

The background features a dark blue gradient with a network graph overlay. The graph consists of numerous nodes, represented by small circles, connected by thin, light-colored lines. Some nodes are highlighted with a soft blue glow. In the upper right corner, there is a faint, vertical column of binary code (0s and 1s) in a light blue color.

Predicting Pneumonia for Mt. Sinai Hospital: Deep Learning Approach

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Overview



**Business
Problem**



Data



**Modeling /
Evaluation**



Conclusion

Business Problem



- Pneumonia detection is easy
- Problem is false positive
- Mt. Sinai needs **a new detection method** to decrease false positive pneumonia detections

Data

- 5863 Lung X-Rays
 - 1381 Normal Lungs
 - 4482 Pneumonic Lungs
- Guangzhou Hospital for Women and Children
- Kaggle
- Different Processing Techniques applied

X-Ray Images of Normal Lungs

Normal 1



Normal 2



Normal 3



Normal 4



Normal 5



Normal 6



Normal 7



Normal 8



Normal 9



Normal 10



X-Ray Images of Pneumonic Lungs

Pneumonia 1



Pneumonia 2



Pneumonia 3



Pneumonia 4



Pneumonia 5



Pneumonia 6



Pneumonia 7



Pneumonia 8



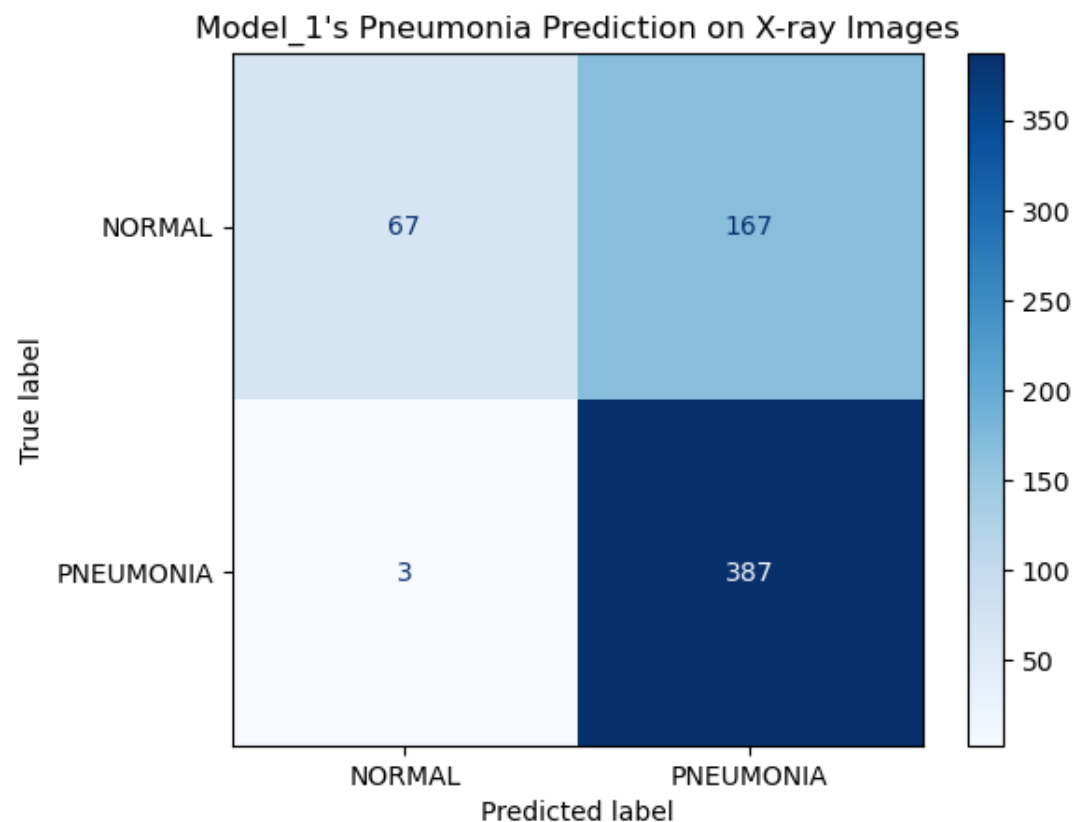
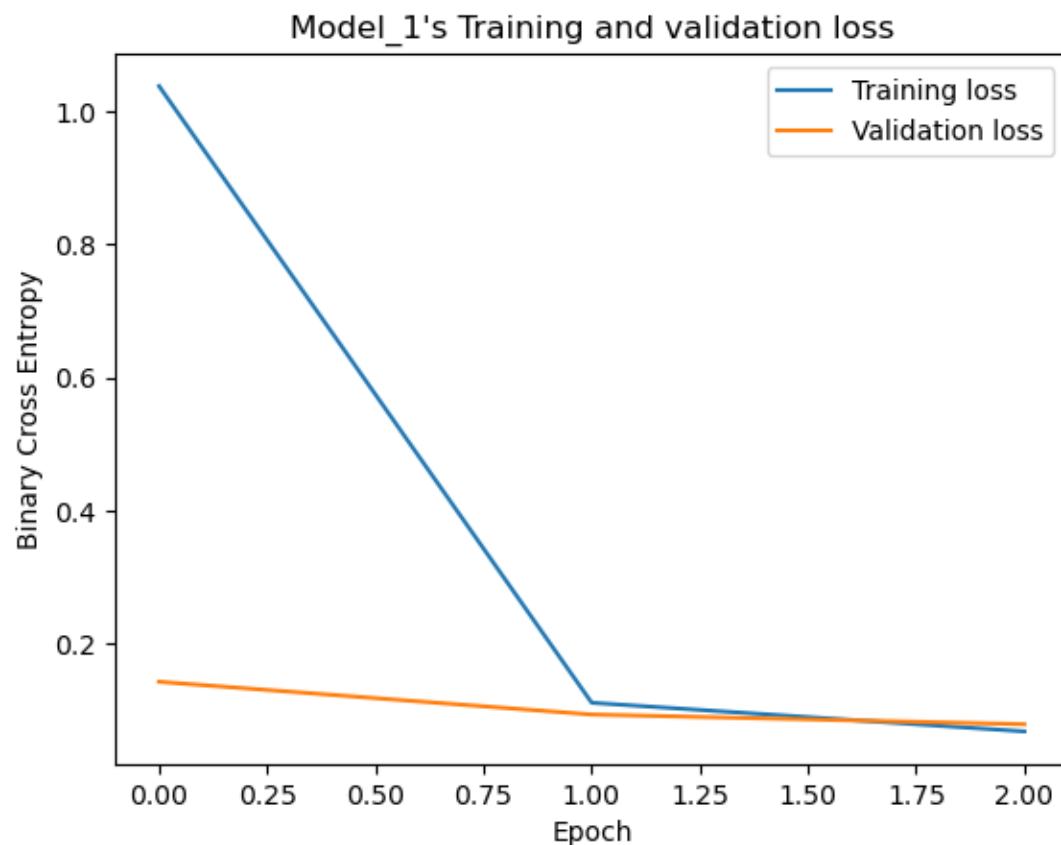
Pneumonia 9



