Chest X-ray Image Classification with Deep Learning

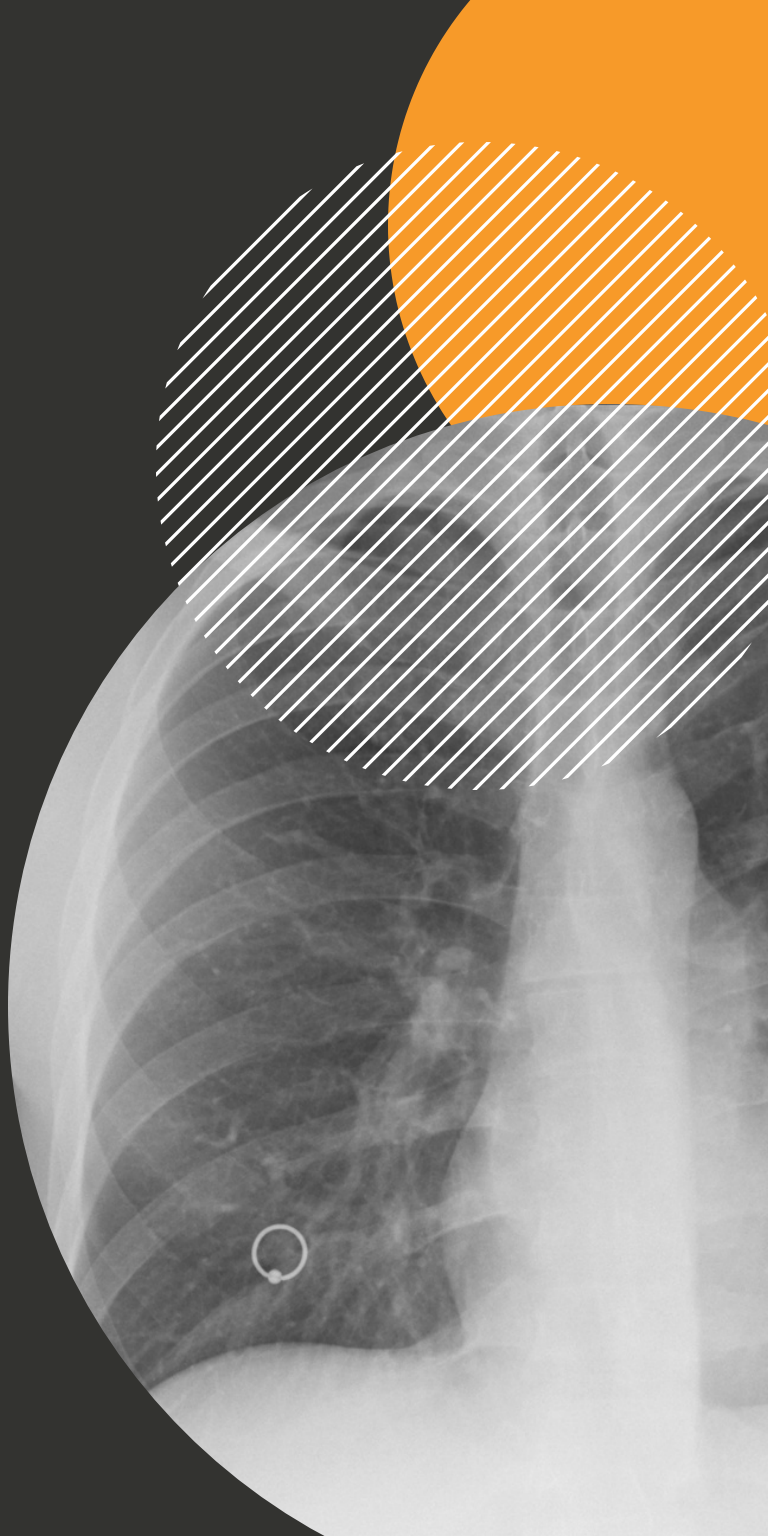
A PRESENTATION BY THE AVENGERS

The Contents

Business Understanding

Pneumonia is diagnosed based on a patient's clinical symptoms, imaging and lab work. The preferred imaging is a plain chest radiograph (X-ray). On a chest X-ray, pneumonia is seen as opacities (white areas on the lung fields).

