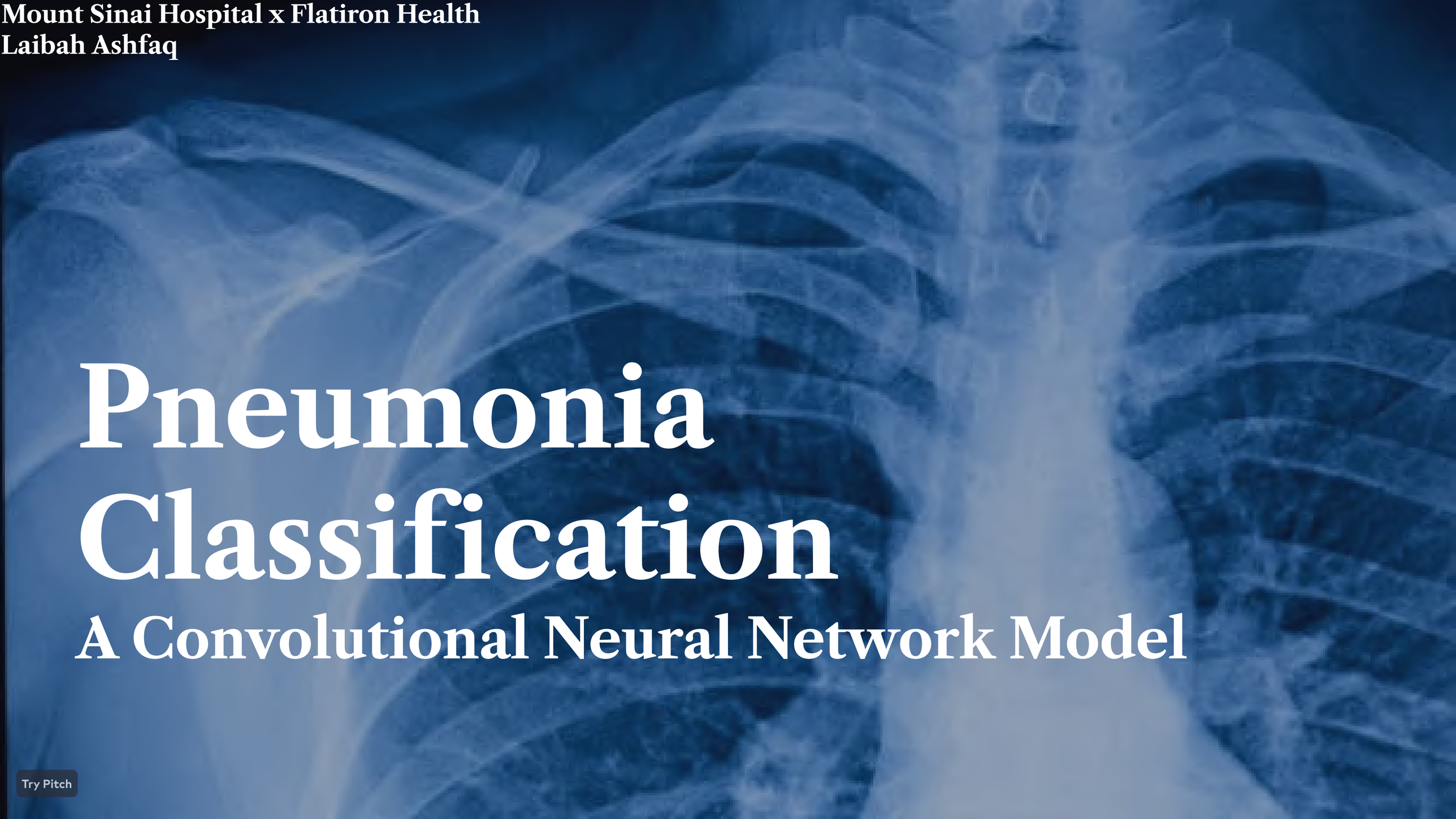
Mount Sinai Hospital x Flatiron Health
Laibah Ashfaq



