

Pneumonia Detection from Chest X-ray through Deep Learning

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What is Pneumonia?

- A respiratory infection in one or both lungs
- High-risk groups: children and elderly (65+)
- Number of deaths in 2019: 43,881

- CDC

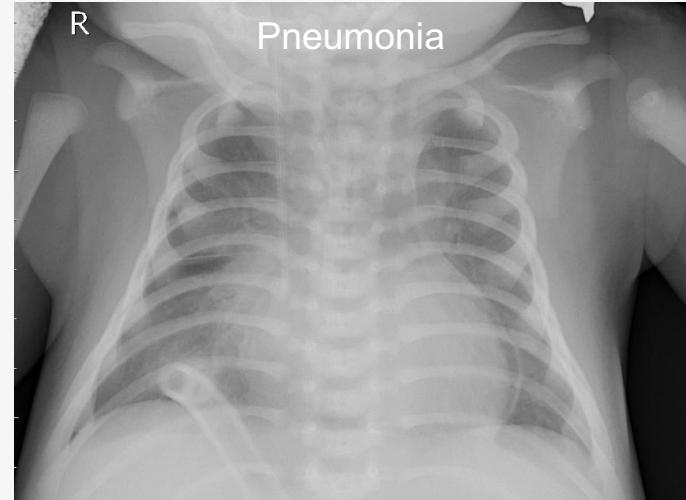
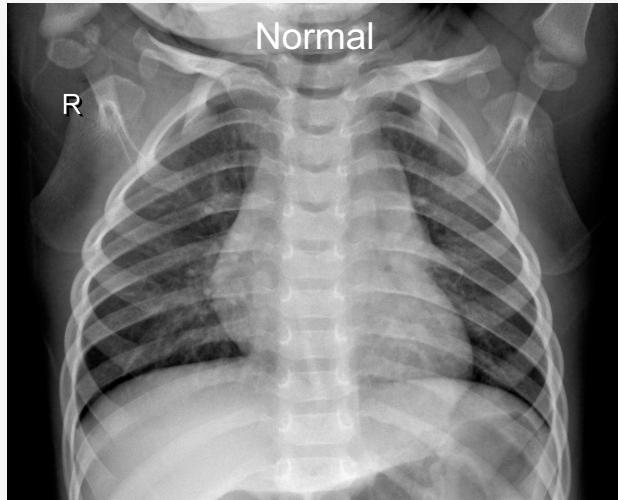
Business Goal

- Streamline radiology department
- Reduce the burden for doctors during peak time