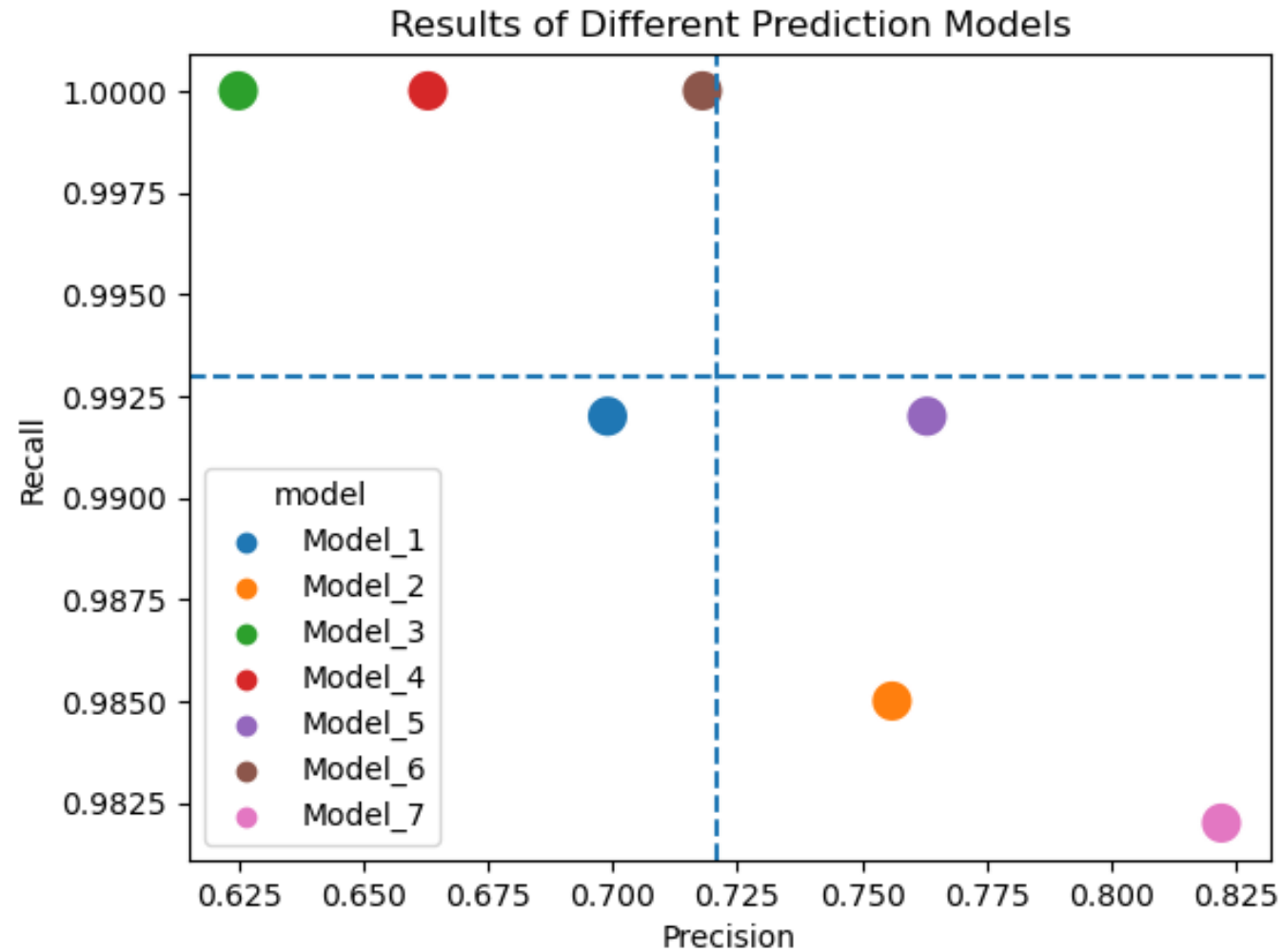
Pneumonia 10



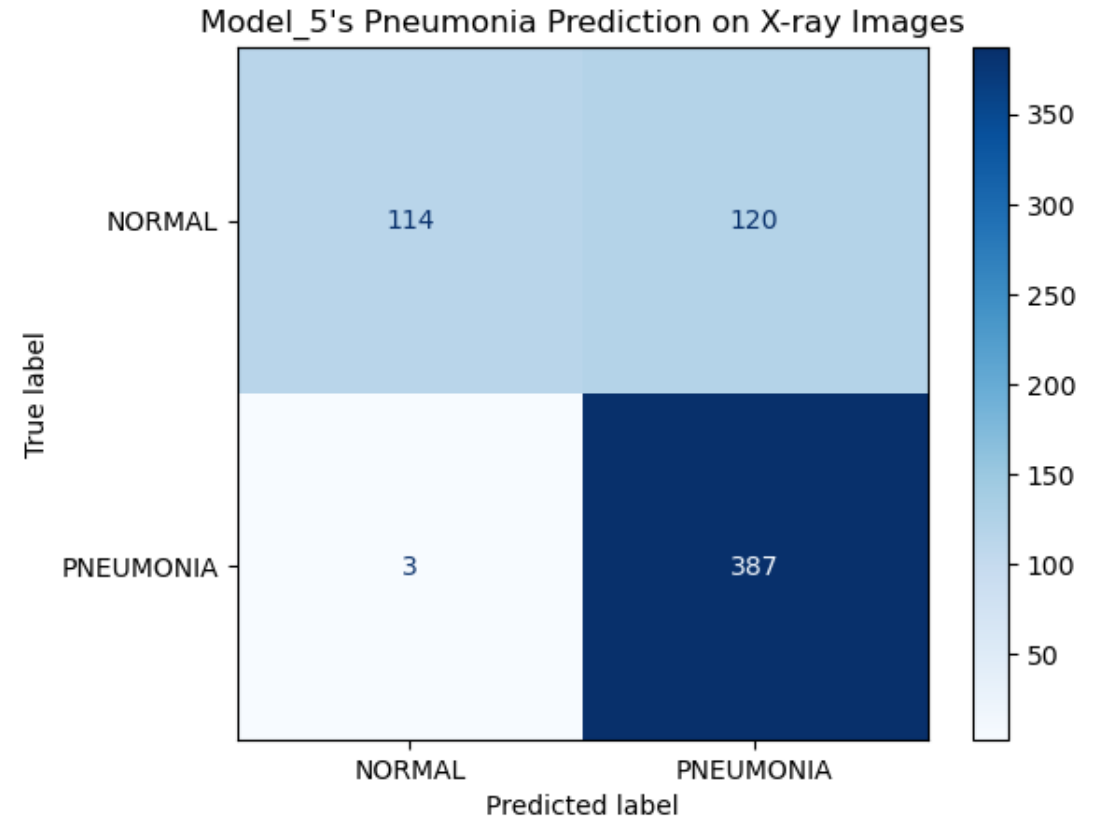
