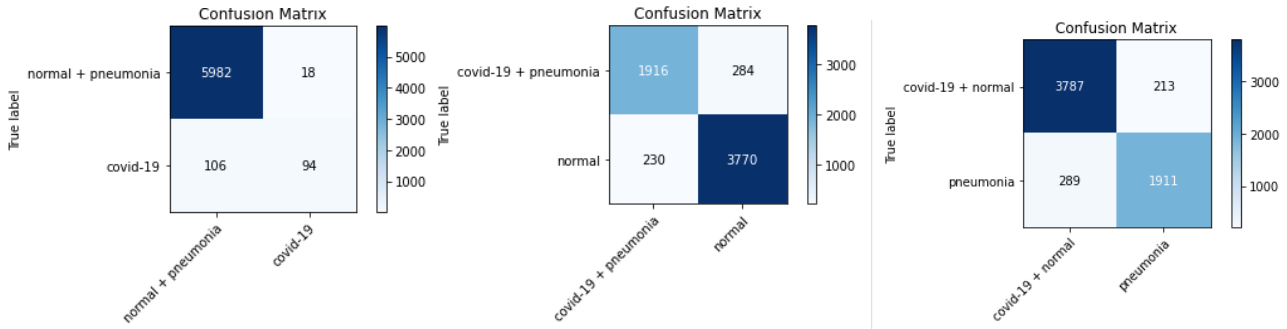
1.2.1. Experimental Setup:

Learning Rate:	0.001
Batch Size:	128
Momentum:	0.9
Training Accuracy:	89.58%
Validation Accuracy:	90.45%
Training F1 Score:	[0.48780488 0.94878049 0.88940092]
Validation F1 Score:	[0.6025641 0.93618078 0.88390379]

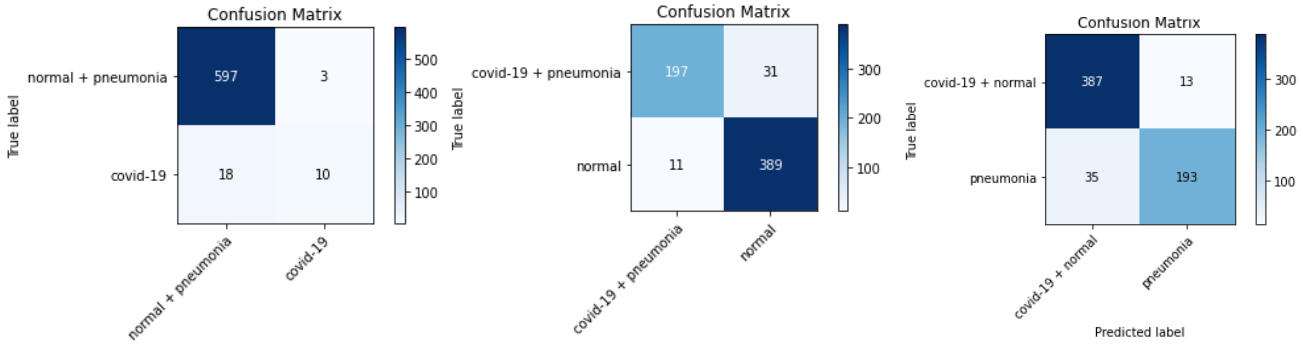
1.2.2. Error and Accuracy Curves:

1.2.3. Confusion Matrix:

Training Confusion Matrix



Validation Confusion Matrix



1.2.3. Analysis:

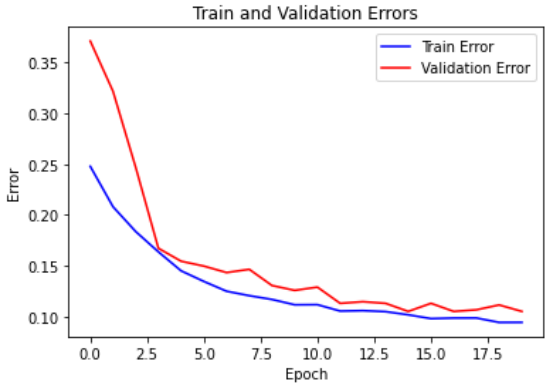
Due to focal loss the Covid-19 accuracy increases as you can see from the confusion matrix.

