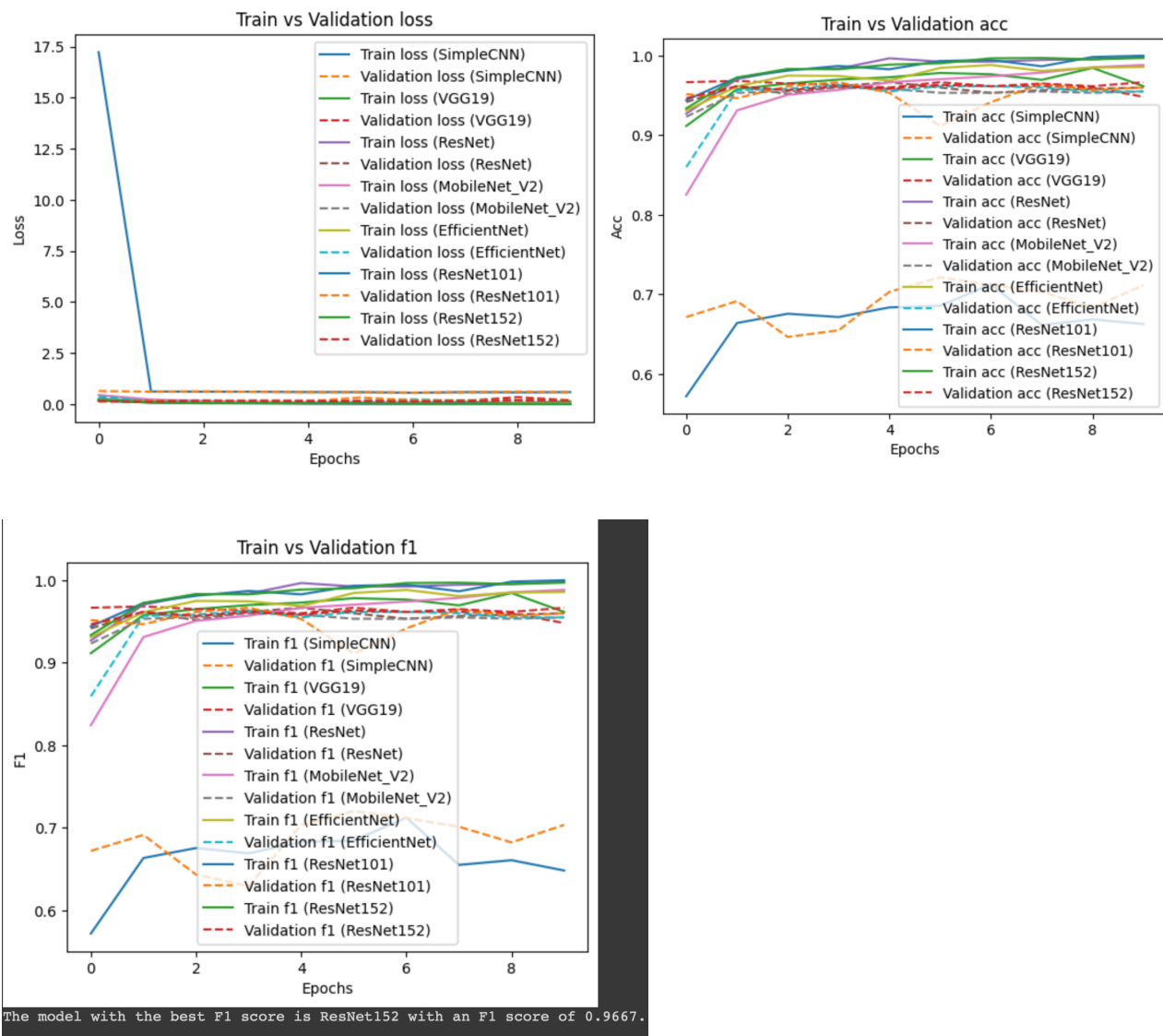


Neural Network Malaria Detection_Joon Jung

Original Dataset training and validation f1 accuracies and loss



For me, I first started with CNN architecture that I hard coded (SimpleCNN), VGG19, and ResNet that we covered in class. I put in the csv file for ResNet and found out I was only the 10th in the leaderboard, so I wanted to do more research into more powerful CNN models available in Pytorch. After those three, I started adding more and more and more models every time I wanted to add more advanced model in there. I have tested out VGG19, ResNet, MobileNet_V2, EfficientNet, ResNet101, and ResNet152. EfficientNet required pip install timm, and ResNet101 and 152 needed updated version of Pytorch. Later, the graph ended up having 7 models and graph did look harder to read. So then I added a print statement for the best model with F1 score, and it gave me ResNet 152. It didn't score higher on the leaderboard though. So I wanted to do something else.

