Assignment # 5

Detecting COVID-19 from X-Rays

Part-2

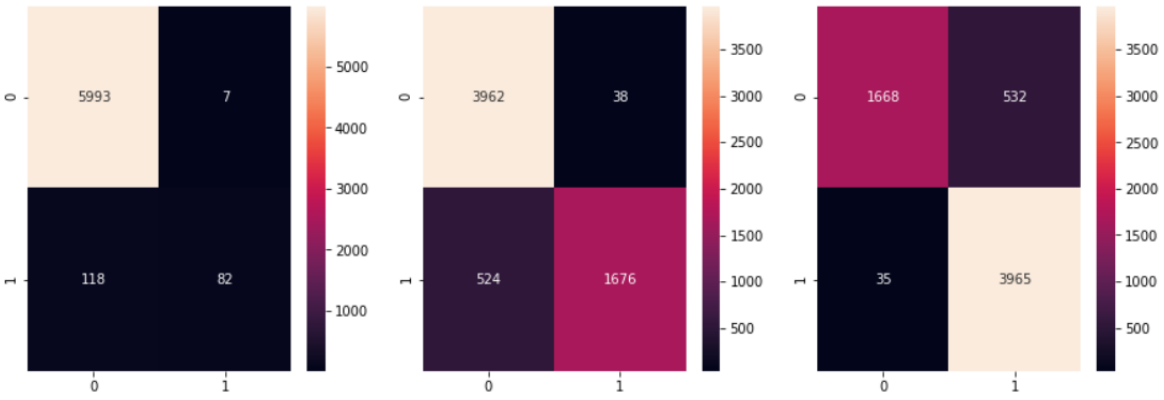
Task-1: Without Focal Loss

For both pre-trained networks, I used the following parameters:

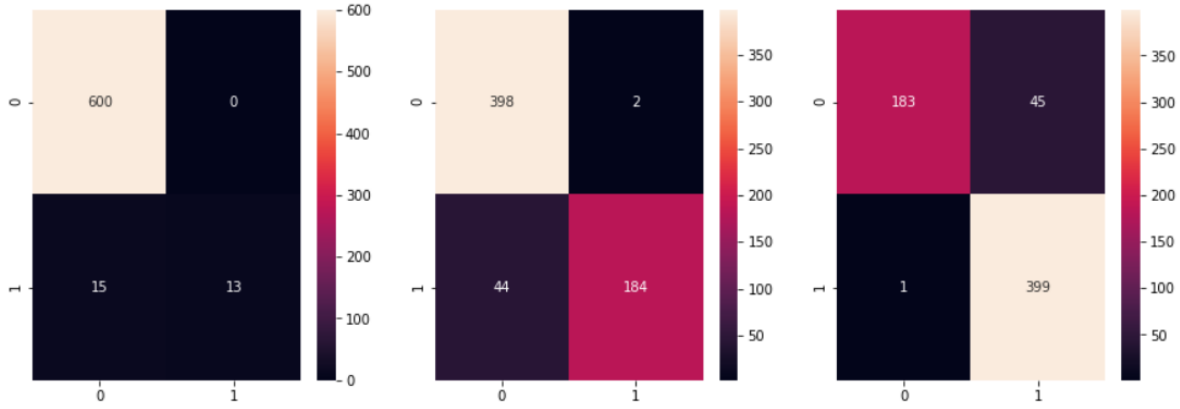
```
Epochs = 10

optimizer = optim.SGD(vgg16.parameters(), lr=0.001, momentum=0.9)
```

1. **VGG-16:**
   Accuracy of the network on the training images came out to be **90 %.**
   Accuracy of the network on the validation images came out to be **92 %.**

