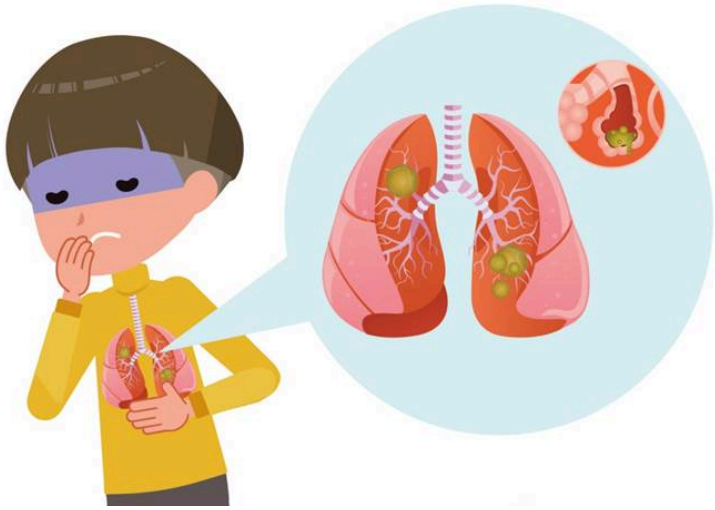
X-Ray Vision: A Deep Learning Approach to Pneumonia Diagnosis

A Case Study by Nathan Geng (DS 4002, Spring 2024)



Pneumonia is classified as an infection of the lungs and is caused by a number of means, including bacteria, viruses, or fungi. In this day and age, it is one of the most common illnesses you can find across the world - in the U.S. alone, there are about 3 million cases diagnosed each year. However, pneumonia becomes a much greater problem in third world countries, where a physician shortage and lack of investment in healthcare systems ultimately lead to a more inefficient diagnosis process. This has crippling downstream effects, especially for affected children, since late identification of pneumonia can change their potential outcome from manageable with treatment, to risk of death. This is where you - a data scientist with experience in machine learning - come in: you have been tasked with building a preliminary image classification model that can be used to predict pneumonia from a mere x-ray image, and present your findings to a board of healthcare officials. In order to support your conclusions, you will need to create a (1) GitHub repository and (2) a brief presentation of your analysis process and findings. You will be using the "Chest X-Ray Images (Pneumonia)" dataset, which has already been separated into healthy/pneumonia labeled images. As a hint, I would recommend using Keras and Tensorflow in Python to create your model.