



Analyzing Chest X-Rays Using Machine Learning

Justin Grisanti

Objectives – 5 Step Model



Obtain a Business Understanding



Understand the Data



Prepare Data for Modeling



Create Models



Generate Results

Business Understanding

Stakeholders:

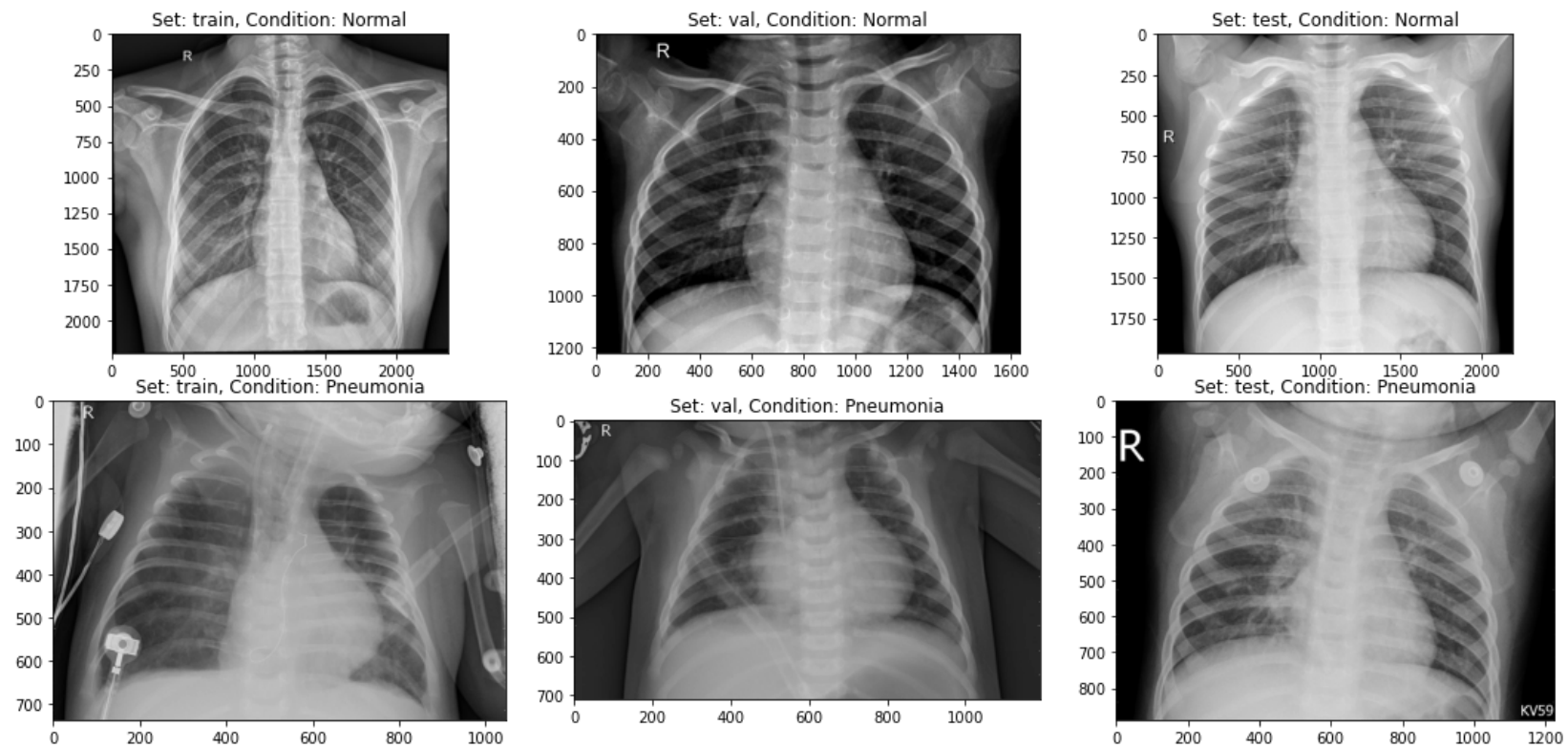
- Hospital Patients with Pneumonia
- Doctors from Mount Sinai
- Radiologists