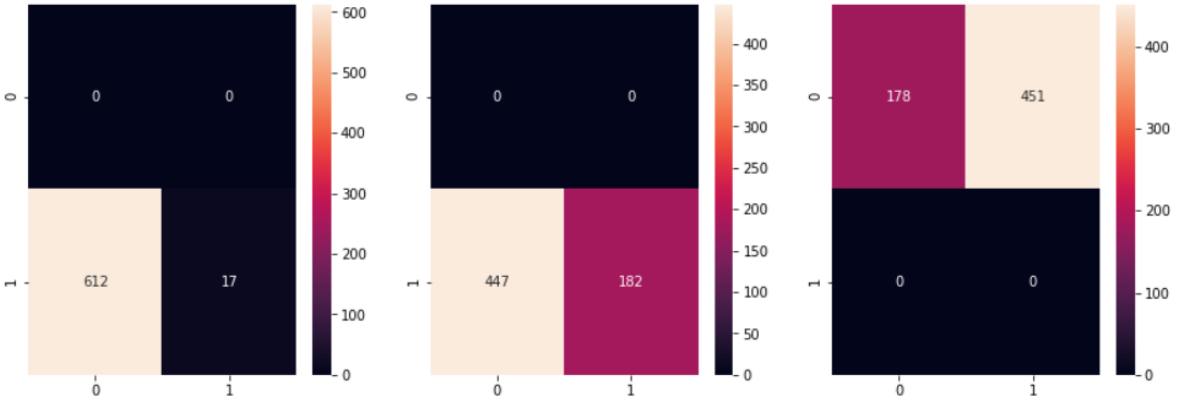
   Confusion matrices for **training set** in the order Covid-19, Pneumonia, and Normal are shown below:



   Confusion matrices for **validation set** in the order Covid-19, Pneumonia, and Normal are shown below:



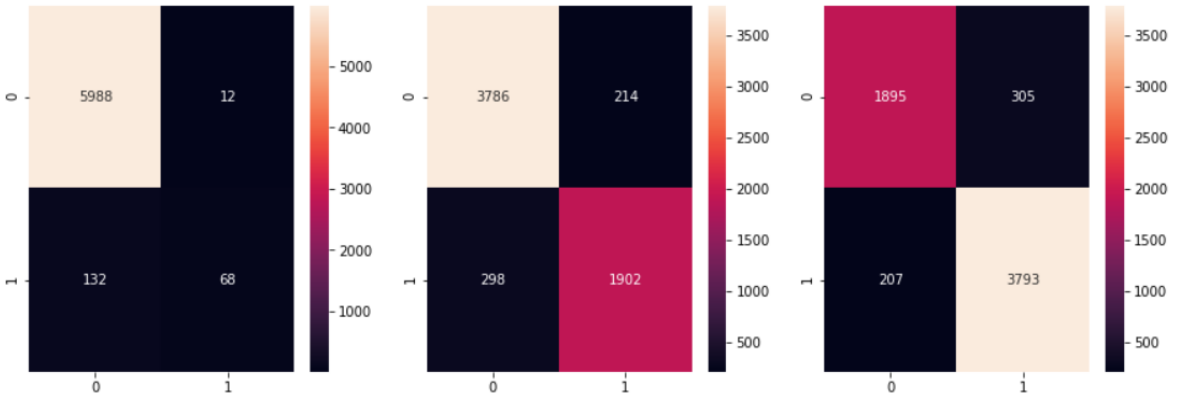
Confusion matrices for **testing set** in the order Covid-19, Pneumonia, and Normal are shown below:



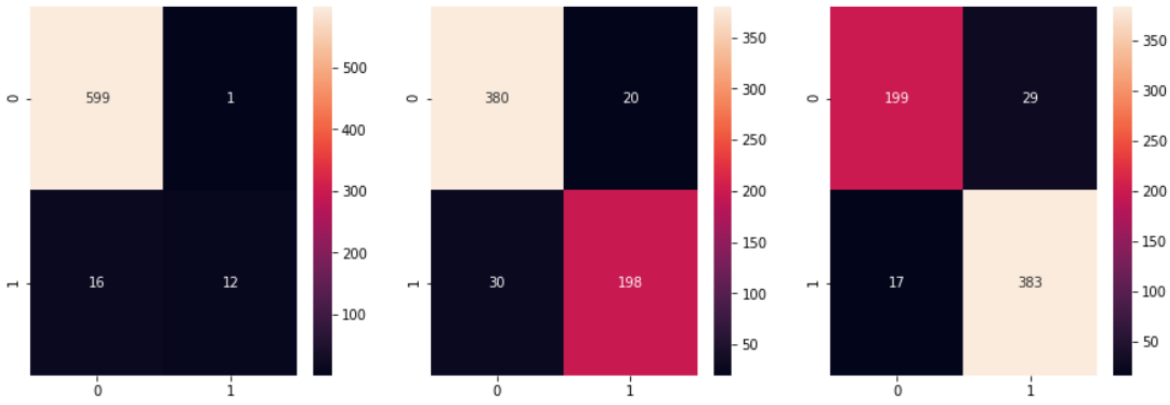
2. **ResNet-18:**

Accuracy of the network on the training images came out to be **90 %.**
Accuracy of the network on the validation images came out to be **92 %.**