While some consider X-rays to be the gold standard of diagnosis, they are prone to misinterpretation depending on the quality of the image, experience of healthcare professionals etc.



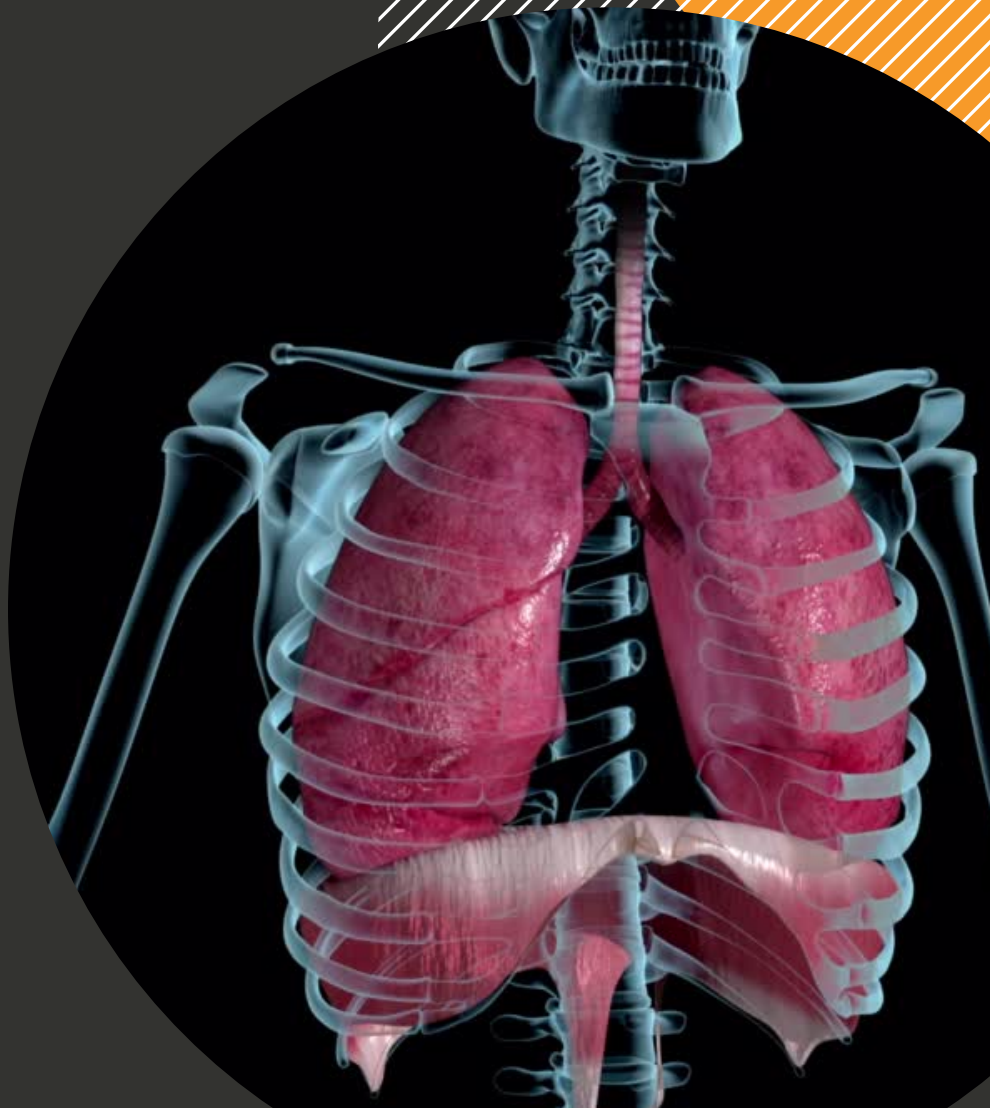
Problem Statement

Tibabu Hospital did a research on the accuracy of Pneumonia diagnosis. Accurate diagnosis of the disease is crucial in reducing disease burden, hospitalizations and mortality.The the results were not impressive. So to improve diagnosis of pneumonia using x-rays, tasked us to come up with a solution.

Proposed Solution

Come up with a classification algorithm that will determine if a patient has pneumonia or not based on their chest X-ray image(s).

