X-Ray Image Classification

Identifying Pneumonia from Chest X-Rays

By Seth Schober

Agenda

1. Objective & Approach

2. The Data

3. Data Exploration

4. Modeling

5. Performance

6. Limitations and Next Steps

7. Conclusion

Objective & Approach

Goal

- Identify pneumonia

Methodology:

- Analyze database of chest x-rays
- Create models (neural networks)
- Optimize models based on performance metrics

The Data

Source
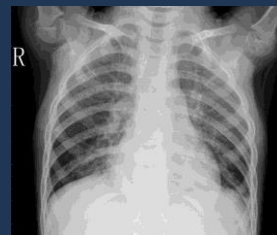- "Large Dataset of … Chest X-Ray Images" from <u>Mendeley Data</u>

Key Attributes
- Over 5,800 images
- Labeled as "normal" or "pneumonia"

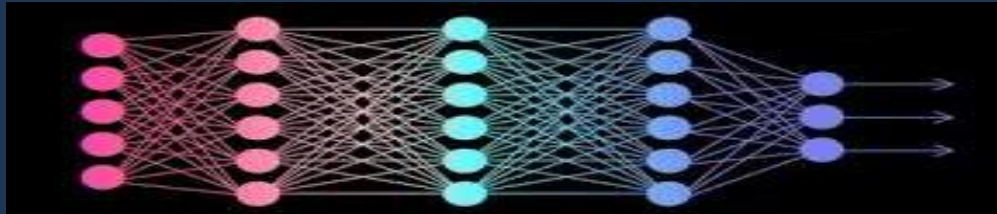# Data Exploration: Example Images
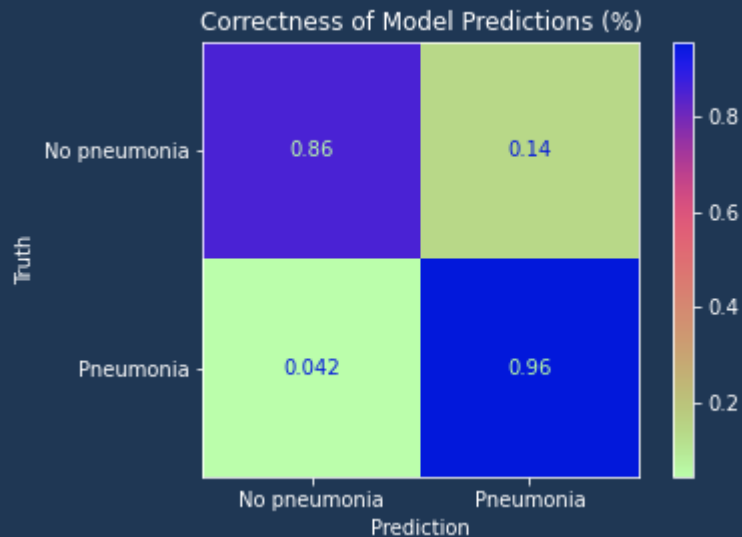
Normal

Pneumonia

Modeling

- Dozens of neural network models tested
- "Black box" models make identifying the "why" behind a classification hard
- Overall 96% accuracy

Performance

- Correctly classifies 96% of images
- "Misses" case of pneumonia only 1 in 240 times
- Most mistakes are false positives (preferable)

Correctness of Model Predictions (%)

	No pneumonia	Pneumonia
No pneumonia	0.86	0.14
Pneumonia	0.042	0.96

Truth / Prediction

Limitations & Next Steps

Limitations
- Black box model
- X-rays provided by only one study (limited scope)

Next Steps
- Add image processing step to identify region in image that shows pneumonia

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