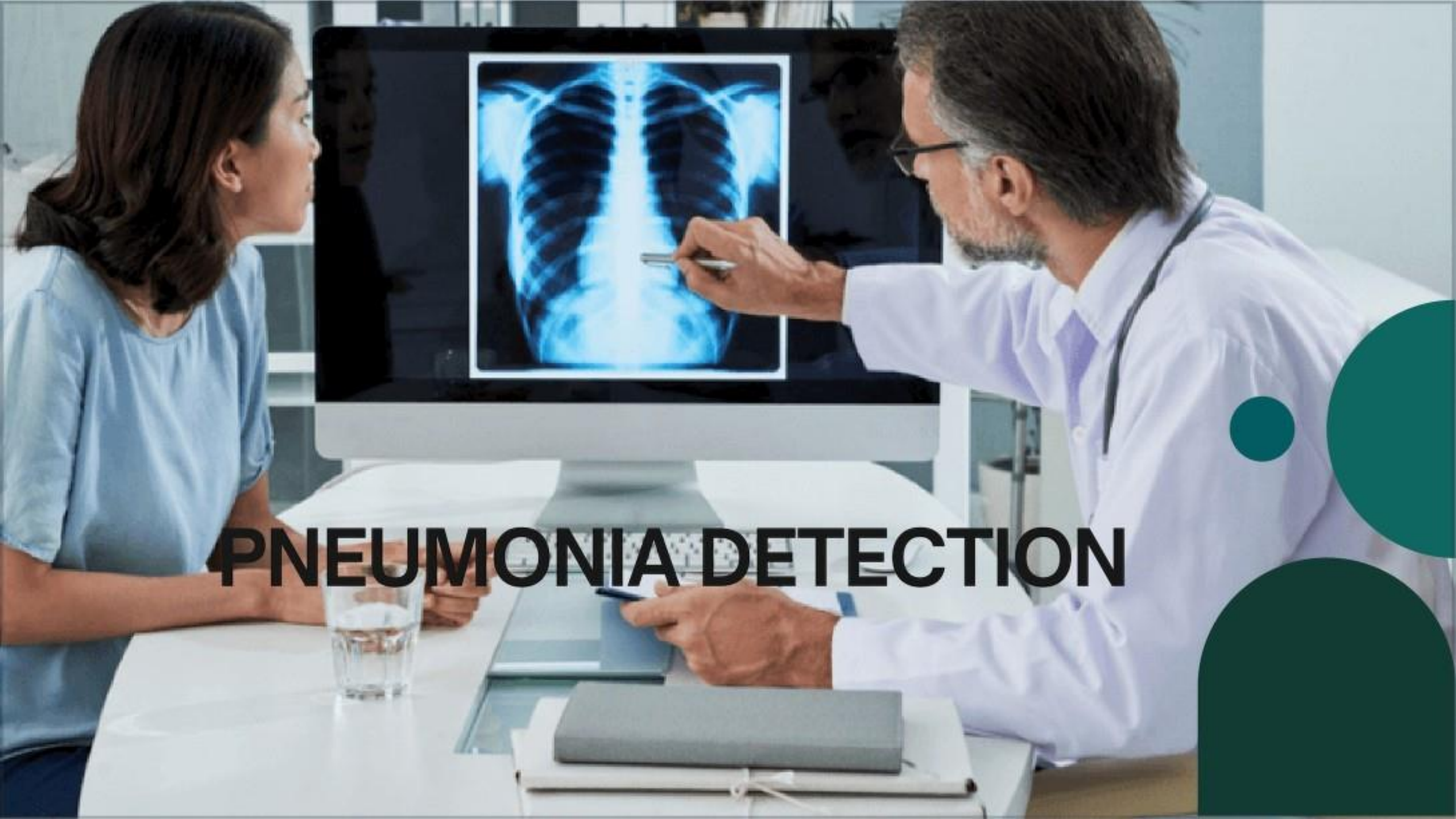


PNEUMONIA DETECTION

OVERVIEW

OVERVIEW

BUSINESS AND DATA UNDERSTANDING

MODELLING

EVALUATION

RECOMMENDATIONS AND NEXT STEPS

OVERVIEW

This project focuses on leveraging a dataset of chest X-ray images to develop machine learning models capable of accurately diagnosing pneumonia.