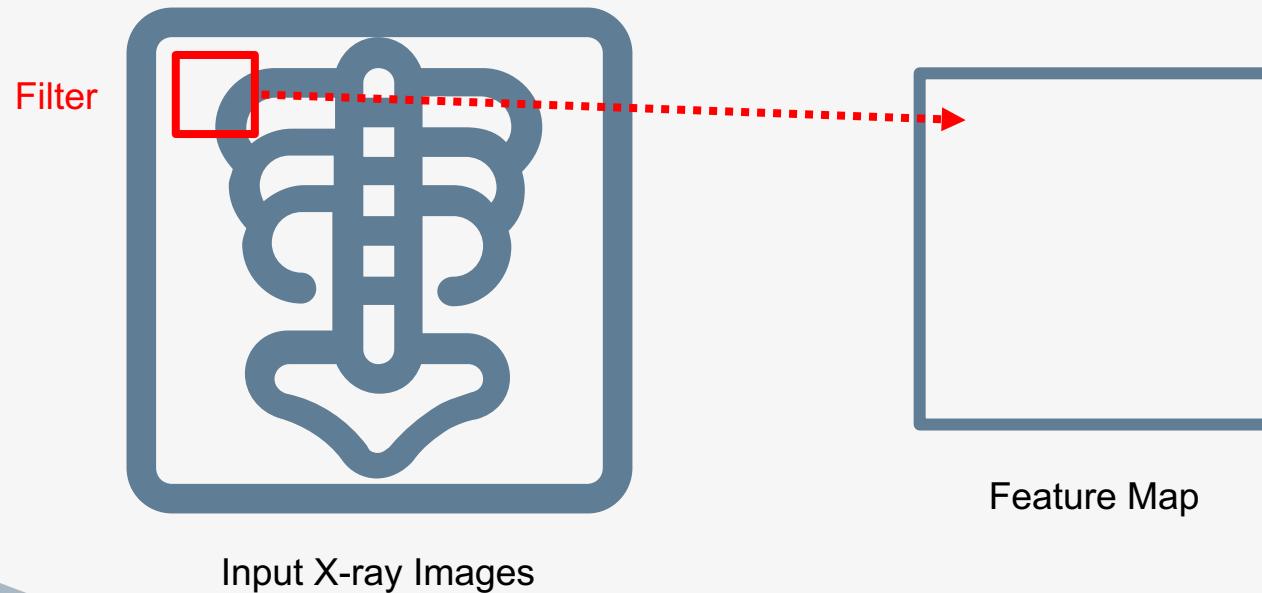


Data and Methods

- 5,856 Chest X-ray images
- Train, Test, and Validation
- Convolutional Neural Network (CNN)



What is CNN and how does it work?



Model Evaluation

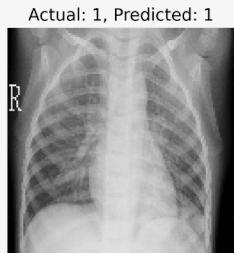
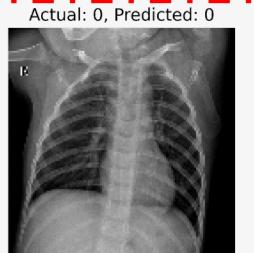
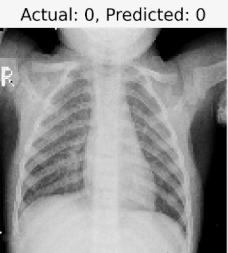
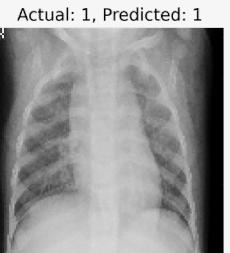
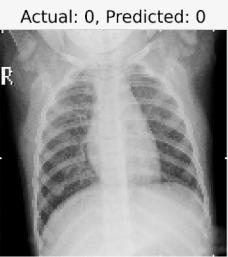


	Test Accuracy	F1 - score
Baseline	0.7484	0.50
5 blocks	0.8782	0.83
Pretrained VGG19	0.8942	0.85

F1- score: higher the score, less the false positives and false negatives

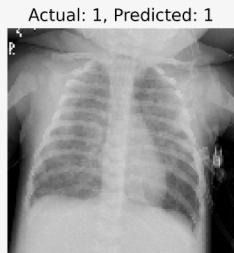
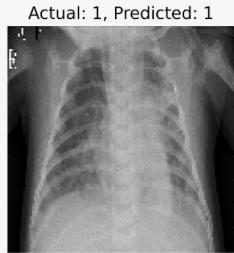
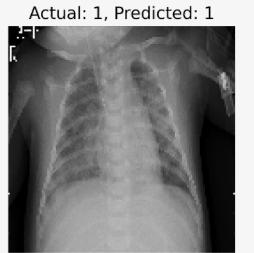
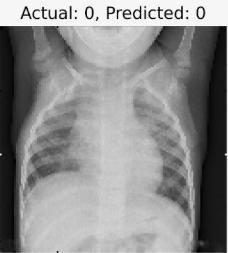
Result