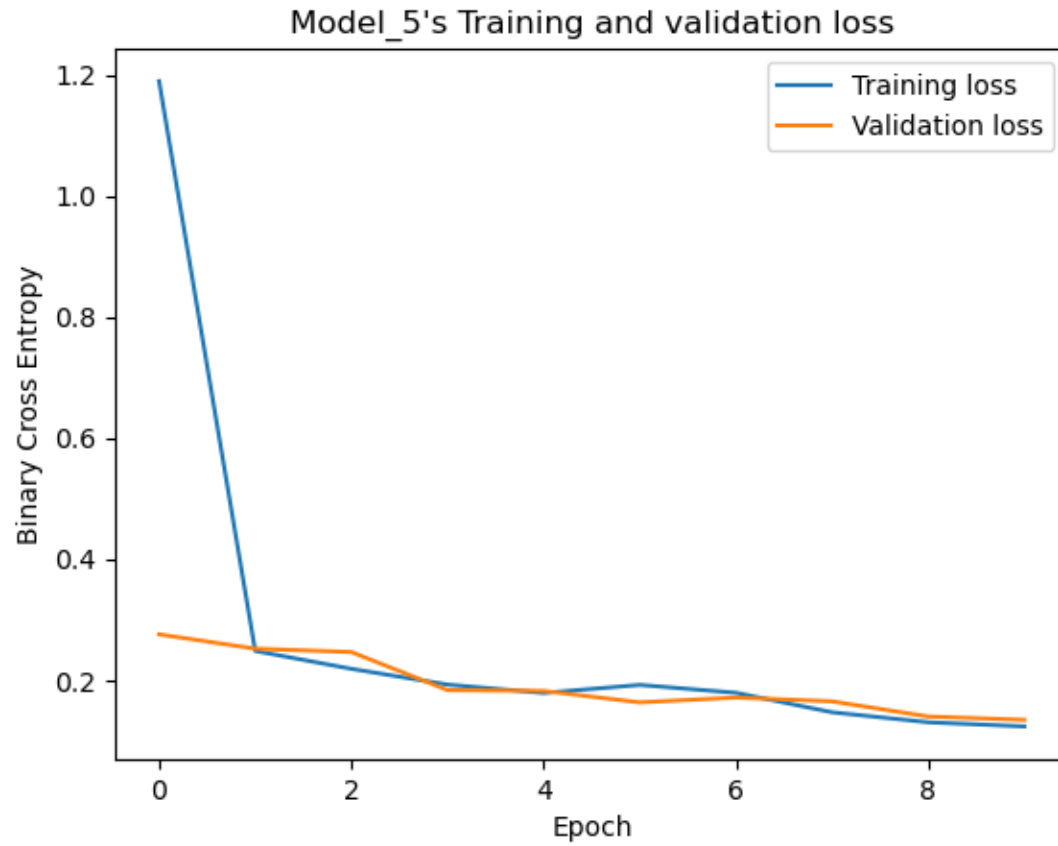
Modeling - Baseline