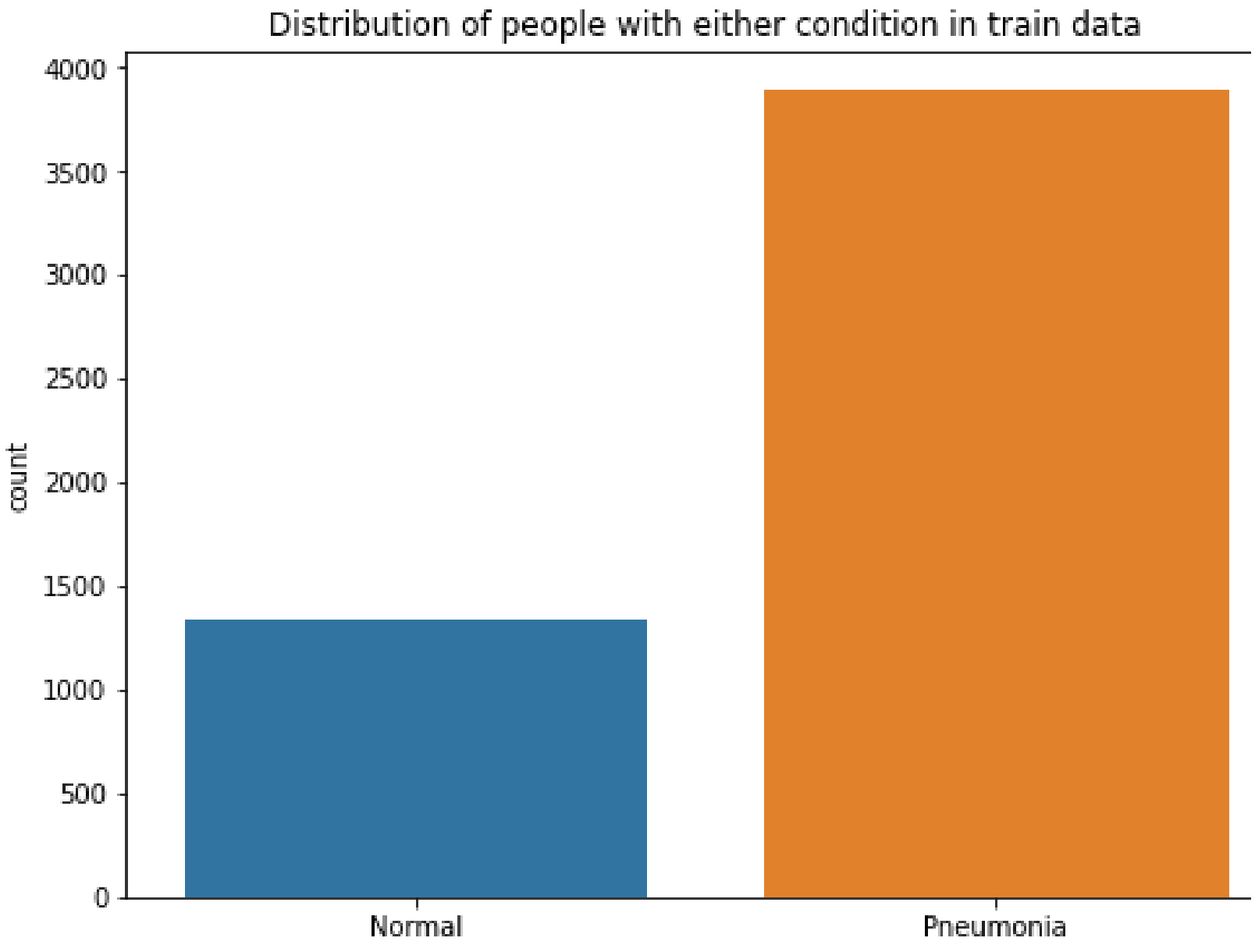
CodeText



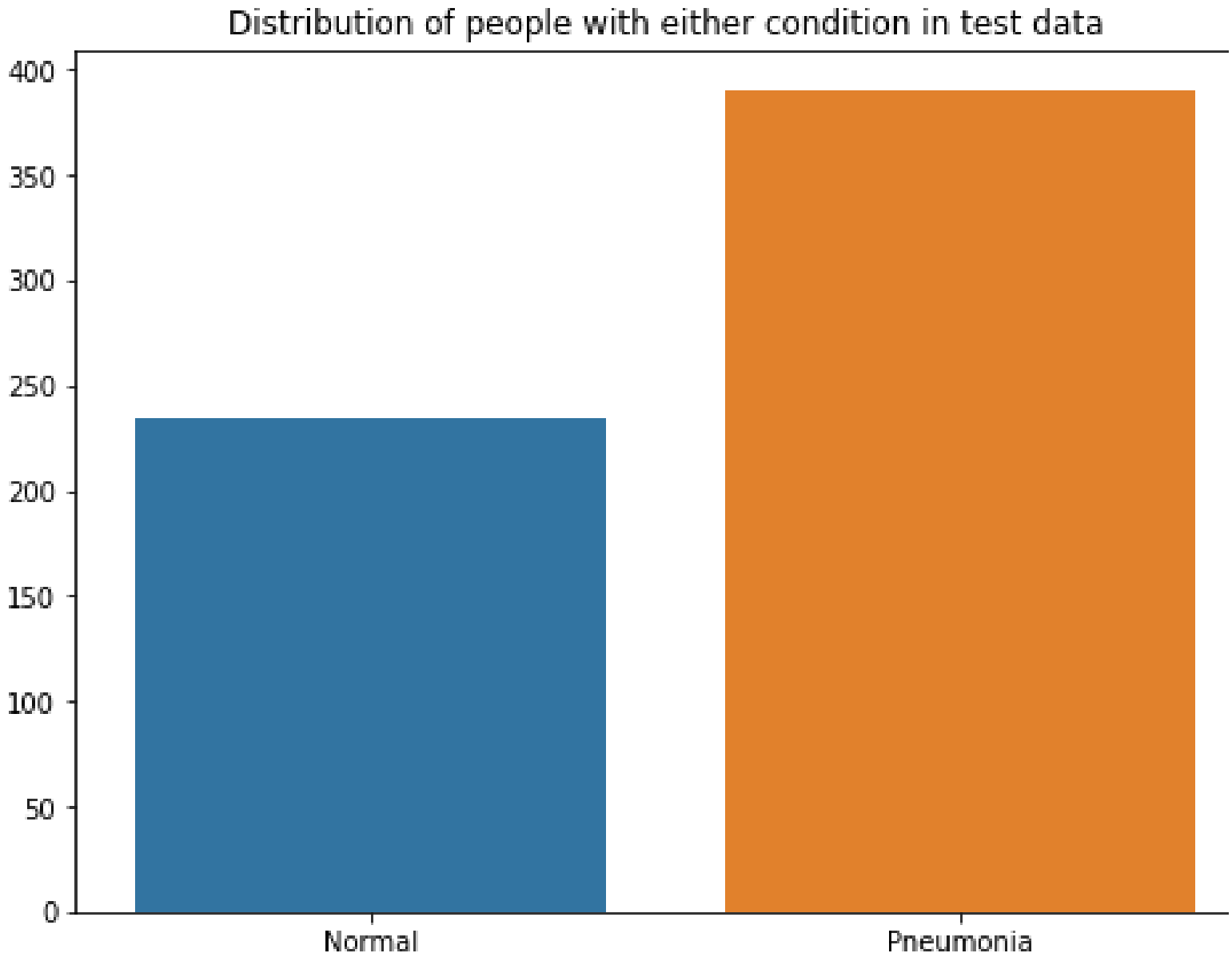
Data Report

1. Obtain the dataset from Kaggle
2. Loading and exploration of the dataset
3. Make some visualizations for further exploration
4. Reshape and normalize the data in preparation for modelling