Augmented image dataset

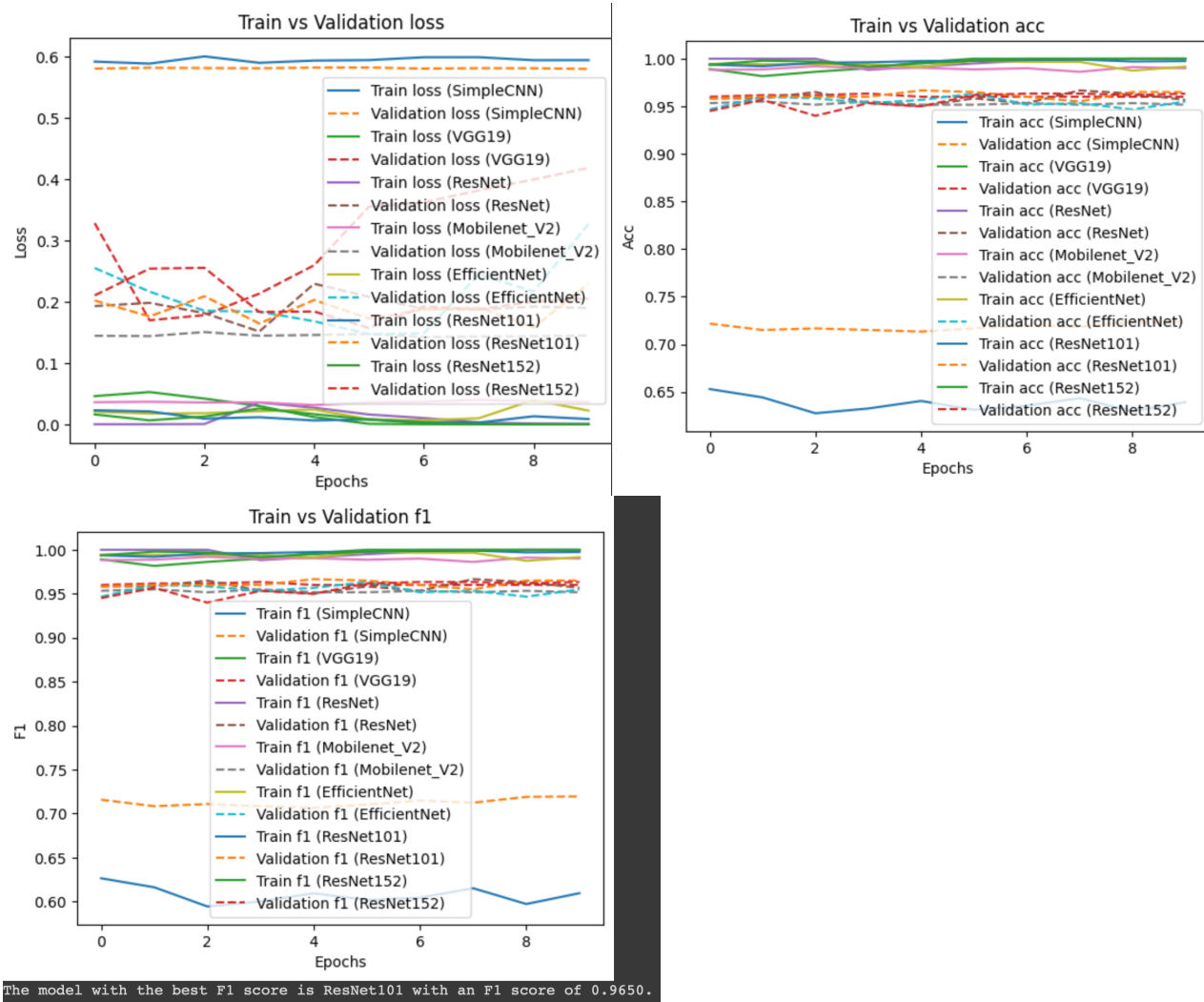
```
train_transforms = transforms.Compose([
    # augmentation for training
    transforms.RandomHorizontalFlip(),
    transforms.RandomVerticalFlip(),
    transforms.ColorJitter(brightness=0.2, contrast=0.2, saturation=0.2, hue=0.1),
    transforms.RandomRotation(20),
    transforms.RandomResizedCrop(224),
    transforms.ToTensor(),
    transforms.Normalize(mean=[0.485, 0.456, 0.406], std=[0.229, 0.224, 0.225]),
])

val_transforms = transforms.Compose([
    # Standard transformations for validation (no augmentation)
    transforms.Resize((224, 224)),
    transforms.ToTensor(),
    transforms.Normalize(mean=[0.485, 0.456, 0.406], std=[0.229, 0.224, 0.225]),
])

train_dataset.transform = train_transforms
val_dataset.transform = val_transforms
```