Pneumonia Classification

A Convolutional Neural Network Model

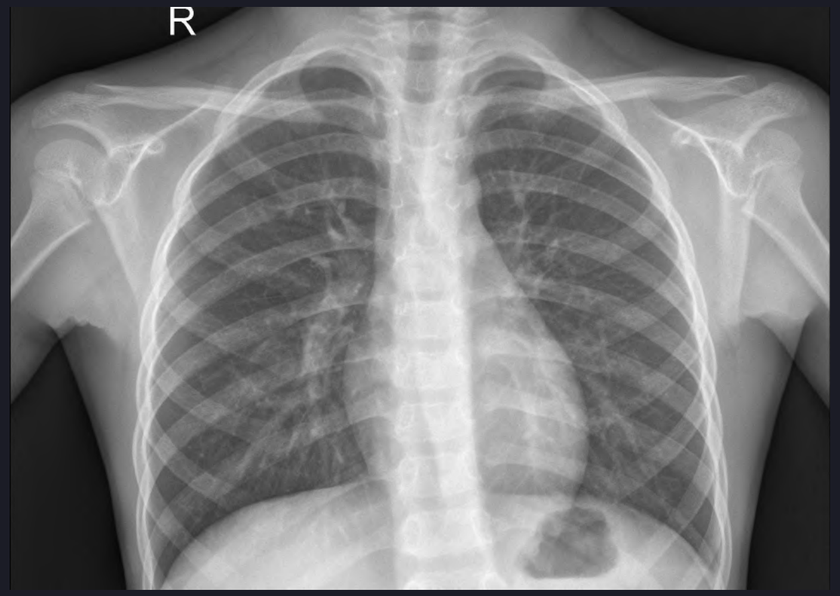
What is Pneumonia

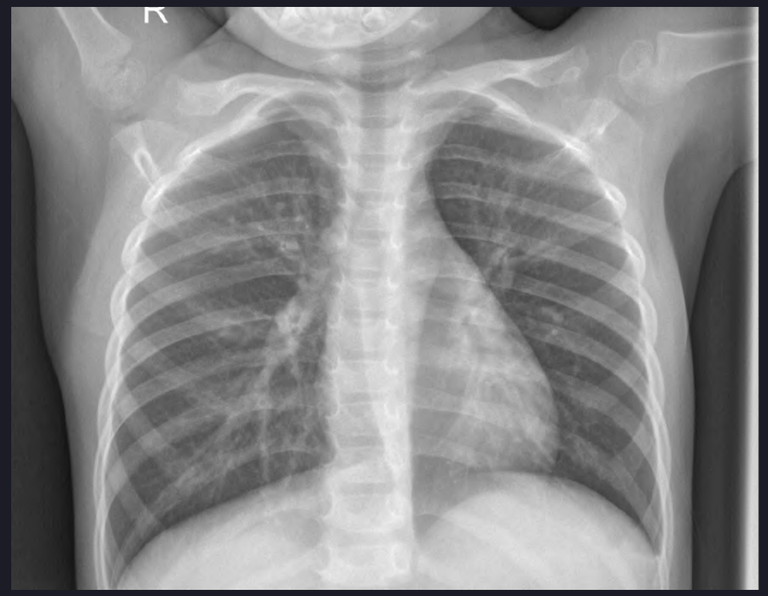
- lung inflammation caused by bacterial or viral infection, in which the air sacs fill with pus and may become solid.
- Contagious like a flu or cold
- Some people feel better and are able to return to their normal routines in 1 to 2 weeks.
- For others, it can take **a month or longer**. Most people continue to feel tired for about a month.
- “Pneumonia and influenza” are the **third leading cause of death in New York City**

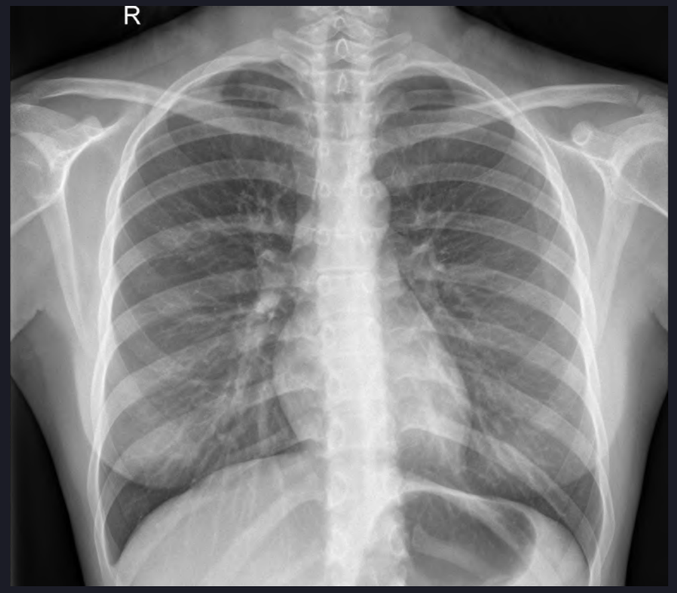
Business Understanding

- Stakeholders: Mount Sinai Hospital and NYC department of Health
- Problem: There's a city wide shortage of X-ray technicians/ radiologist and a greater need for doctors to be able to interpret imaging faster
- The Project: building a neural network model that can accurately predict respiratory diseases from X-rays