Business Problem

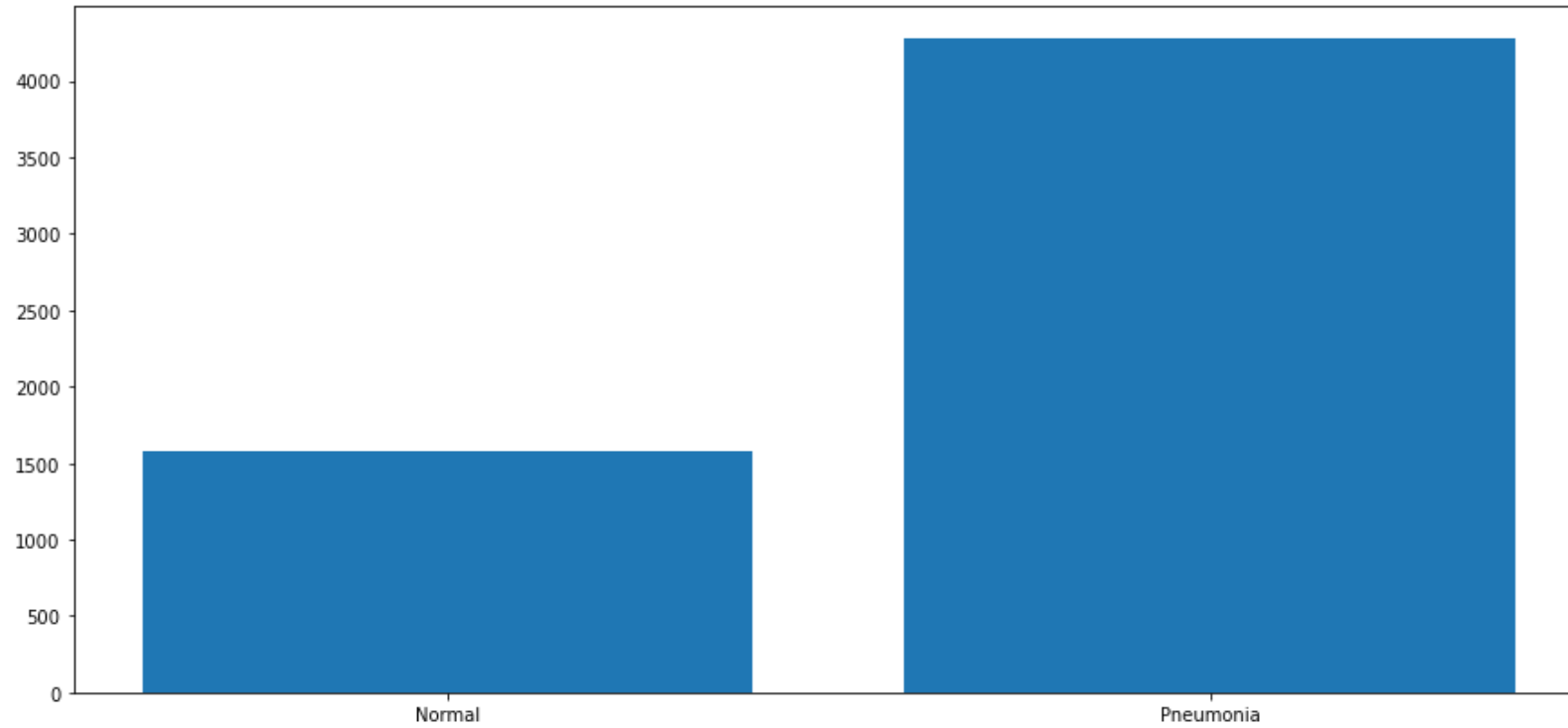
- Pneumonia ranks second to congestive heart failure as the reason for hospital readmission within 30 days of a previous hospitalization
- Mount Sinai has contracted me to use deep learning to more accurately predict whether a patient has pneumonia, given a patient's chest x-ray

Goals/Value-add

- To reduce the number of readmissions due to missed cases of pneumonia
- To provide Mount Sinai with a model that can more accurately classify a patient's chest x-ray



