

# Supervised Learning:

## Pneumonia Image Classification

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### Dataset Distribution

- Train Set (60%)
- Val Set (30%)
- Test Set (10%)

### Hyperparameters

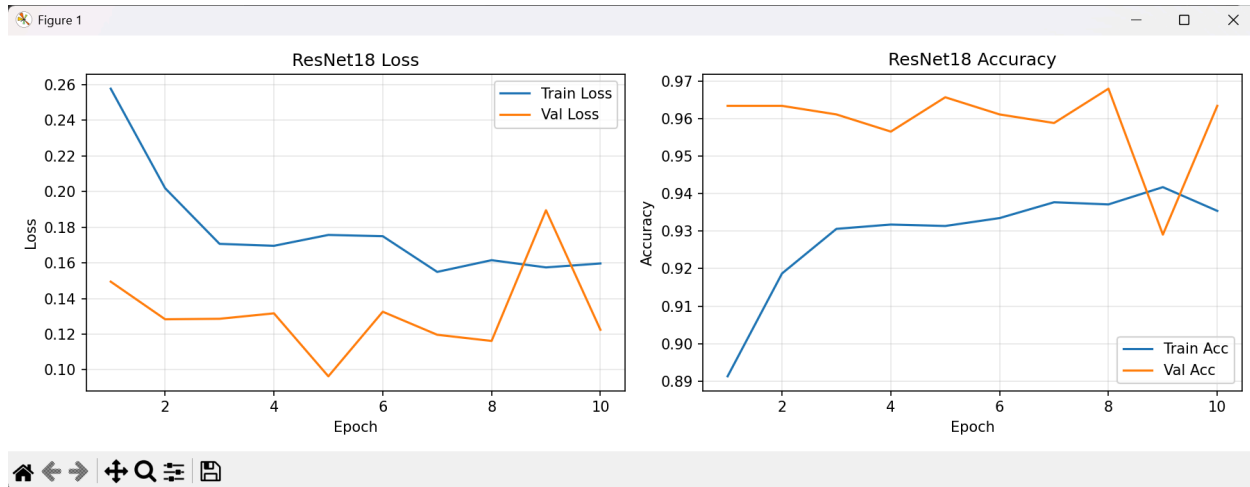
- Epoch - 10
- Learning Rate - 0.001
- Batch size - 16
- Number of activation layers - 3 (with SoftMax output layer)

### Model Performance Summary

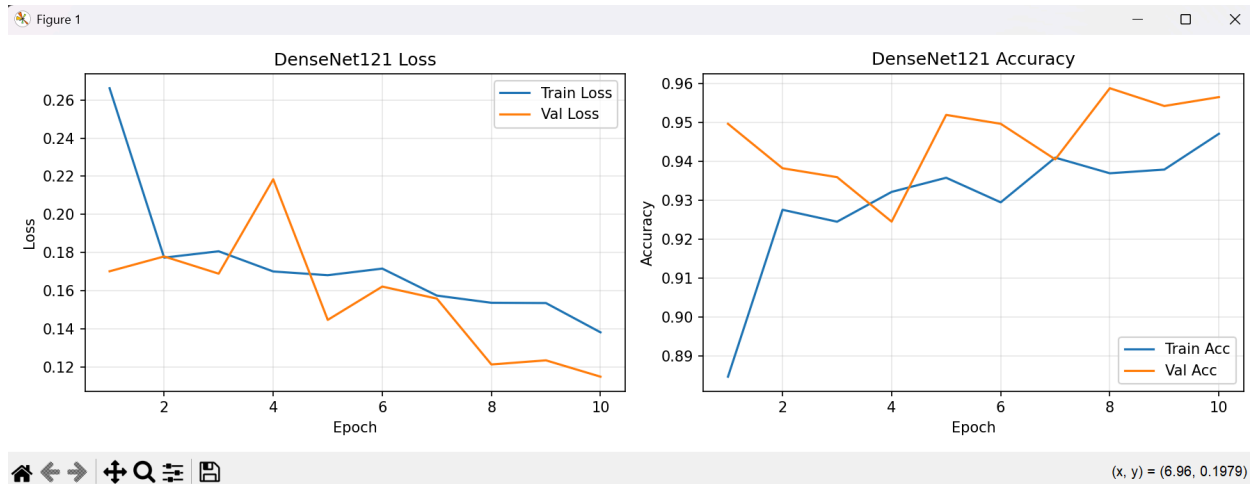
ResNet18 achieved the highest performance with a test loss of 0.2655 and an accuracy of 0.8942, outperforming both DenseNet121 (test loss 0.3537, accuracy 0.8718) and ViT\_B\_16 (test loss 0.6398, accuracy 0.8221). Overall, while all three models showed strong results on the chest X-ray dataset, ResNet18 exhibited the most favorable balance of low loss and high accuracy making it the model of choice for this dataset.