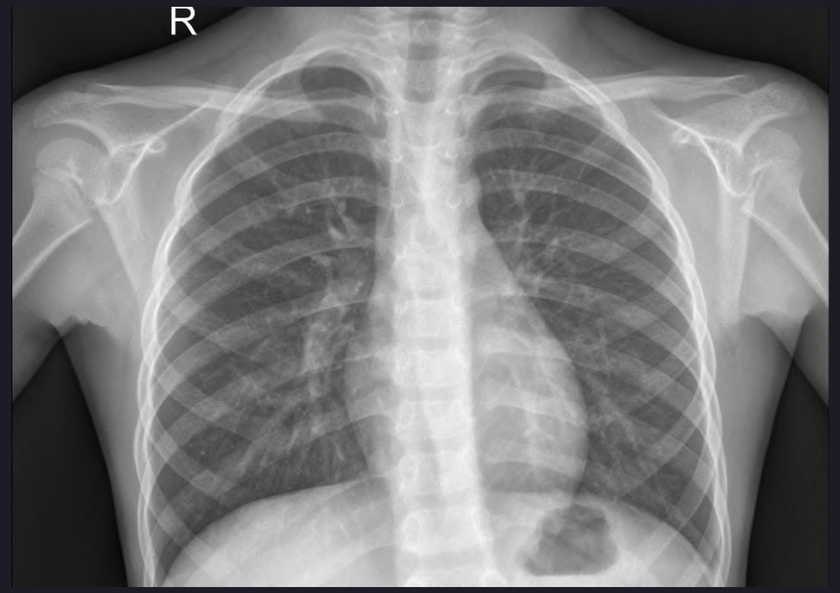
Normal

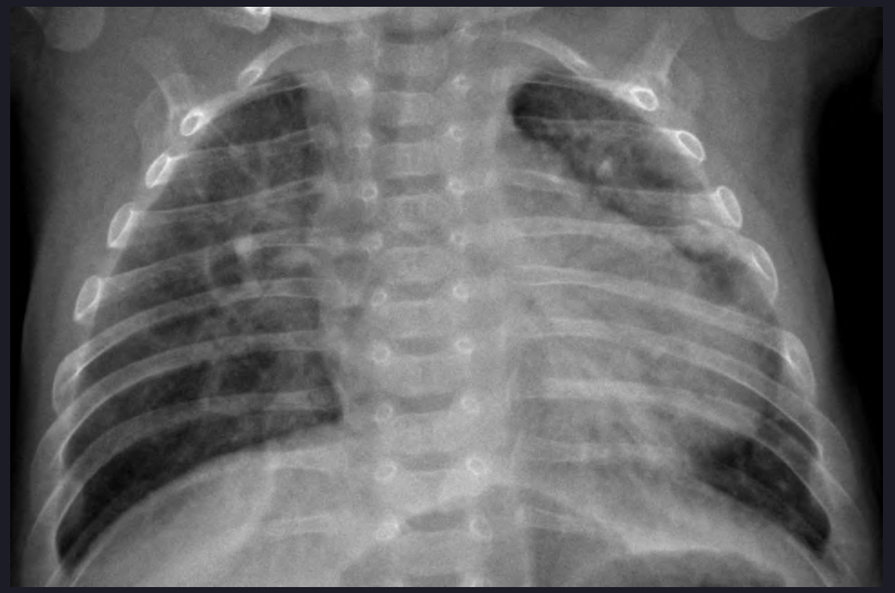




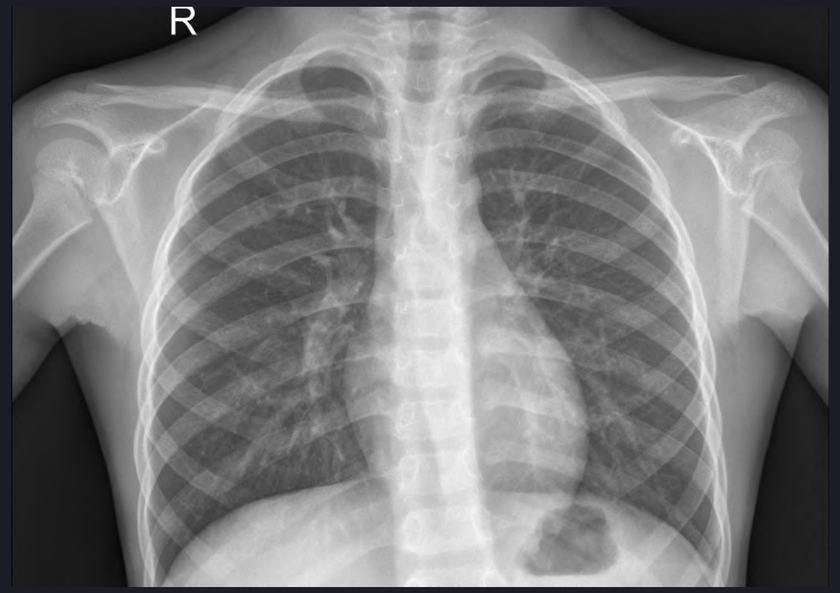


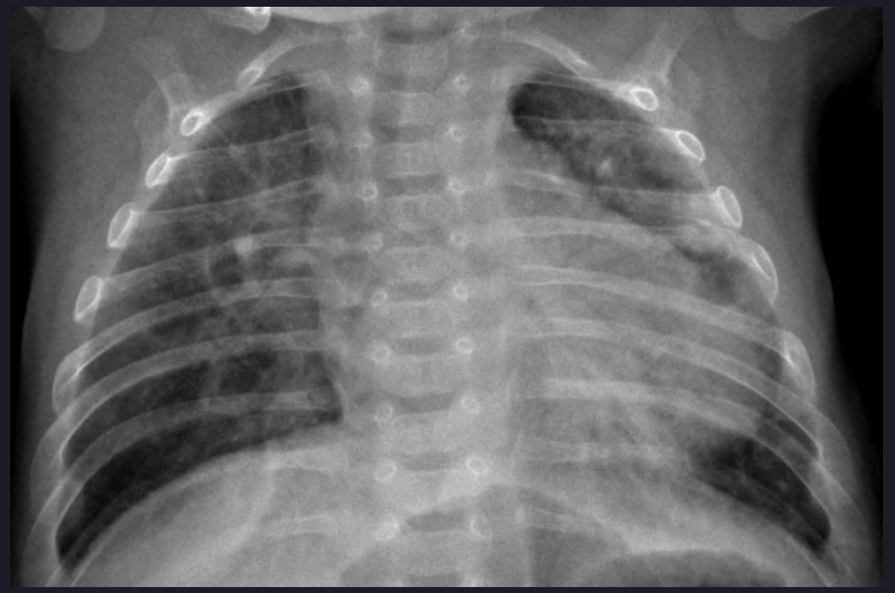
Can You Predict Correctly?