93.75%



1: pneumonia

0: normal

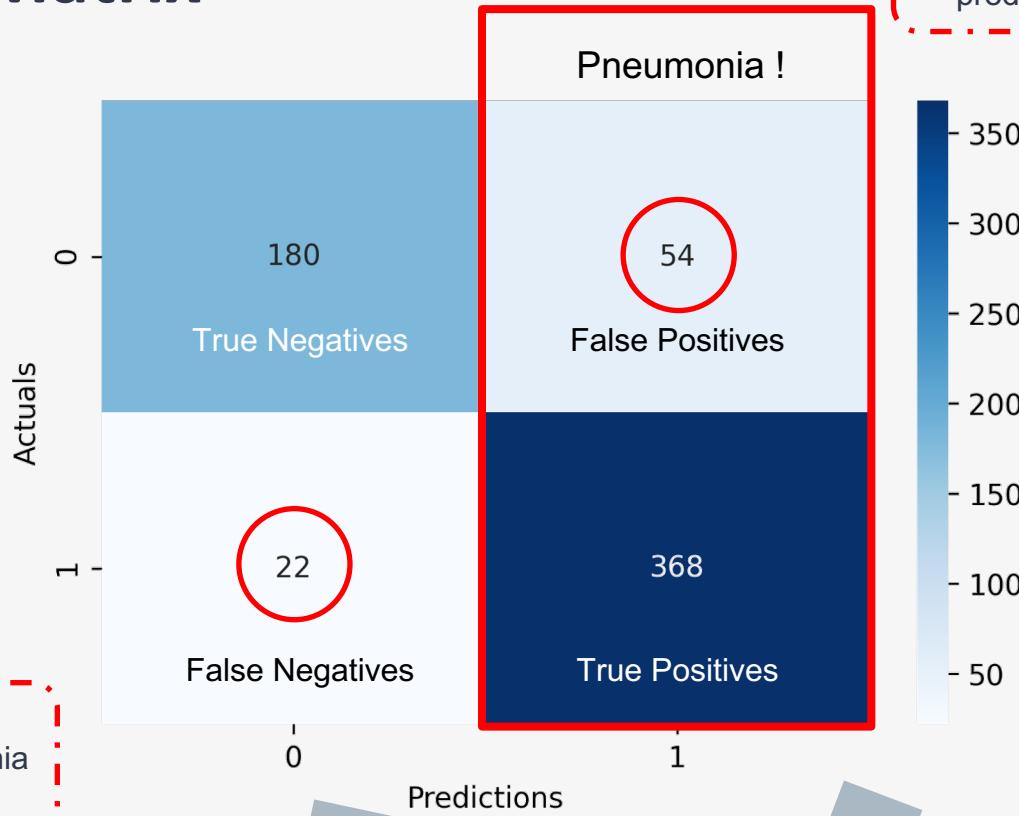


Confusion Matrix

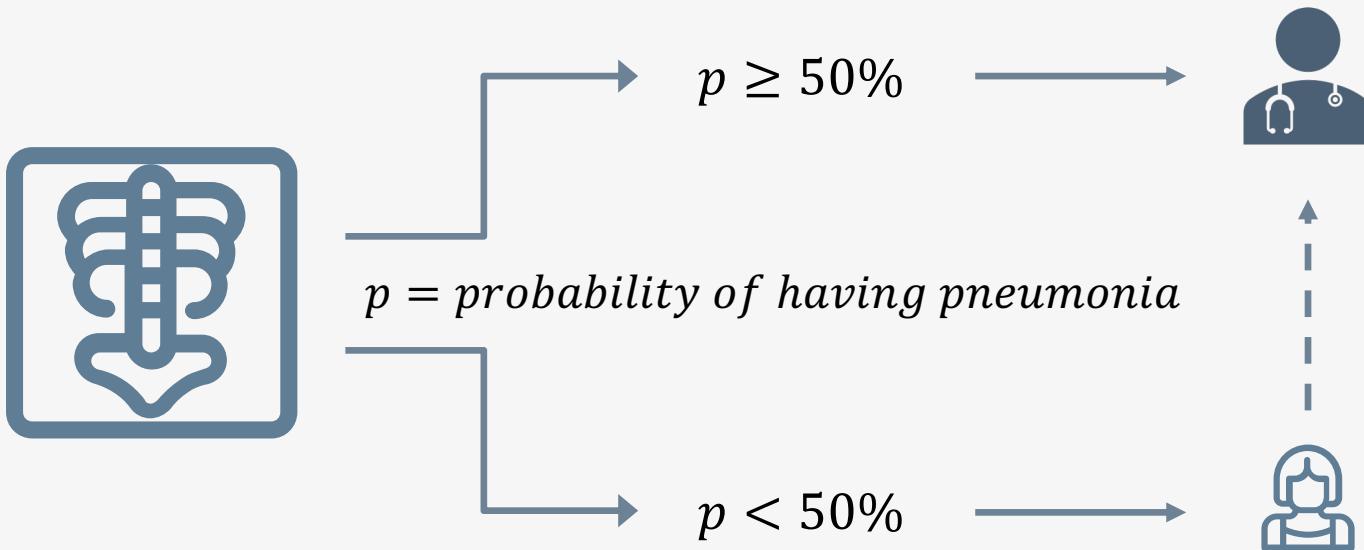


FN

- actually have pneumonia
- predict normal



Recommendation



Conclusion

- Test accuracy: 87.82%
- Holdout validation accuracy: 93.75%
- Threshold: $p < 50\%$

Future Work



Data



Extensive Application

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Thanks



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