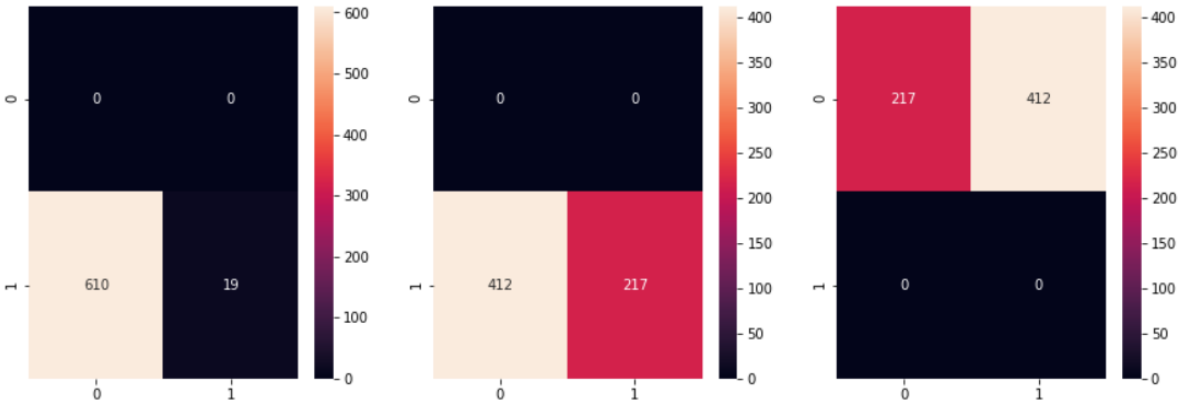
Confusion matrices for **training set** in the order Covid-19, Pneumonia, and Normal are shown below:



Confusion matrices for **validation set** in the order Covid-19, Pneumonia, and Normal are shown below:



Confusion matrices for **testing set** in the order Covid-19, Pneumonia, and Normal are shown below:



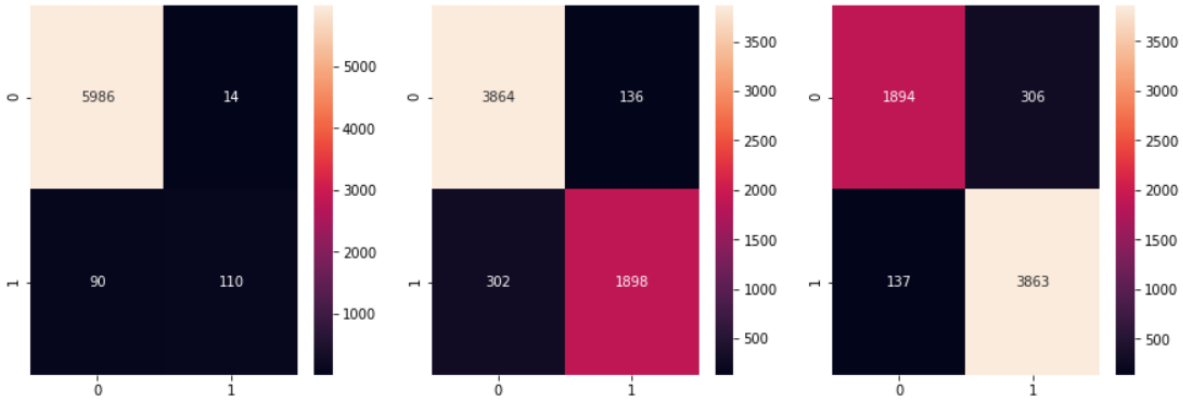
Task-2: With Focal Loss

In this task, for both pre-trained networks, I used the following parameters:

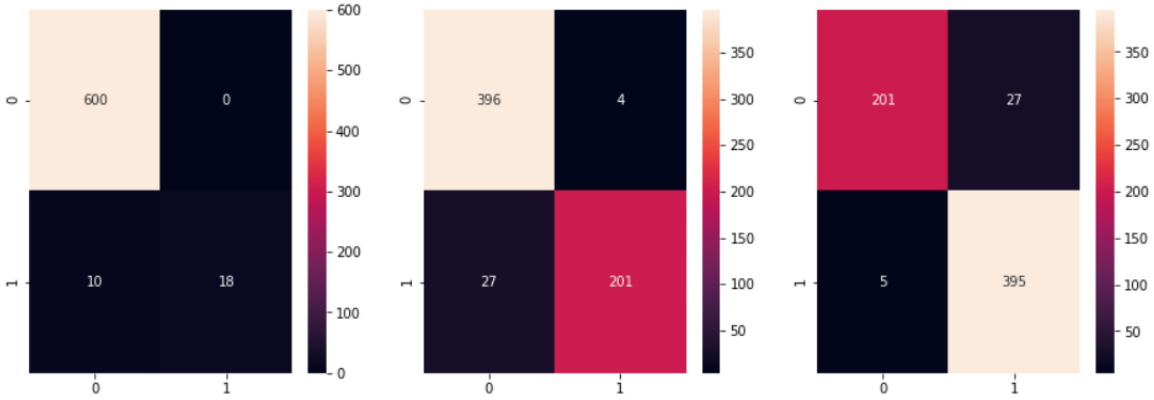
```
Epochs = 10

optimizer = optim.SGD(vgg16.parameters(), lr=0.001, momentum=0.9)
```

1. **VGG-16:**
   Accuracy of the network on the training images came out to be **92 %.**
   Accuracy of the network on the validation images came out to be **94 %.**

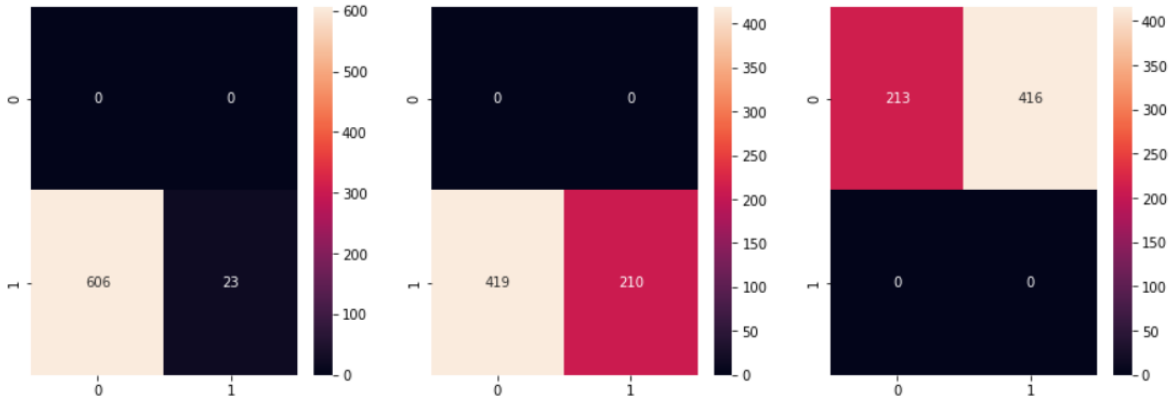
   Confusion matrices for **training set** in the order Covid-19, Pneumonia, and Normal are shown below:



   Confusion matrices for **validation set** in the order Covid-19, Pneumonia, and Normal are shown below:

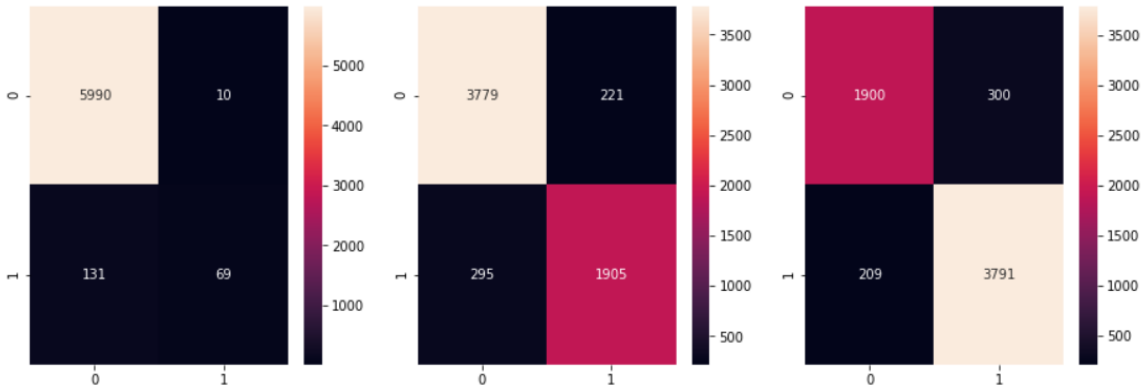


   Confusion matrices for **testing set** in the order Covid-19, Pneumonia, and Normal are shown below:

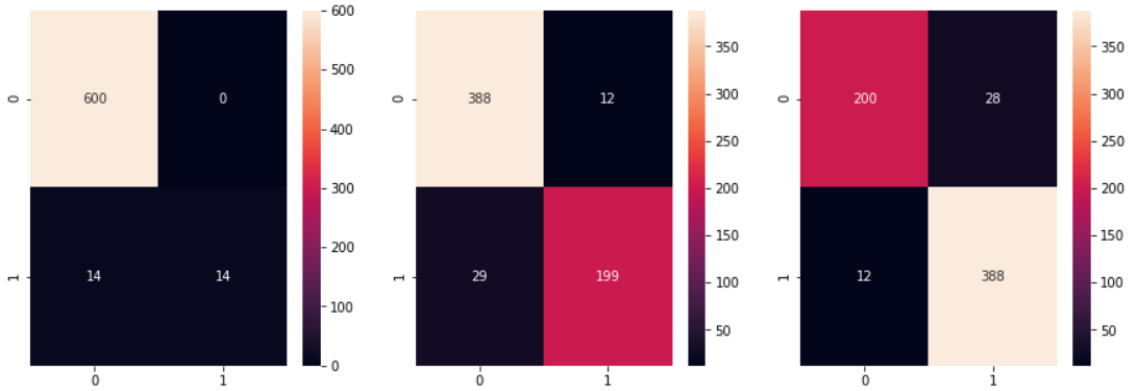


2. **ResNet-18:**
   Accuracy of the network on the training images came out to be **90 %.**
   Accuracy of the network on the validation images came out to be **93 %.**

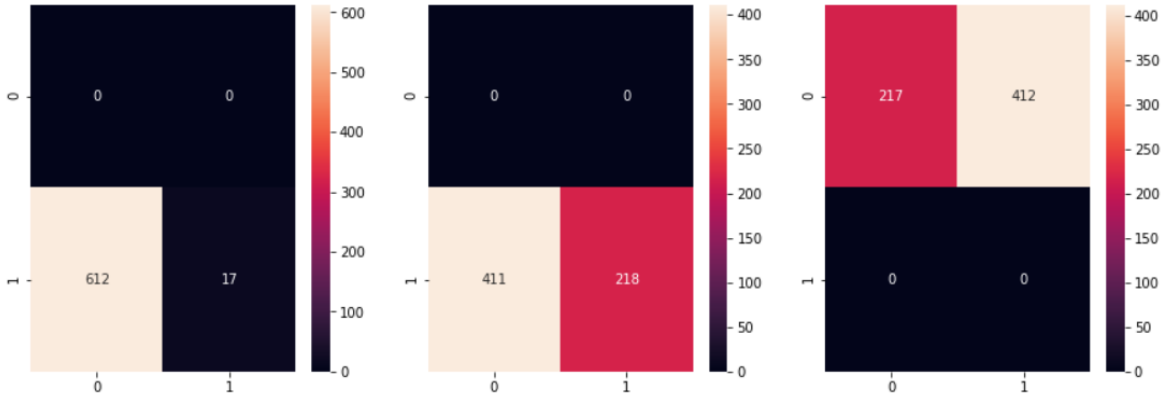
   Confusion matrices for **training set** in the order Covid-19, Pneumonia, and Normal are shown below:



   Confusion matrices for **validation set** in the order Covid-19, Pneumonia, and Normal are shown below:



Confusion matrices for **testing set** in the order Covid-19, Pneumonia, and Normal are shown below:



GITHUB REPOSITORY LINK:

https://github.com/MuaazZakria/MSDS19053_COVID19_DLSpring2020/blob/master/MSDS19053_A5_02.ipynb