This was the image augmentation that I performed. I did image augmentation on the train data set, but not validation dataset on purpose, since the actual test data set it has to use model on won't be augmented images.

This was the results after training on augmented image dataset also.



After the training on augmented dataset also, ResNet101 seemed to be the best performing one. Again, like I said before, in the beginning it was just 3 models, and then more models were added as I went, and I would put in submission as I went and see how they performed, so I had a lot of submissions until I got to this last step. I wish I took some screenshots with fewer models earlier.

However, ResNet101 and ResNet152 both did not perform as well as Resnet, the submission I made earlier. So then I looked into other hyper parameters I can adjust and I adjusted learning rate. I also looked into the best and newest optimizer and I chose NAdam that we also covered in class. I put NAdam for ResNet101 and 152, but it actually still did not perform the highest.

```
resnet101_model = get_resnet_101(num_classes=2)
resnet152_model = get_resnet_152(num_classes=2)

# Function to get NAdam optimizer
def get_nadam_optimizer(model, lr=0.0001):
    return optim.NAdam(model.parameters(), lr=lr)

# Example of how to instantiate a ResNet-101 model and NAdam optimizer

resnet101_optimizer = get_nadam_optimizer(resnet101_model, lr=0.0001)
resnet152_optimizer = get_nadam_optimizer(resnet152_model, lr=0.0001)
```











This is how I got nadam optimizer.


I tried various methods to improve performance like different advanced pre trained models, adjusting my own CNN models, learning rate, image dataset augmentation, NAdam optimizer, etc.

This was the final Kaggle score. I have selected one that has the highest accuracy, and selected another score that is lower but it was done by more powerful model, because I worry that my highest accuracy one had overfit a lot and it will perform badly on the private leaderboard.

HW 2: CNNs against Malaria

Submit Prediction

Overview	Data	Discussion	Leaderboard	Rules	Team	Submissions
#	Team	Members	Score	Entries	Last	
1	Britney W		0.97079	5	2d	
2	SarveshParadkar1		0.97072	36	6h	
3	Chetan Chilkunda		0.96954	8	1d	
4	Sungwon Lee		0.96762	7	8h	
5	ilkwoncho		0.96750	4	2d	
6	ronsarma		0.96719	3	2h	
7	Vikas Reddy Katta		0.96539	12	3h	
8	Fangzhou Yuan		0.96506	20	32m	
9	Anqi Wu		0.96442	12	2h	
10	cmujj14		0.96431	4	5h	



Your Best Entry!
Your submission scored 0.96230, which is not an improvement of your previous score. Keep trying!