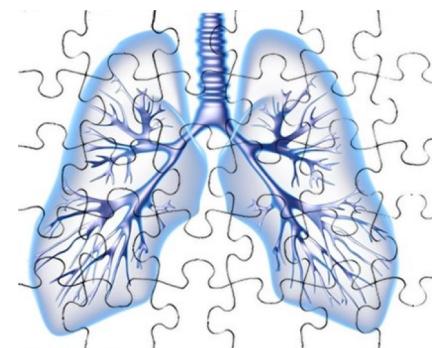


# Diagnosing pneumonia

Carolina Gonzalez

## Business Case

- Pneumonia is the world's leading cause of death among children under 5 years of age.
- In the US, pneumonia was one of the top ten most expensive conditions seen during inpatient hospitalizations.
- Chest X-rays are the most common imaging examination tool used in practice
- There is a shortage of experts who can interpret X-rays



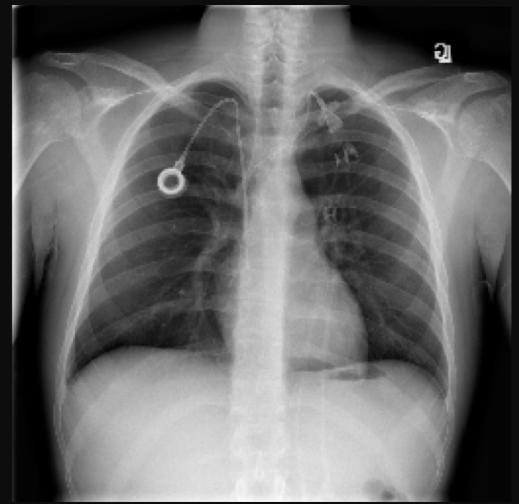
# Data

- 25684 labelled X-rays
- Coordinates for boxes indicating location of pneumonia for positive images
- 20025 no pneumonia images