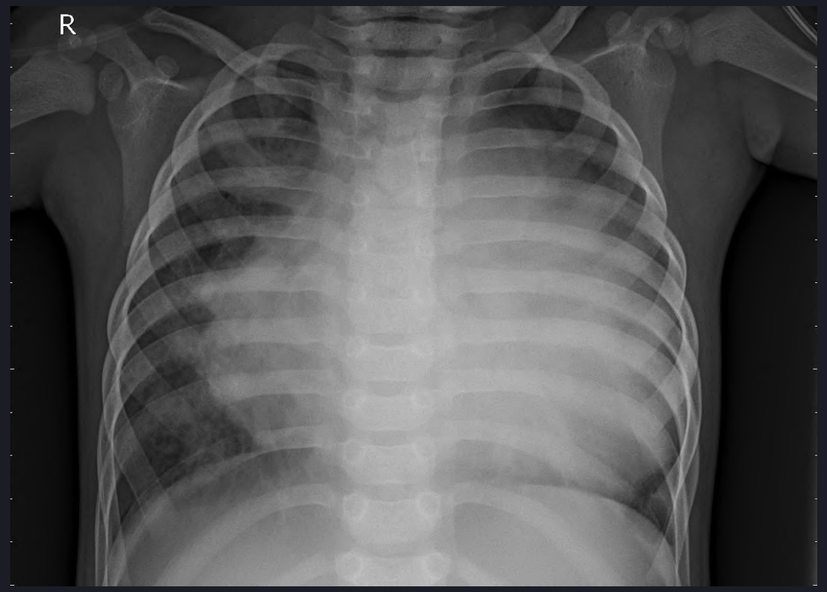


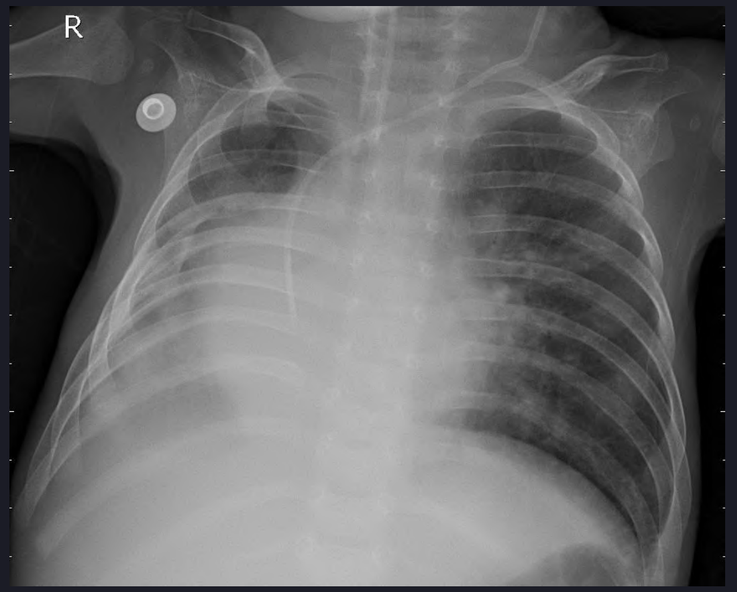
Can You Predict Correctly?