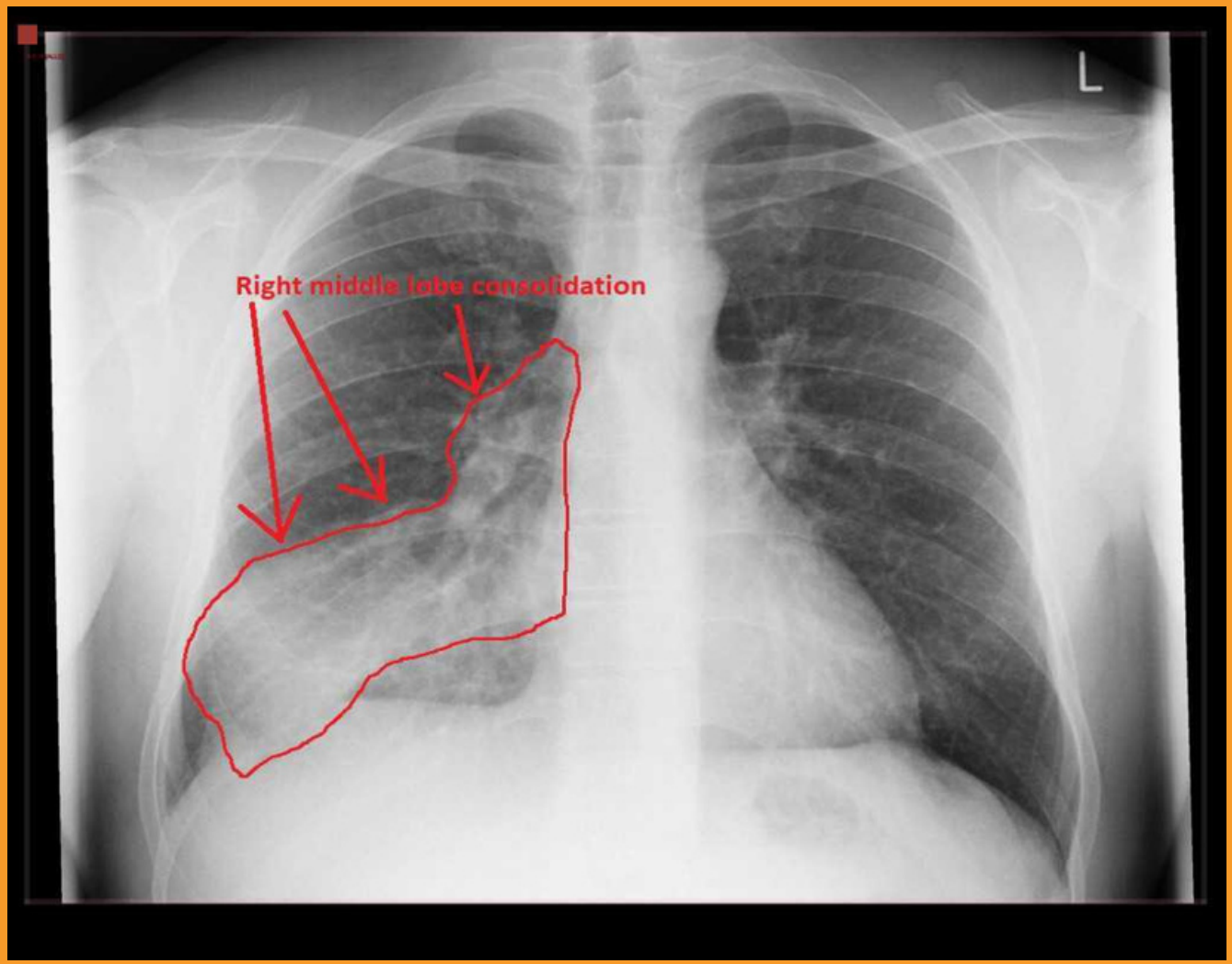
Distribution Of Normal and Pneumonia X-Rays on the Test Data