# Accuracy and loss plots

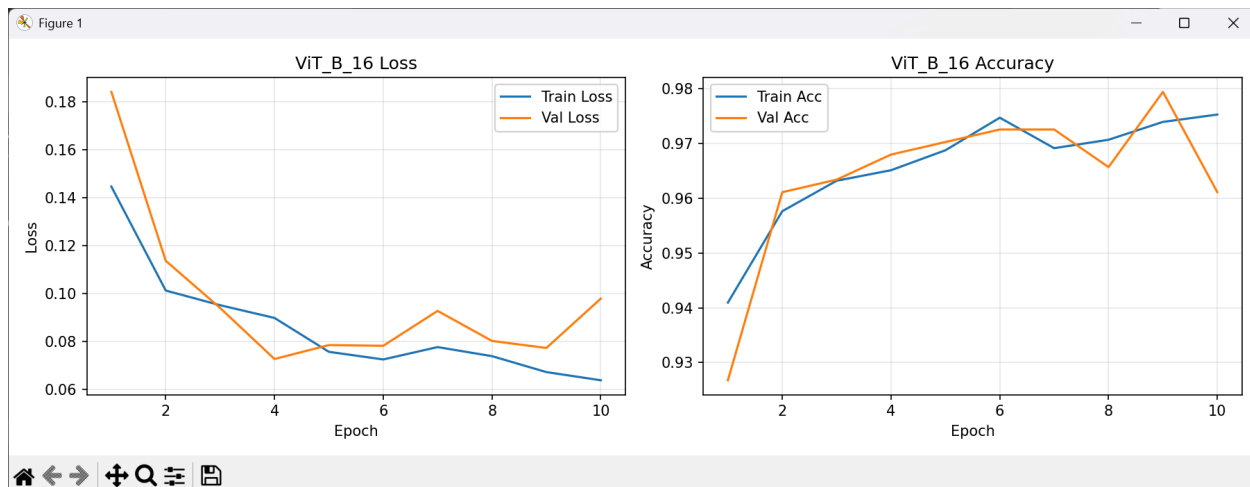
**ResNet18 - Test Loss: 0.2655, Test Accuracy: 0.8942**