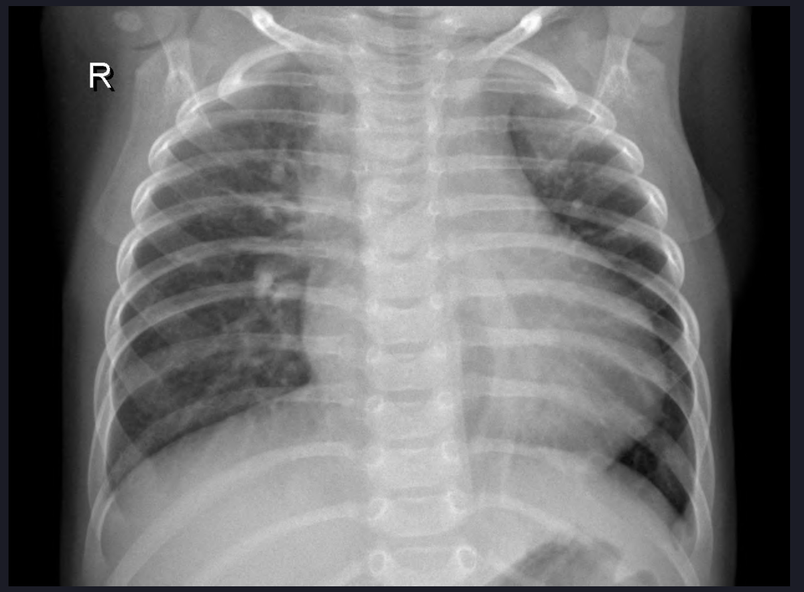




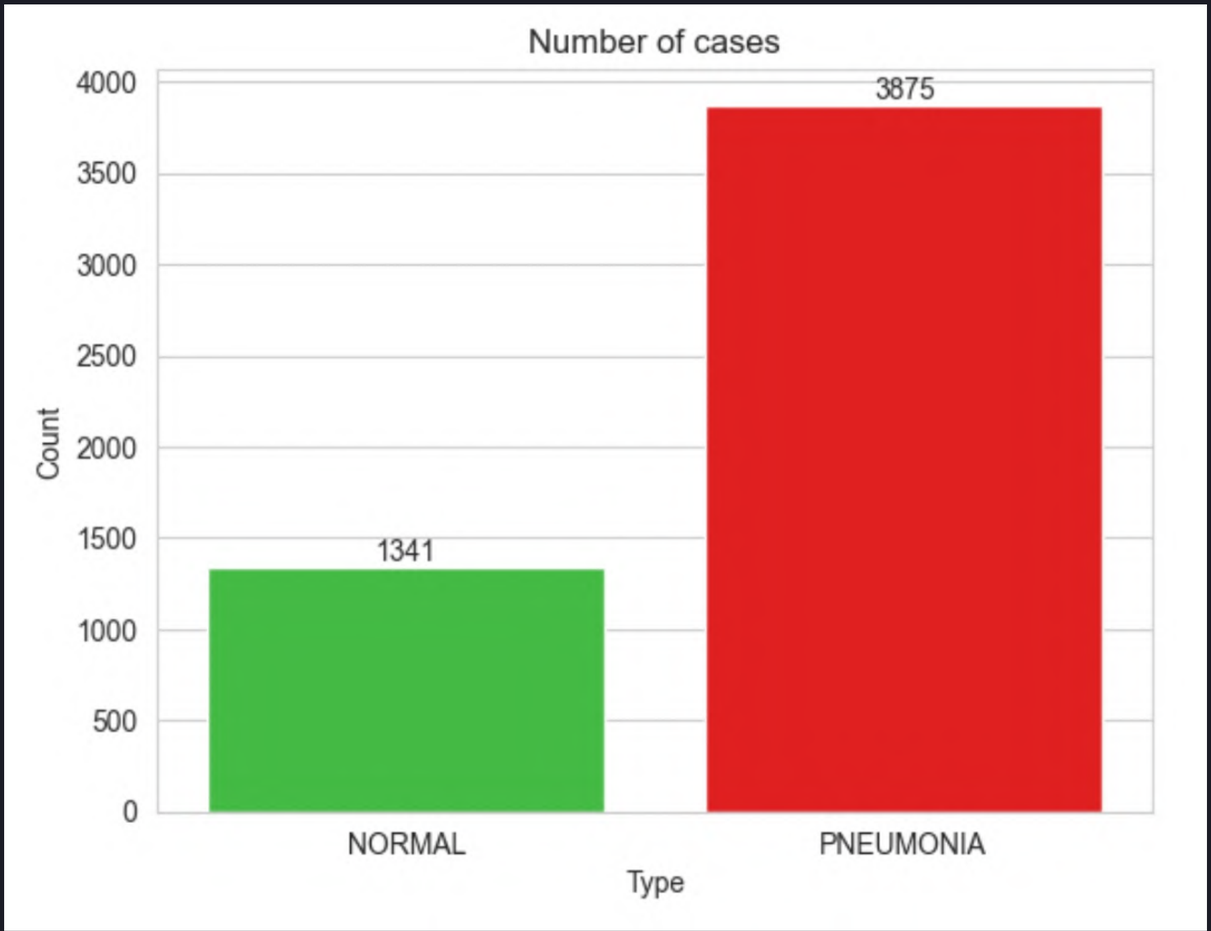
Pneumonia





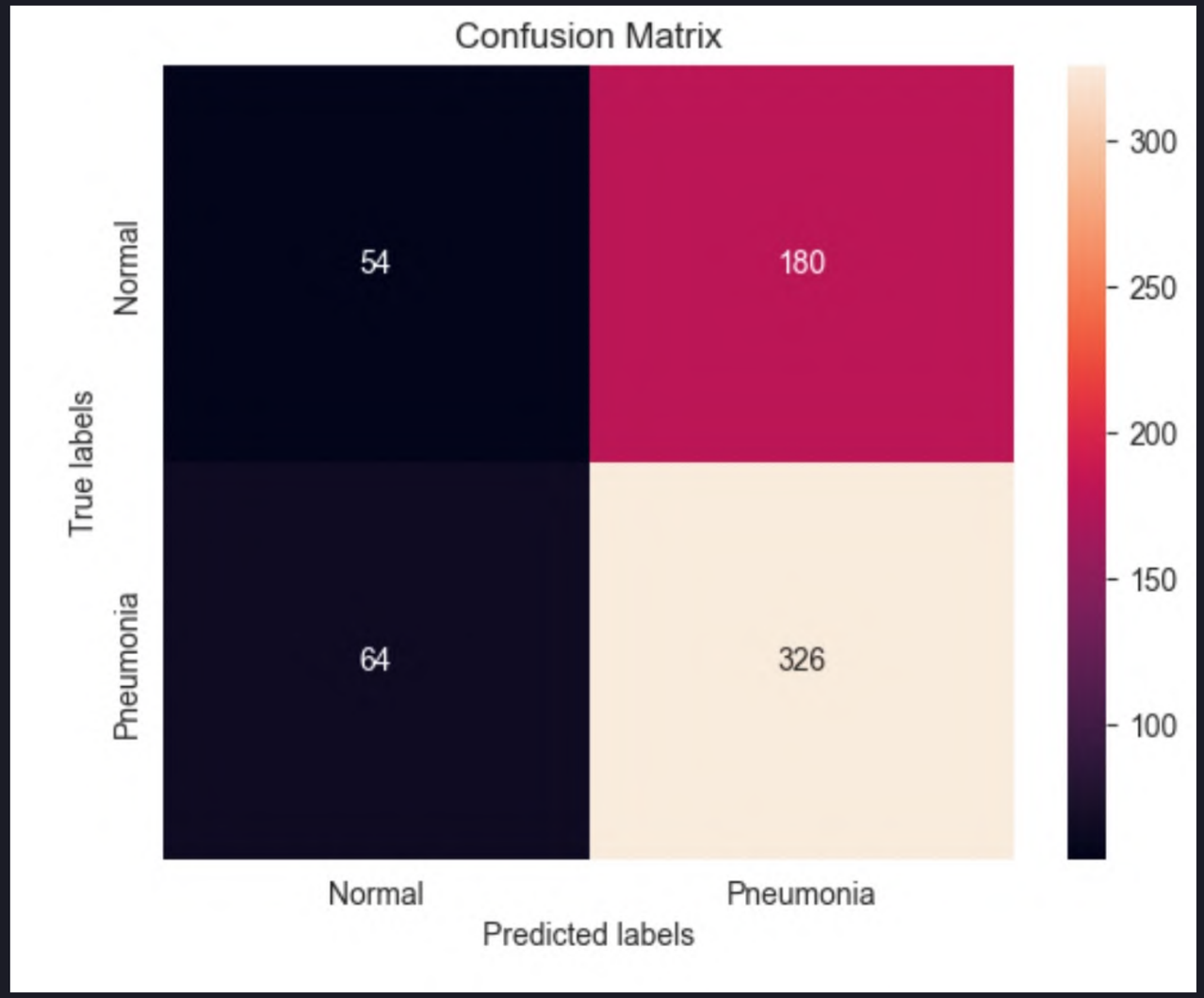


Our Data



- Used the X-ray data from the Mendeley database
- Chest X-ray images (anterior-posterior) were selected from retrospective cohorts of pediatric patients of one to five years old from Guangzhou Women and Children's Medical Center, Guangzhou