Model Performances

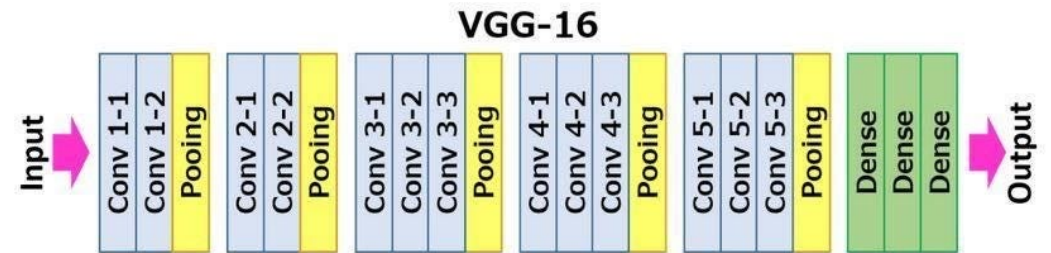


Modeling – Final Model (Fifth)



Modeling – Final Model (Fifth)

- VGG-16
- Flatten
- Dense (512)
- Dropout(0.5)
- Sigmoid



Evaluation – False Negatives

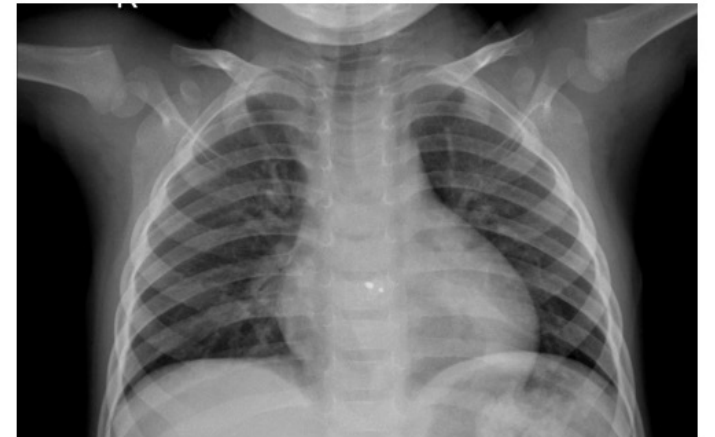
False Negative



False Negative



False Negative



Conclusion

- Retained the Recall
- Improved the Precision by 0.075

Recommendation

- Roll out subscription services to smaller hospitals
- Apply this model to other lung infection diseases

Next Steps

- Gather more data
 - More data on men's lung x-ray images
 - More data on races other than Asian
- Try different Fine-Tuning

Thank you!

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