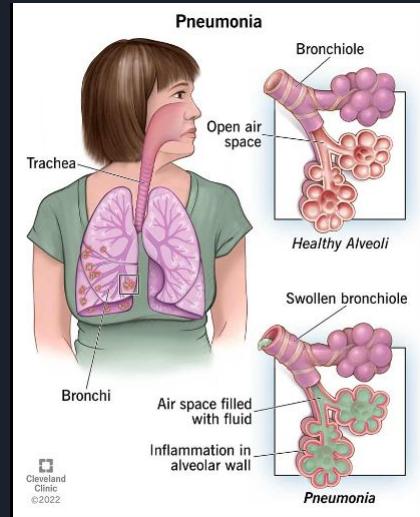


PNEUMONIA DETECTION WITH DEEP LEARNING USING X-RAY IMAGES

INTRODUCTION

Pneumonia is a common and potentially serious respiratory infection that affects the lungs. It can be caused by various pathogens, including bacteria, viruses, fungi, and even certain chemicals or irritants. Pneumonia occurs when these agents enter the lungs and cause inflammation in the air sacs, known as alveoli, which can fill with pus or other fluids. This can make it difficult for the affected person to breathe and lead to a range of symptoms, from mild to severe. Early detection helps.





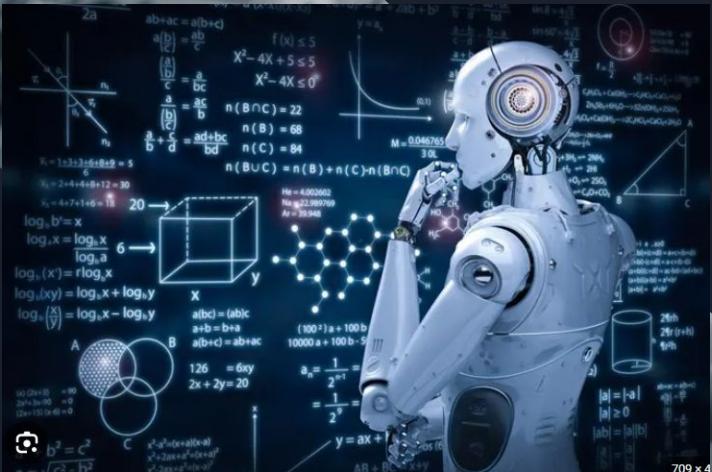
Business Understanding



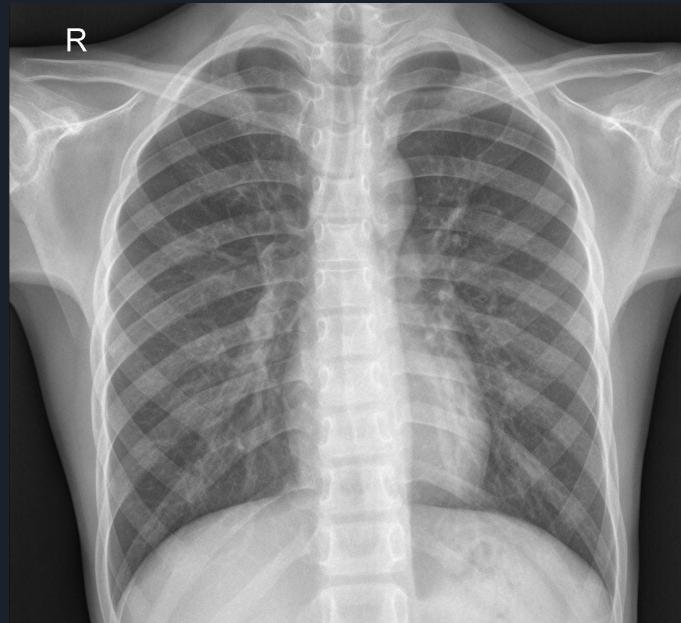
Nairobi Hospital has commissioned the development of a machine learning model for pneumonia diagnosis from X-ray images, recognizing the critical importance of accurate and efficient pneumonia detection in healthcare. This initiative aims to streamline diagnosis, optimize resource allocation, and aligns with the broader trend of AI integration into healthcare, offering potential cost savings and improved treatment outcomes.

Project objective

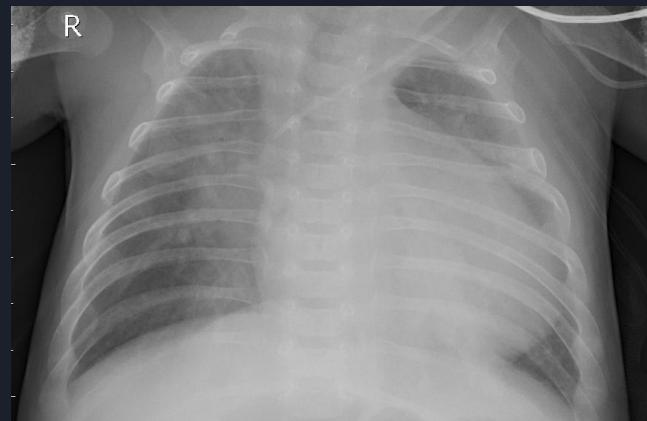
- Challenges in Pneumonia Diagnosis
Need for Efficient and Reliable Detection
- Objectives:
 - Develop a Pneumonia Detection Model
 - Fine-Tune for Optimal Performance
 - Evaluate Using Key Metrics



Healthy lung image



Lung infected with Pneumonia





Modeling

We developed a couple of models but chose the best performing which has an accuracy of 95.8%. Recall of 0.94 on Normal images and recall of 0.97 on pneumonia classified cases.



Conclusion



We prioritized recall in developing several models for pneumonia diagnosis from X-ray images, meeting all objectives, and selecting the best-performing model, 'cnn_best_model.h5,' recognizing the critical importance of capturing all positive instances in healthcare image classification.



Recommendations

Our Convolutional Neural Network (CNN) image classification model, while effective, requires continuous evaluation, data augmentation, and error analysis for ongoing refinement, offering potential for even better results in the future and significant benefits for Nairobi Hospital in terms of faster diagnosis and cost reduction.

Thank you!

Feel free to ask questions