Our Proposed Model

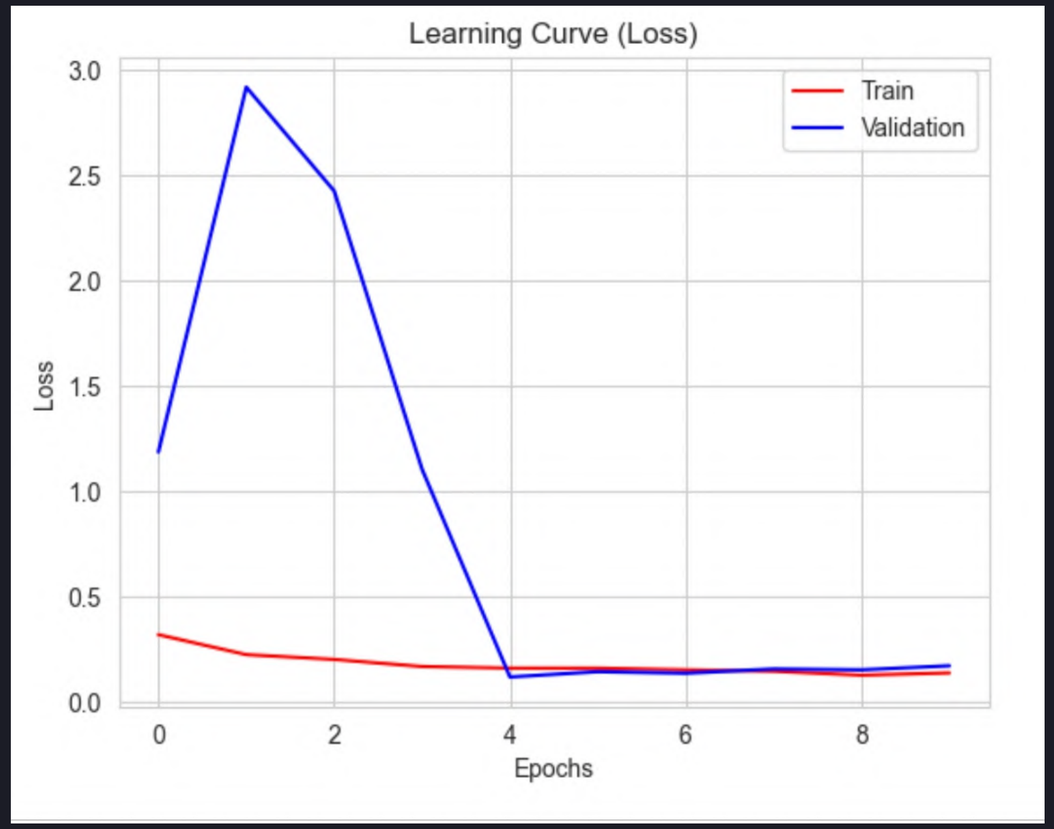


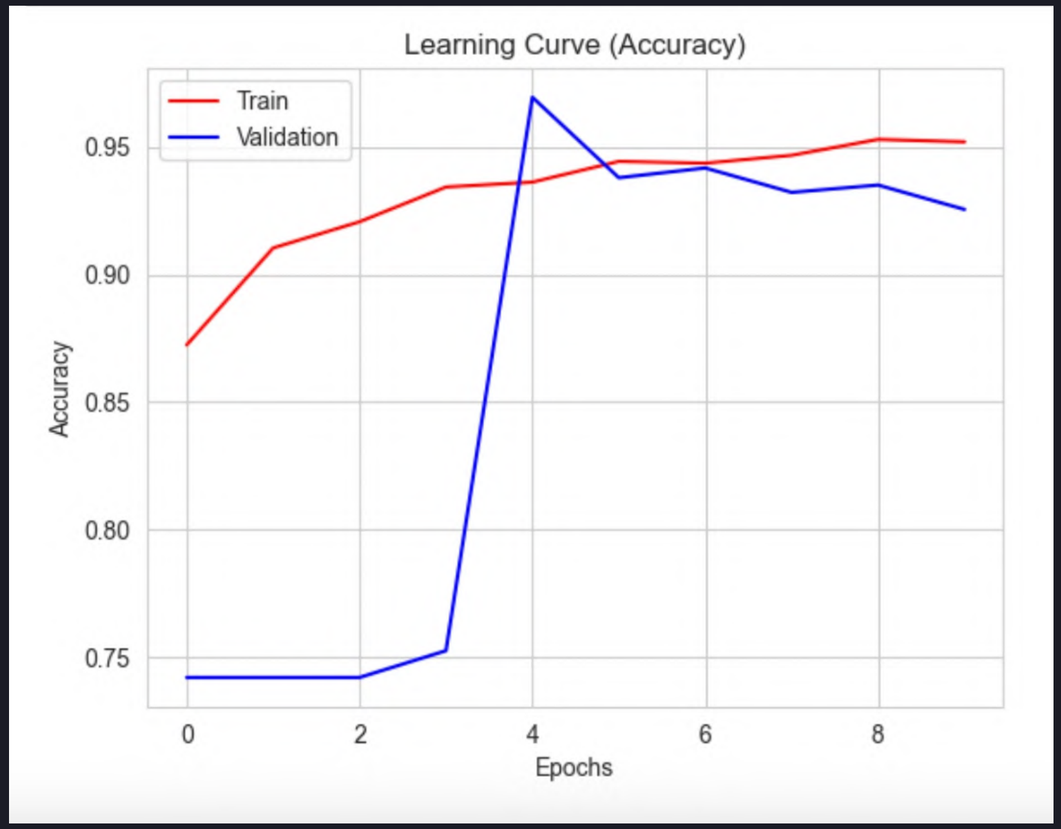
Test Accuracy: 0.81 %

Validation Accuracy: 0.97%

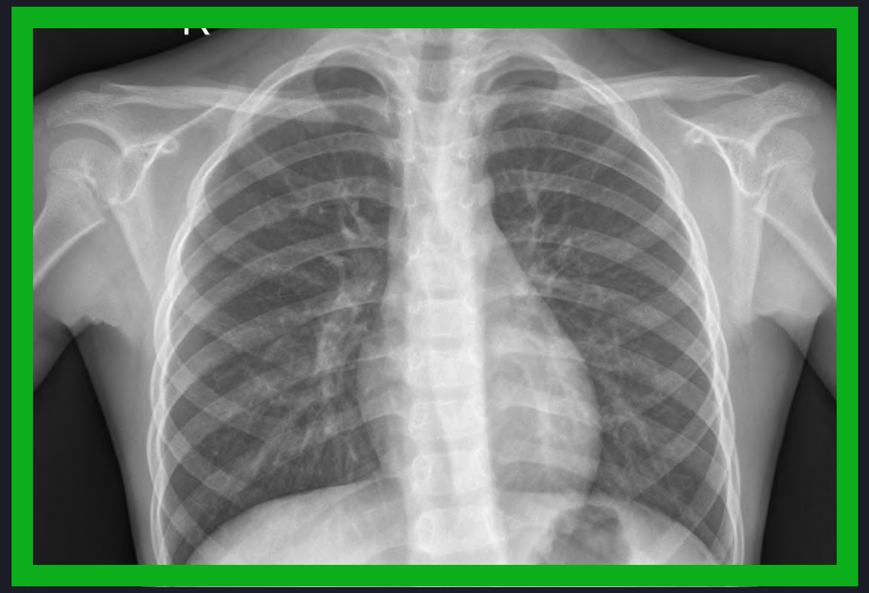
F1 Score: 0.73 %

Visualizing Model Performance





Model Performance



Normal

Pneumonia

Recommendations

1. X-ray Efficiency

Use this model to create an app embedded within imaging machines such that they can predict as the image is being generated

2. Future Epidemics

Use it to help combat healthcare shortage during epidemics in hospitals and clinics

3. Imaging Efficiency

Can use neural networks to model CT scans and MRI scans as well

Thank You