Image Classification

Detecting Pneumonia in Chest X-rays

The Key Importance of Diagnosing Pneumonia

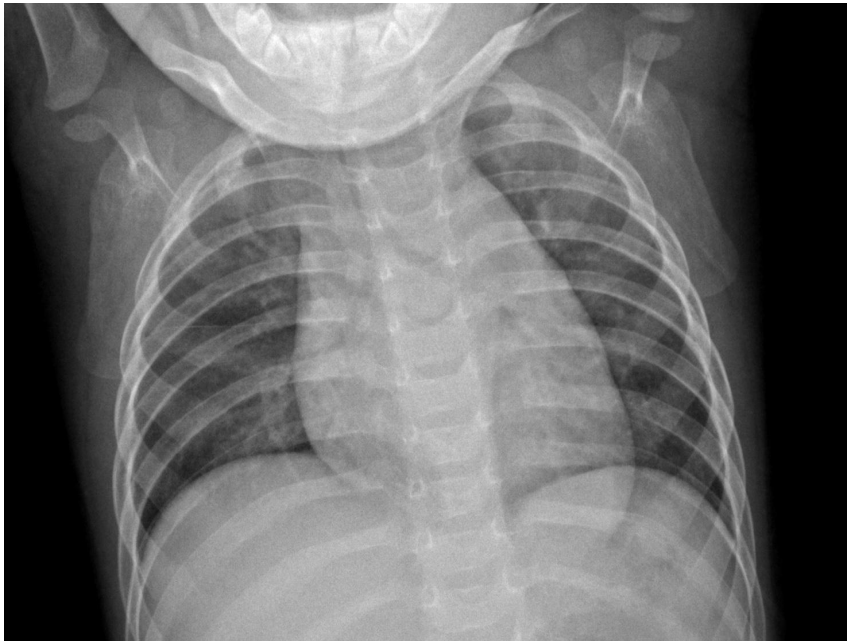
- Pneumonia is responsible for more childhood deaths than any other infectious disease[1]

- Early diagnosis and treatment are critical [2]

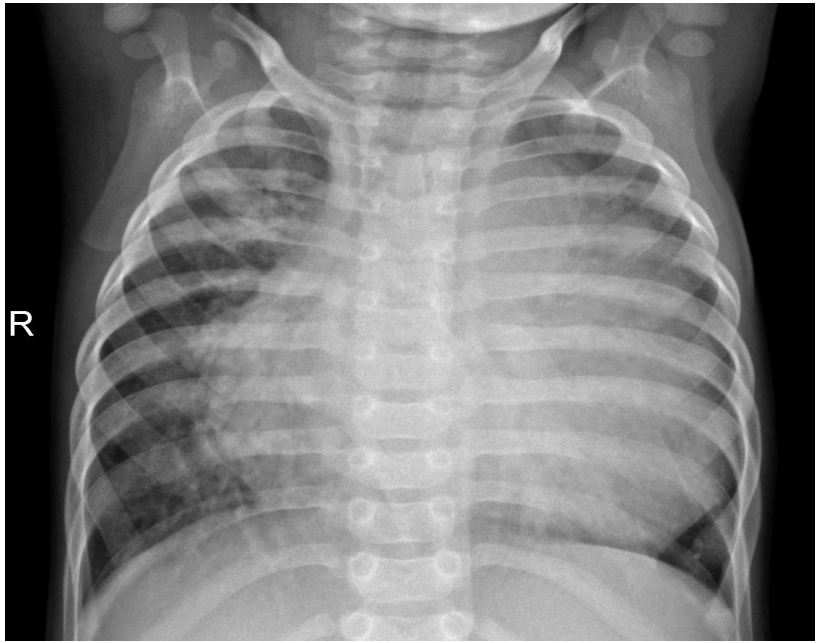
[1]https://data.unicef.org/topic/child-health/pneumonia/