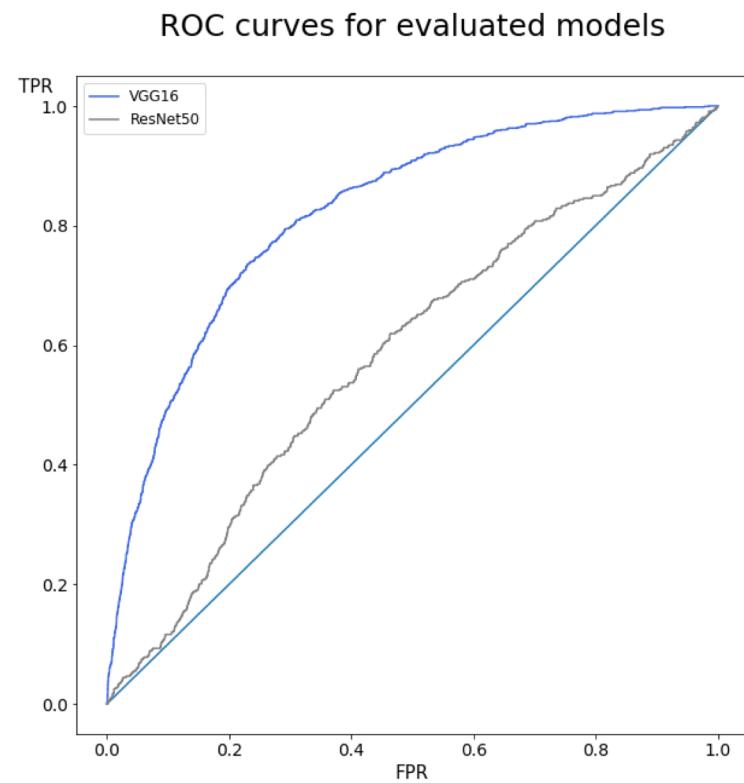
Pneumonia  
Positive image



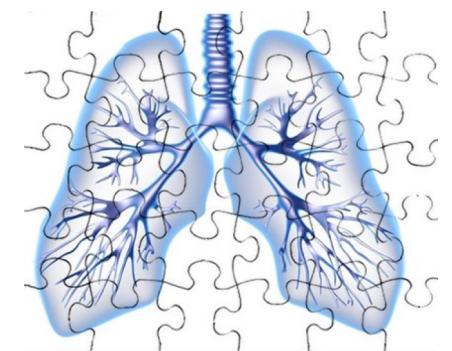
Pneumonia  
Negative image



# Model



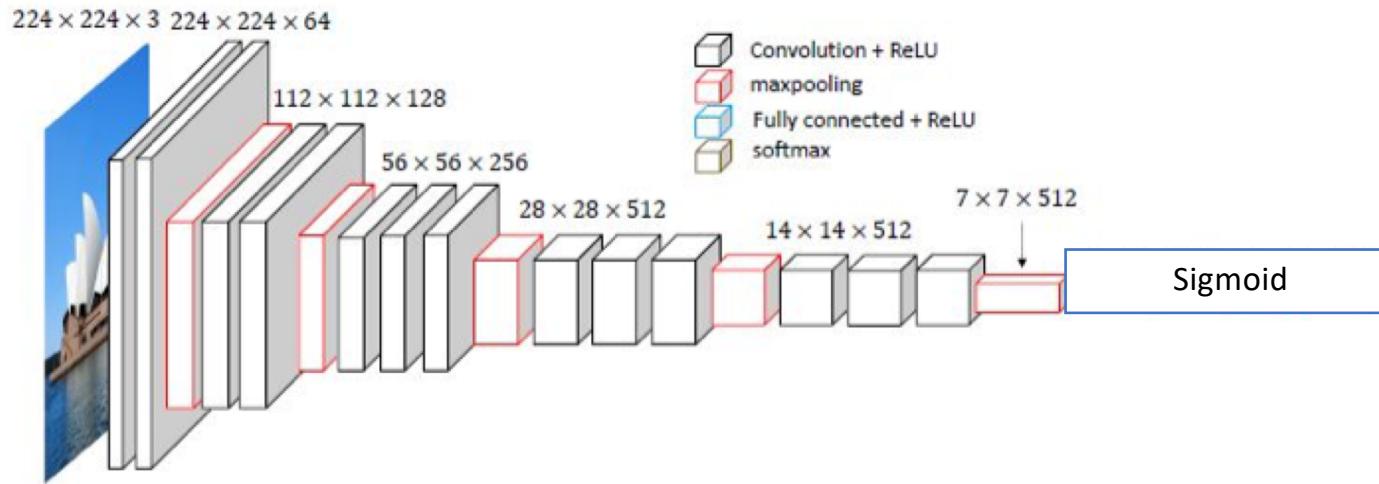
- Neural Networks Transfer learning:
  - VGG16
  - ResNet50
- Object location system, yolo



VISION

# VGG16 architecture

VISION



# Evaluation of performance

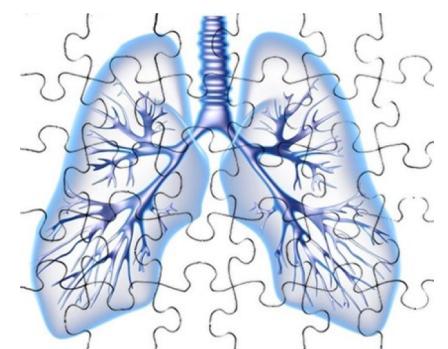
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## CheXNet: Radiologist-Level Pneumonia Detection on Chest X-Rays with Deep Learning

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Pranav Rajpurkar<sup>\*1</sup> Jeremy Irvin<sup>\*1</sup> Kaylie Zhu<sup>1</sup> Brandon Yang<sup>1</sup> Hershel Mehta<sup>1</sup>  
Tony Duan<sup>1</sup> Daisy Ding<sup>1</sup> Aarti Bagul<sup>1</sup> Robyn L. Ball<sup>2</sup> Curtis Langlotz<sup>3</sup> Katie Shpanskaya<sup>3</sup>  
Matthew P. Lungren<sup>3</sup> Andrew Y. Ng<sup>1</sup>

	F1 Score
Radiologist 1	0.383
Radiologist 2	0.356
Radiologist 3	0.365
Radiologist 4	0.442
Radiologist avg.	0.387
<b>Model</b>	<b>0.573</b>

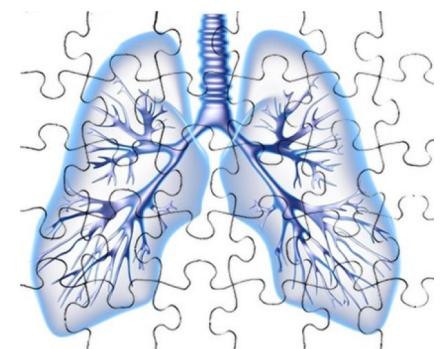


# Conclusions

- Transfer learning was used for predicting pneumonia based on chest X-rays data only.
- The results showed an improvement over radiologists performance without metadata.

## Future work:

- Inclusion of metadata such as patient temperature, presence of coughing, chest or lateral pain.



# Questions



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