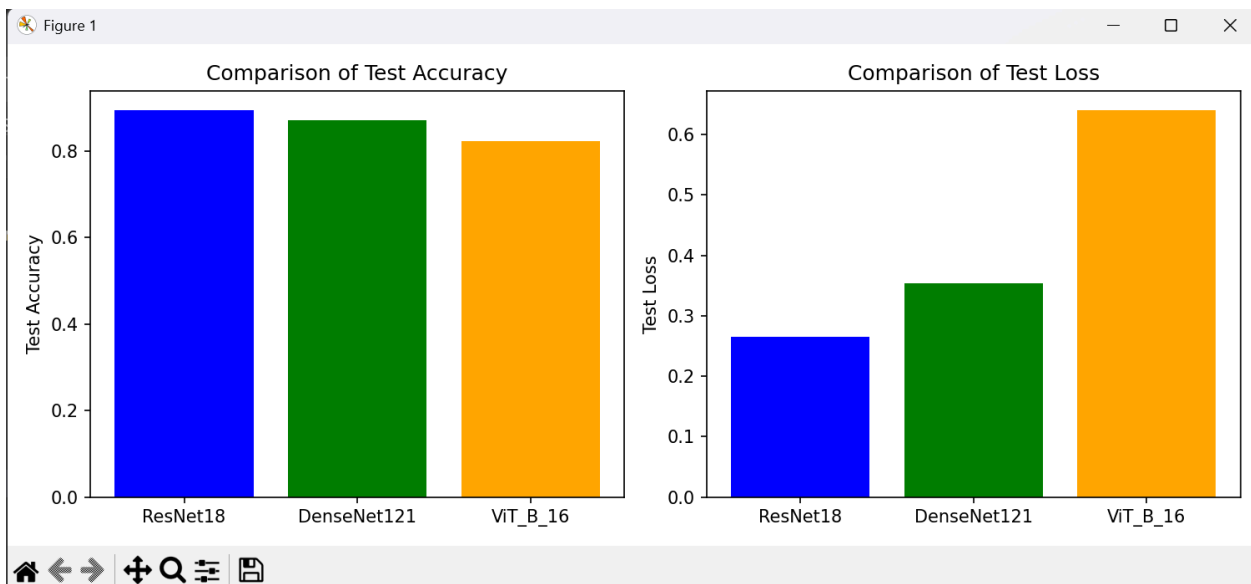


**DenseNet121 - Test Loss: 0.3537, Test Accuracy: 0.8718**

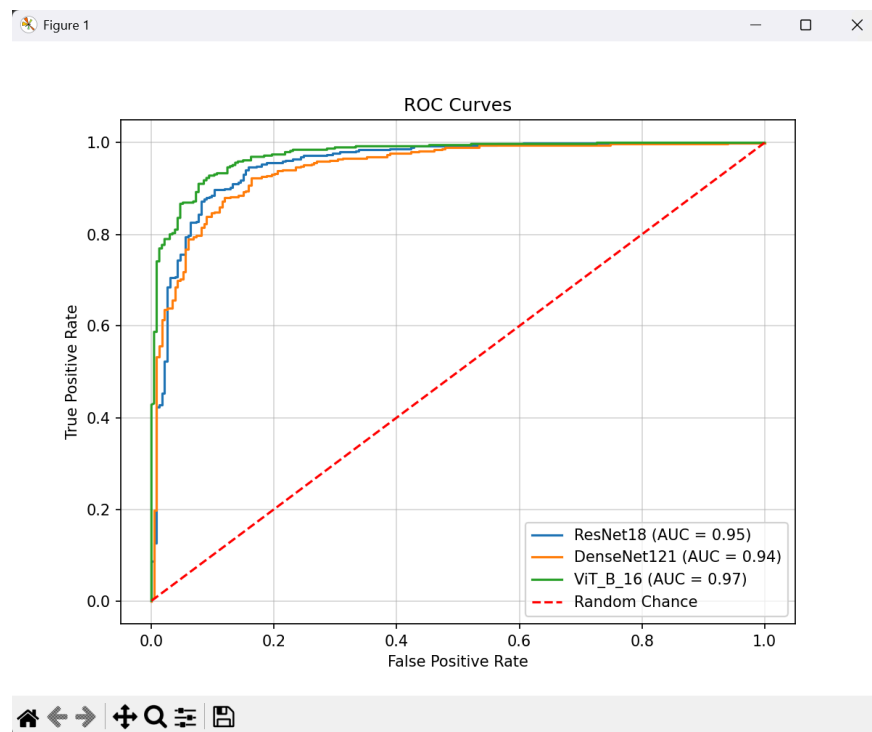


**ViT\_B\_16 - Test Loss: 0.6398, Test Accuracy: 0.8221**

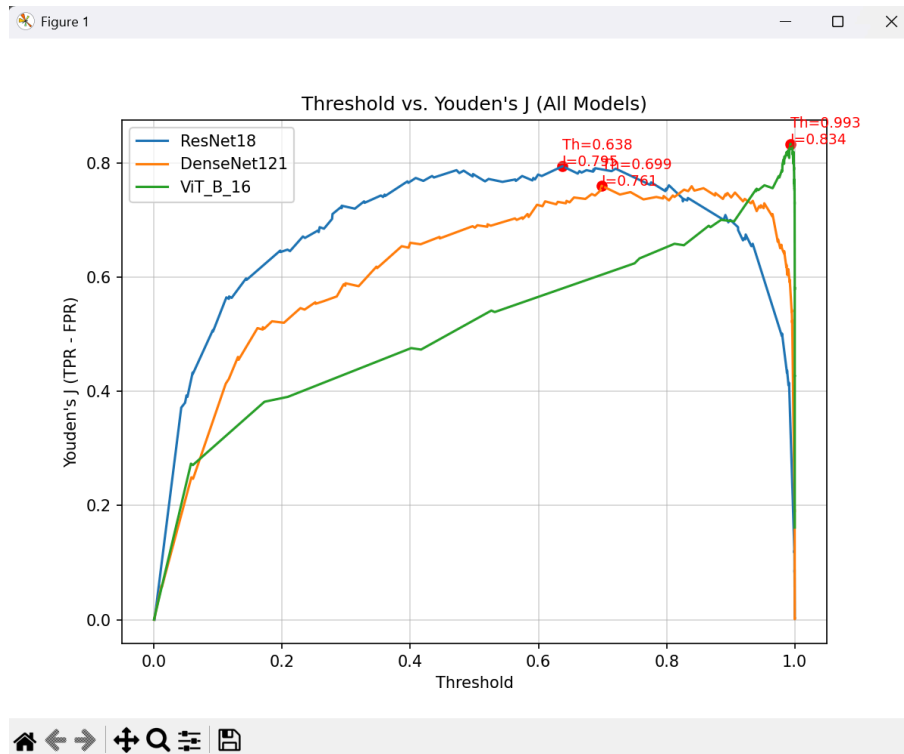




# ROC plots



## Youden's J plots



## References

1. **Git repository:**  
<https://github.com/akshat-git/Pneumonia-Image-Classifer-Supervised-Learning>
2. **Dataset:**  
<https://www.kaggle.com/datasets/paultimothymooney/chest-xray-pneumonia>