[2]https://pneumonia.biomedcentral.com/articles/10.15172/pneu.2014.5/482

Sample X-Rays



Normal



Pneumonia

The Diagnostic Solution

We have developed a software tool that helps diagnose pneumonia

- Begin treatment sooner

- Provide a “second opinion” to medical professionals

Method

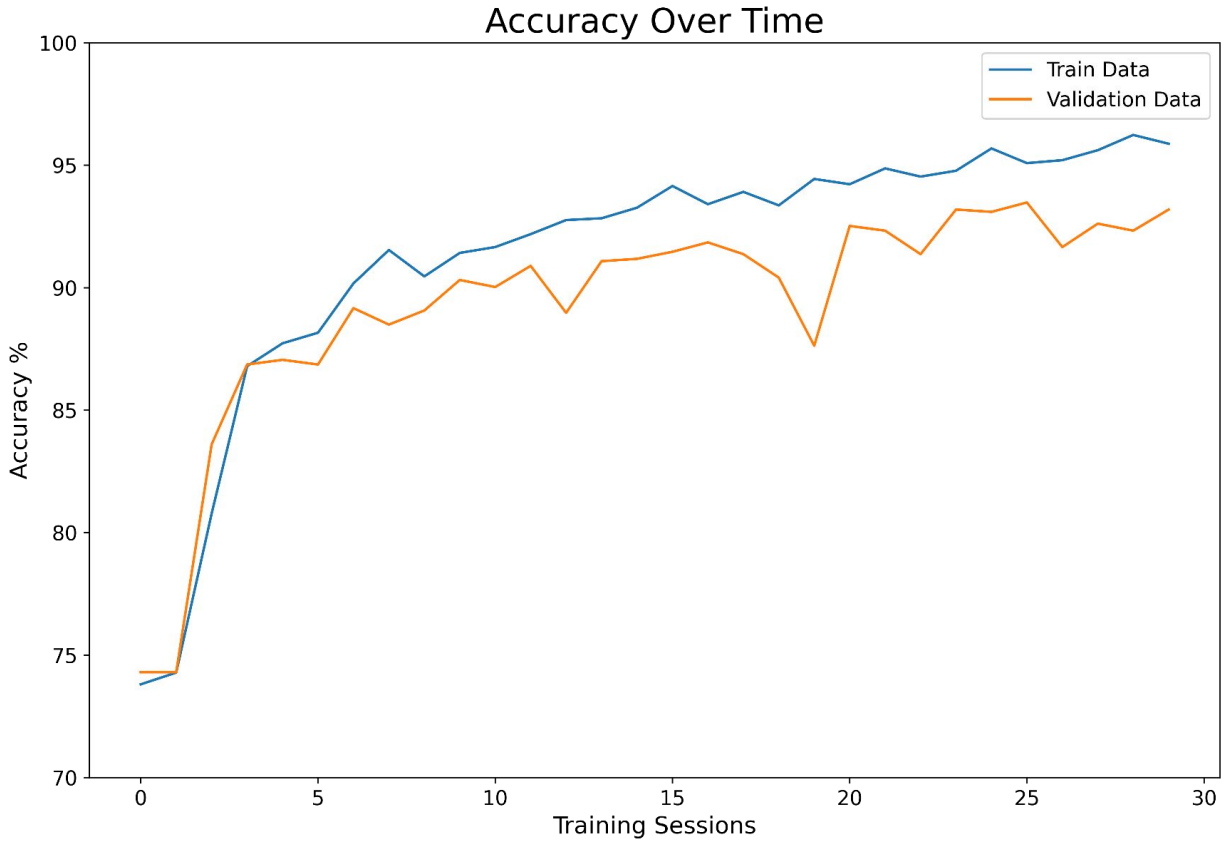
Convolutional neural network(CNN) algorithms process and learn from thousands of images

Key metrics in model:

Accuracy: Reliable predictions

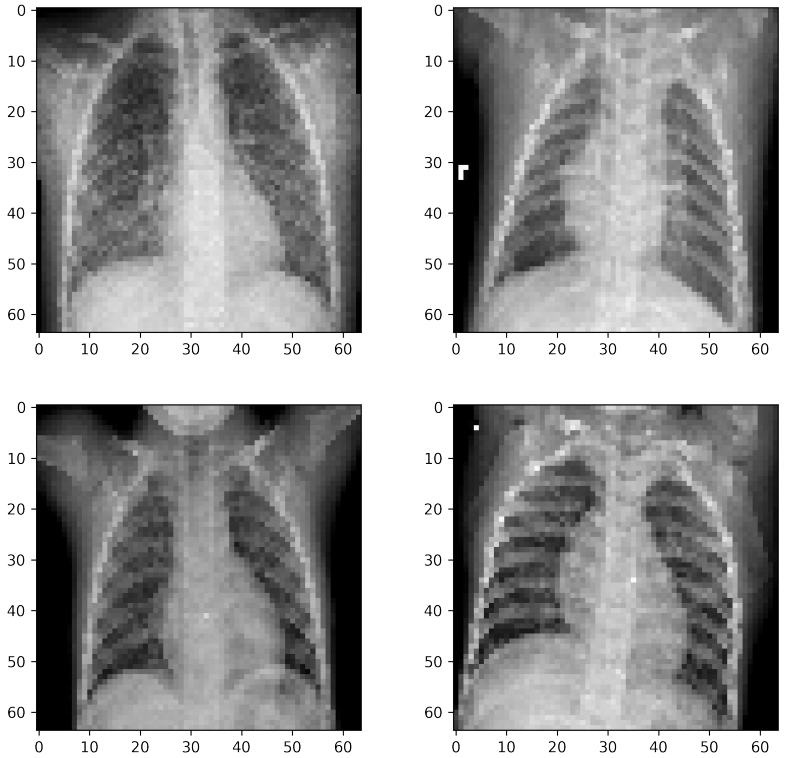
Recall: Reducing chance of a missed diagnosis

Model Metrics



Model Performance

- Overall Accuracy: 88%
- Very sensitive to pneumonia
- Missed only 4 out of 390 pneumonia cases
- 1% False-Negative rate



Next Steps

- More data to improve model training
- Distinguish between viral and bacterial infections
- Create dataset of images that are specifically misdiagnosed, to act as a better “second opinion”
    - Radiological evidence of pneumonia in patients was reported in only 14% of symptomatic children[1]

[1]https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1570841/

Thank you!

Full Project Available on Github

Yuhkai Lin

github.com/yuhkulele

Peter Burton

github.com/pburtonak