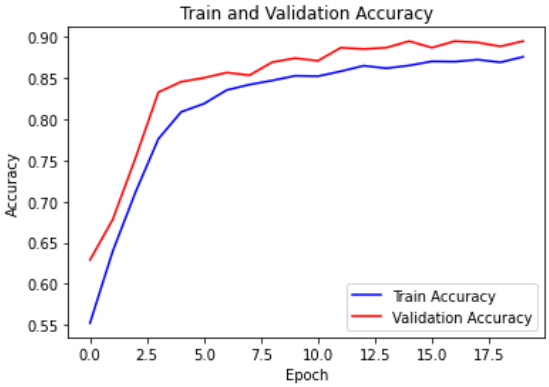
1.3. ResNet18 without Focal Loss:

1.3.1. Experimental Setup:

Learning Rate:	0.001
Batch Size:	128
Momentum:	0.9
Training Accuracy:	87.92%
Validation Accuracy:	89.17%
Training F1 Score:	[0. 0.93164557 0.86138855]
Validation F1 Score:	[0. 0.93913043 0.89135255]

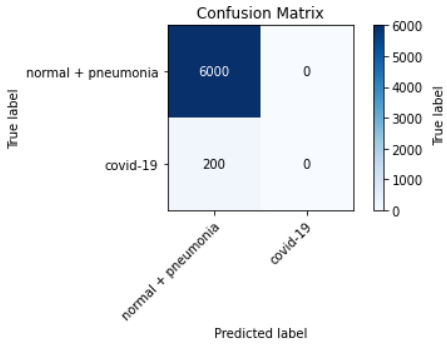
1.3.2. Error and Accuracy Curves:

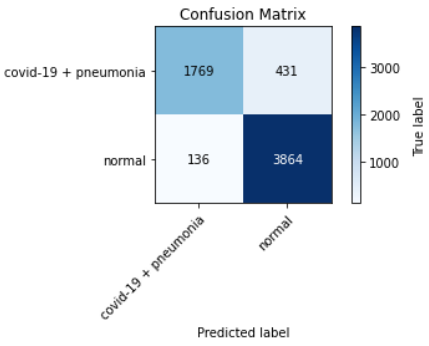


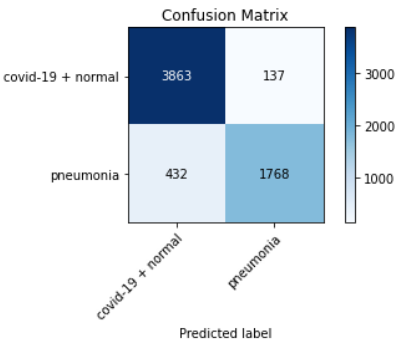


1.3.3. Confusion Matrix:

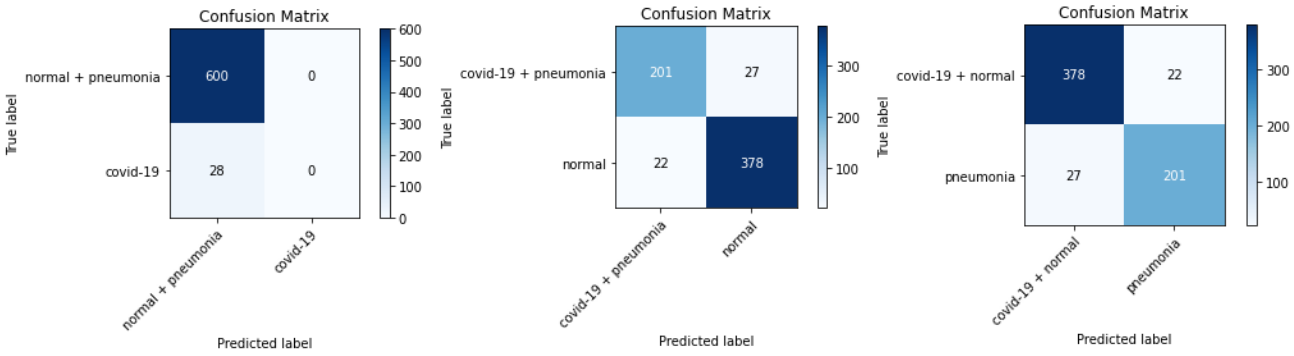
Training Confusion Matrix







Validation Confusion Matrix

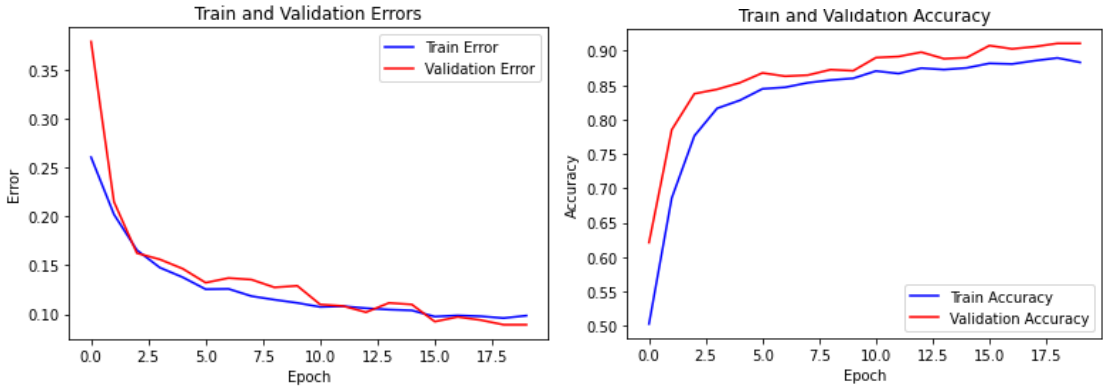


1.4. Resnet18 with Focal Loss:

1.4.1. Experimental Setup:

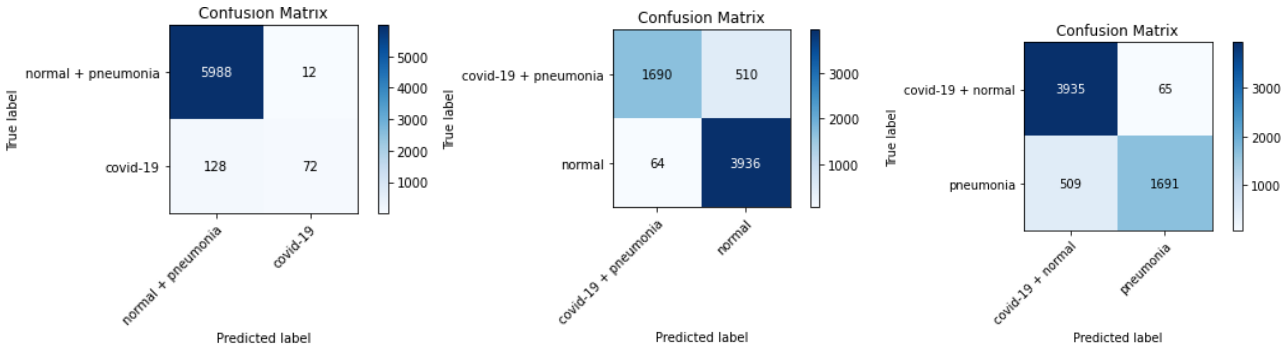
Learning Rate:	0.001
Batch Size:	128
Momentum:	0.9
Training Accuracy:	89.58%
Validation Accuracy:	90.45%
Training F1 Score:	[0.48780488 0.94878049 0.88940092]
Validation F1 Score:	[0.6025641 0.93618078 0.88390379]

1.4.2. Error and Accuracy Curves:

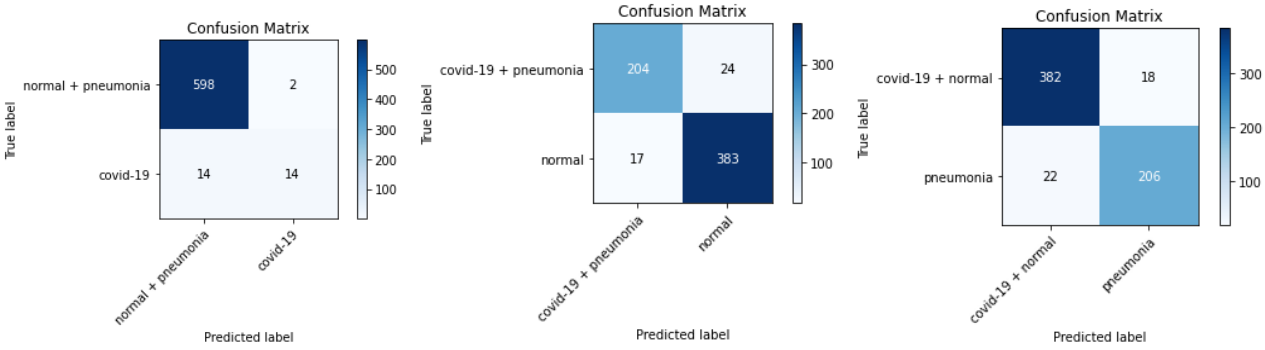


1.4.3. Confusion Matrix:

Training Confusion Matrix



Validation Confusion Matrix



1.5. Test Data Result:

With my experiments and observation *ResNet18 with Focal Loss* gives best validation accuracy.