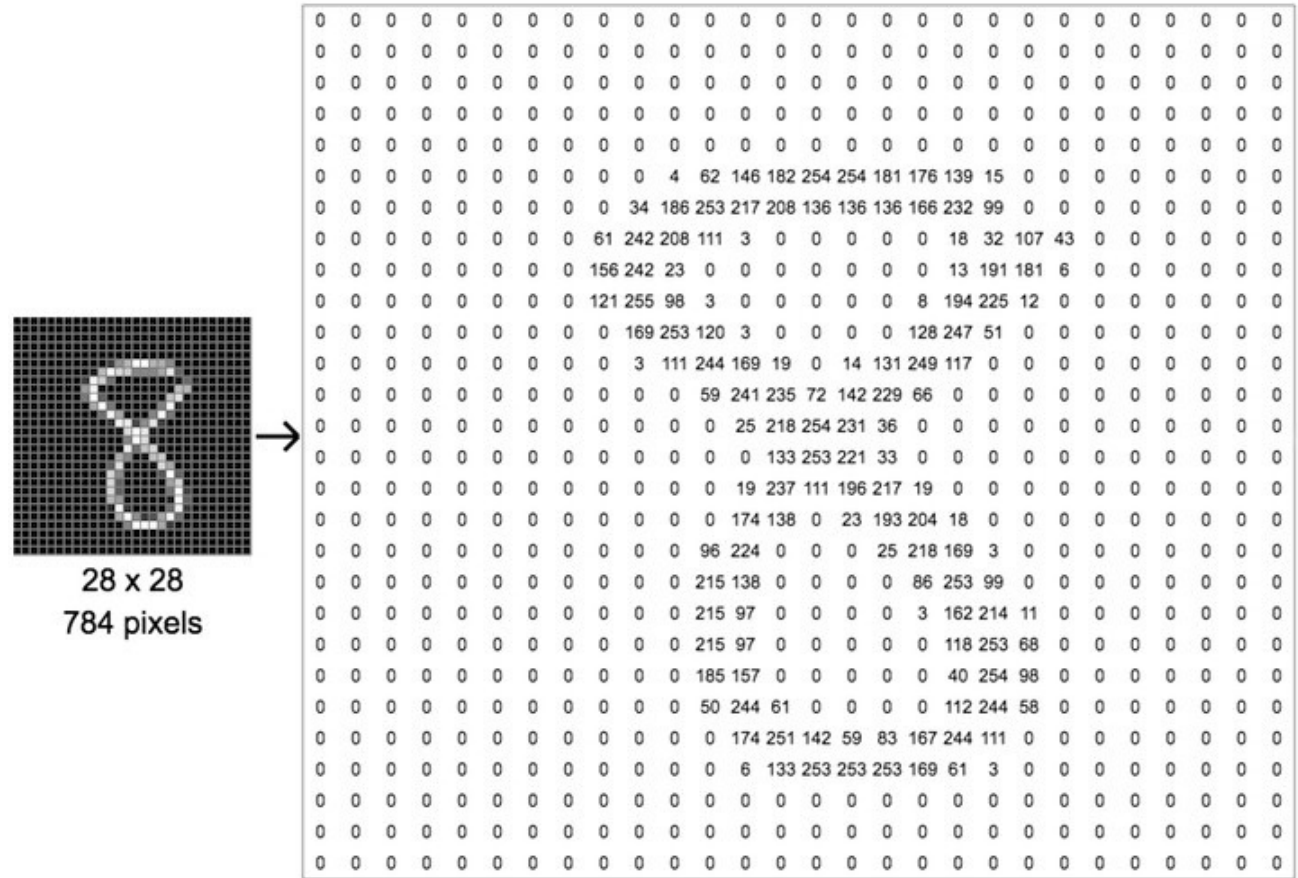
Data Understanding



Data Understanding

Data Preparation

- Using preprocessing techniques to convert an image from a picture to an array of numbers that our computer can read