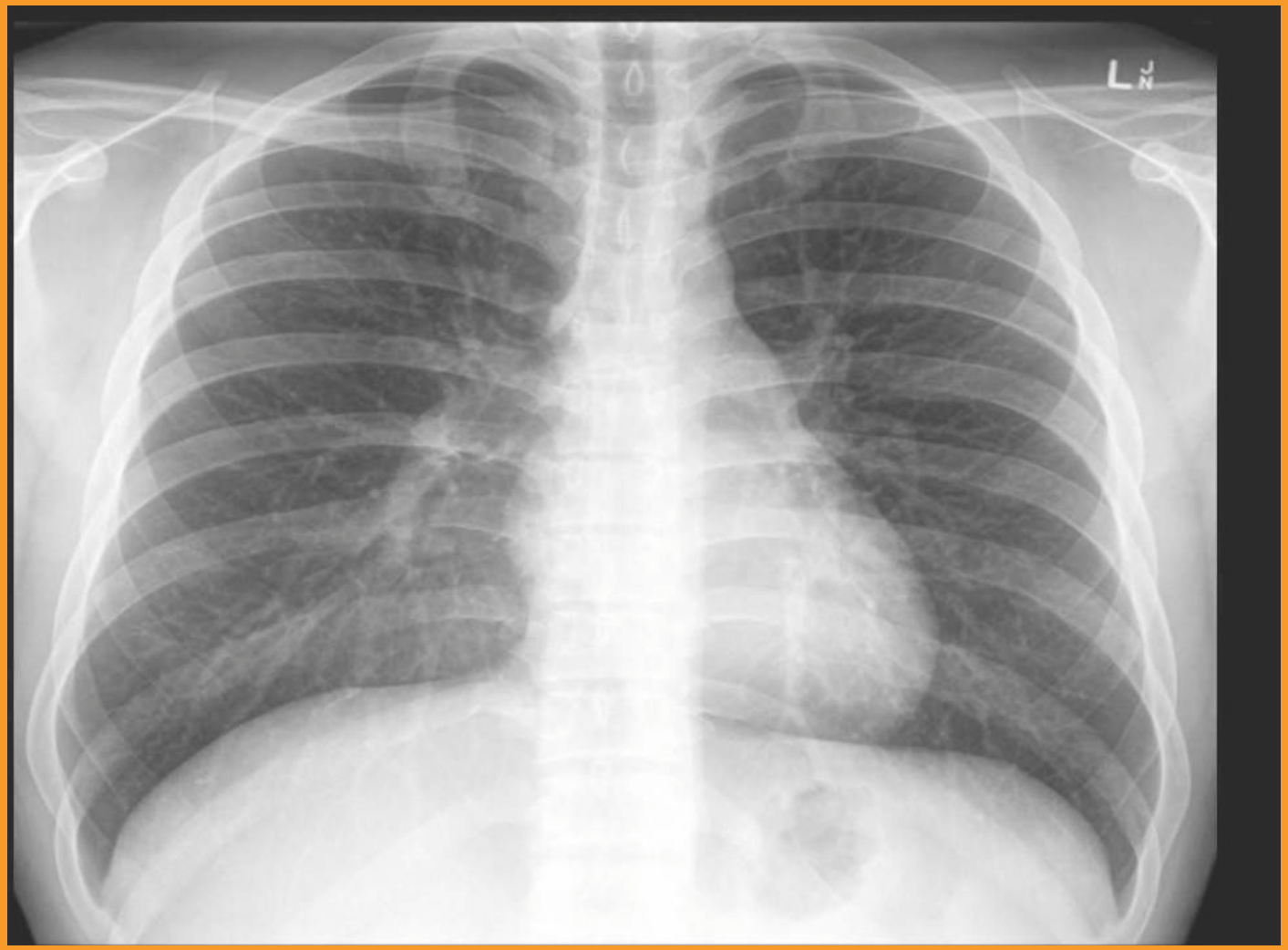
Distribution Of Normal and Pneumonia X-Rays on the Test Data



Graphical Representation of an Infected Lung VS a Normal Lung



An infected lung



A normal lung

The results for the final CNN model

Recall score for the final model.

Accuracy score for our final model

loss of our final model

Transfer Model Results

Recall score for the transfer model.

Accuracy score for our final model

loss of our final model

Conclusion

The sensitivity of detecting pneumonia by emergency medicine specialists and radiologists according to this paper is 83%, therefore:

- Given that the model has 98% sensitivity, interpretation of chest x-rays using this Convolutional Algorithm might help in improving the diagnostic accuracy of pneumonia.
- The algorithm is fast (36s) hence will increase efficiency considering the current understaffing in the Hospital.

Recommendation

Using the model for detection of pneumonia from chest x-ray images is a recommended option.

Based on the scores above the model can be deployed for use in the hospital. This will improve efficiency in diagnosis of pneumonia easing the burden of the understaffed workers.

It is health that is real wealth and not pieces of gold and silver

Mahatma Ghandi

Thank You

THE AVENGERS