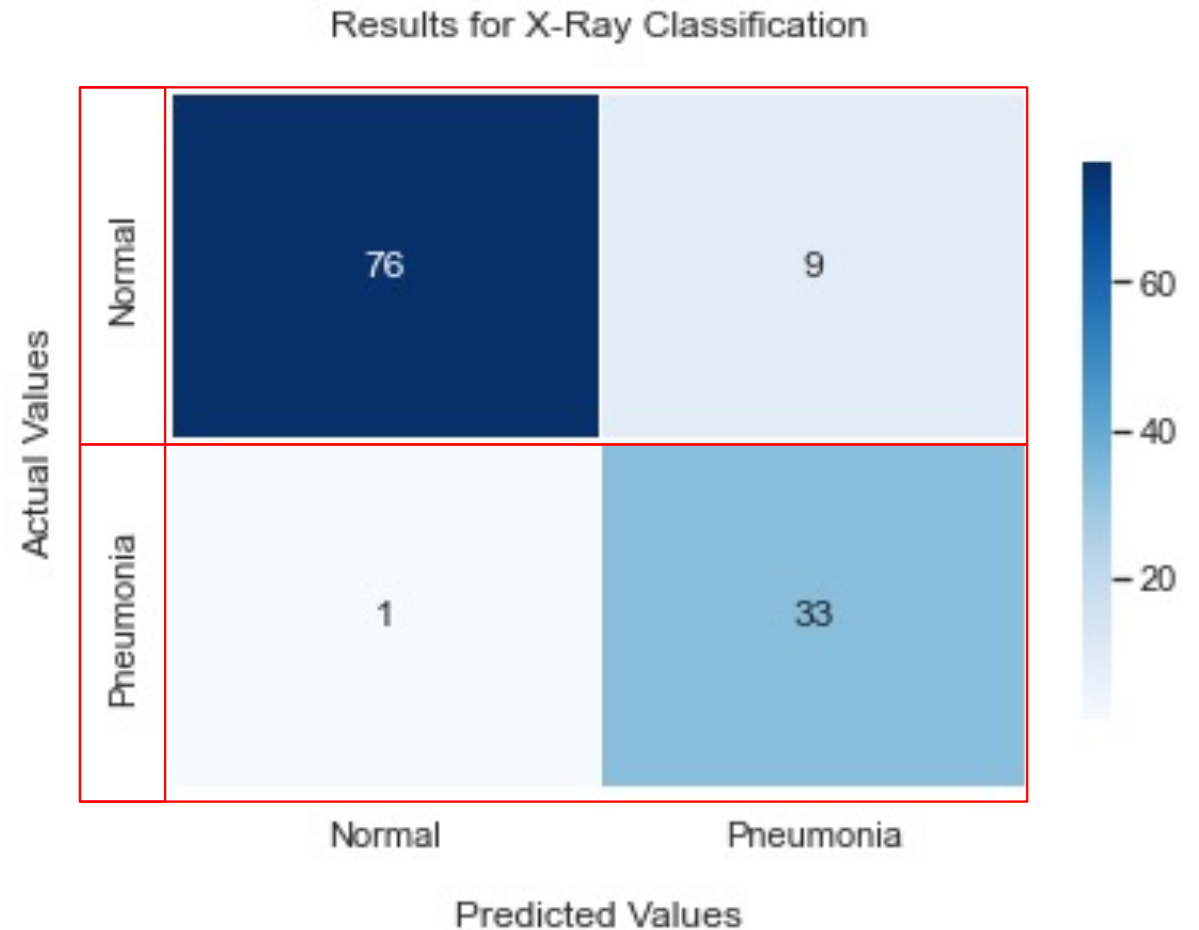


Modeling

- Redefine the Problem
 - Patients are readmitted due to doctors' failure to diagnose pneumonia
- Modeling Solution
 - Our model should minimize false negatives (Type II error)
 - False Negatives: Patients diagnosed as not having pneumonia when they actually have pneumonia
 - Using Recall to minimize Type II error
 - Image Classification using Keras

Best Model Results

- Best Model: 97% Recall Score
- Patient has Pneumonia:
 - **Correctly classified that the patient has pneumonia 97% of the time**
- Patient doesn't have Pneumonia :
 - Correctly classified that the patient doesn't have pneumonia 89% of the time
- Value: Model prevents False Negatives 92% of the time



Next Steps:

Introduce
more data



Try a new set
of models



Thank You For Your
Time!