The dataset, sourced from Kaggle, comprises images classified into two categories: pneumonia and normal.

This project aims to build and optimize convolutional neural network (CNN) models to achieve high diagnostic accuracy.

BUSINESS UNDERSTANDING

Chest X-Rays

Early detection and treatment of pneumonia are essential for avoiding complications and enhancing clinical results. Chest X-rays are a frequently used imaging modality for diagnosing pneumonia

Healthcare professionals, patients, hospitals, researchers and government agencies stand to benefit from these advancements, using the advanced technology models to deepen disease understanding and ensure regulatory compliance.

Stakeholders

Traditionally, diagnosing pneumonia requires time-consuming physical examinations and lab tests, often necessitating multiple doctor visits. We aim to develop a deep learning model capable of accurately detecting pneumonia from chest x-ray images.

PROBLEM STATEMENT AND OBJECTIVES

The key objectives

Leverage deep learning techniques to develop an automated system capable of accurately diagnosing pneumonia from chest X-ray images.

Reduce the diagnostic workload in hospitals and clinics

To Improve diagnostic accuracy and speed, especially in areas with limited access to radiologists.

DATA UNDERSTANDING

Source: Kaggle's Chest X-Ray Images (Pneumonia)

Structure:

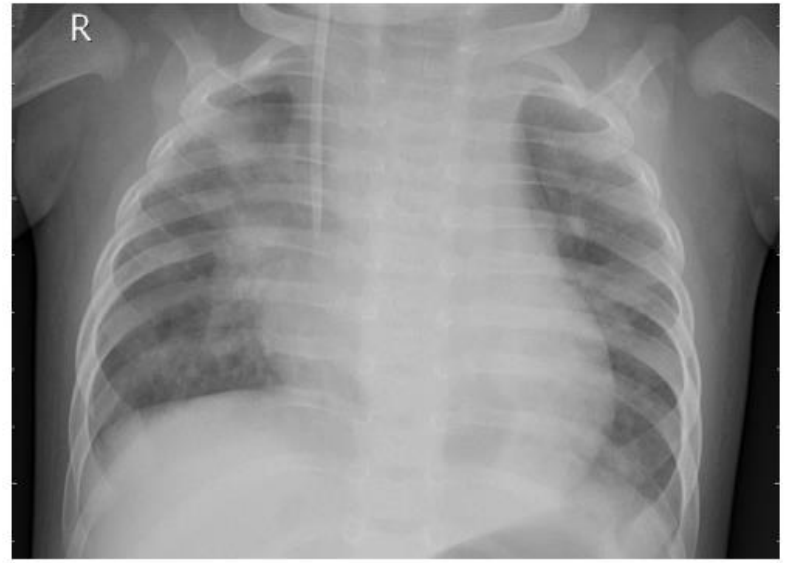
The dataset is organized into three primary directories:

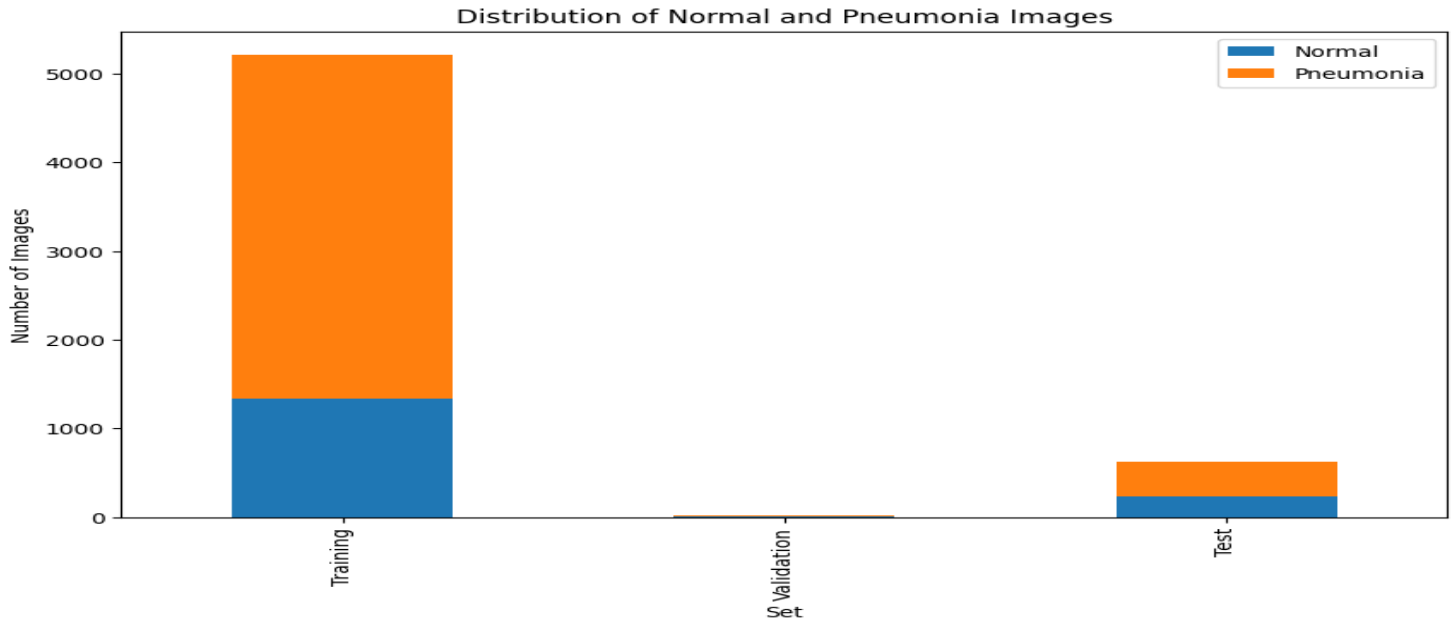
- Train: Contains training images categorized into 'PNEUMONIA' and 'NORMAL’.
- Val: Contains validation images for model tuning and performance evaluation.
- Test: Contains test images for final model evaluation.

DATA UNDERSTANDING

Normal Image:
Dimensions: (2288, 2363)
Pixel range: 0 - 255

Pneumonia Image:
Dimensions: (920, 608)
Pixel range: 0 - 255





MODELLING

Modeling Architecture

We focused on below modeling for accuracy

Baseline CNN
Tuned baseline CNN
Complex Model
ResNET50V Model

Results Evaluation

Accuray

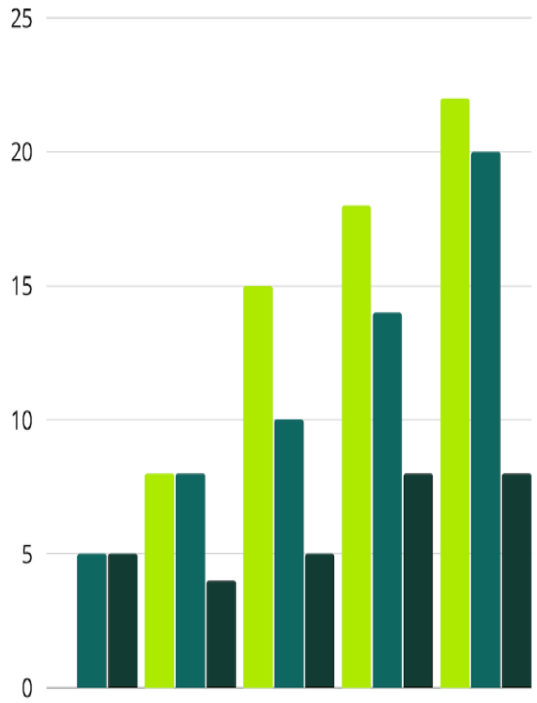
Baseline model accuracy was 0.875

The tunned baseline model gave 0.875

Complex architecture model produced 1.833 approximate

The ResNET50V2 prduced

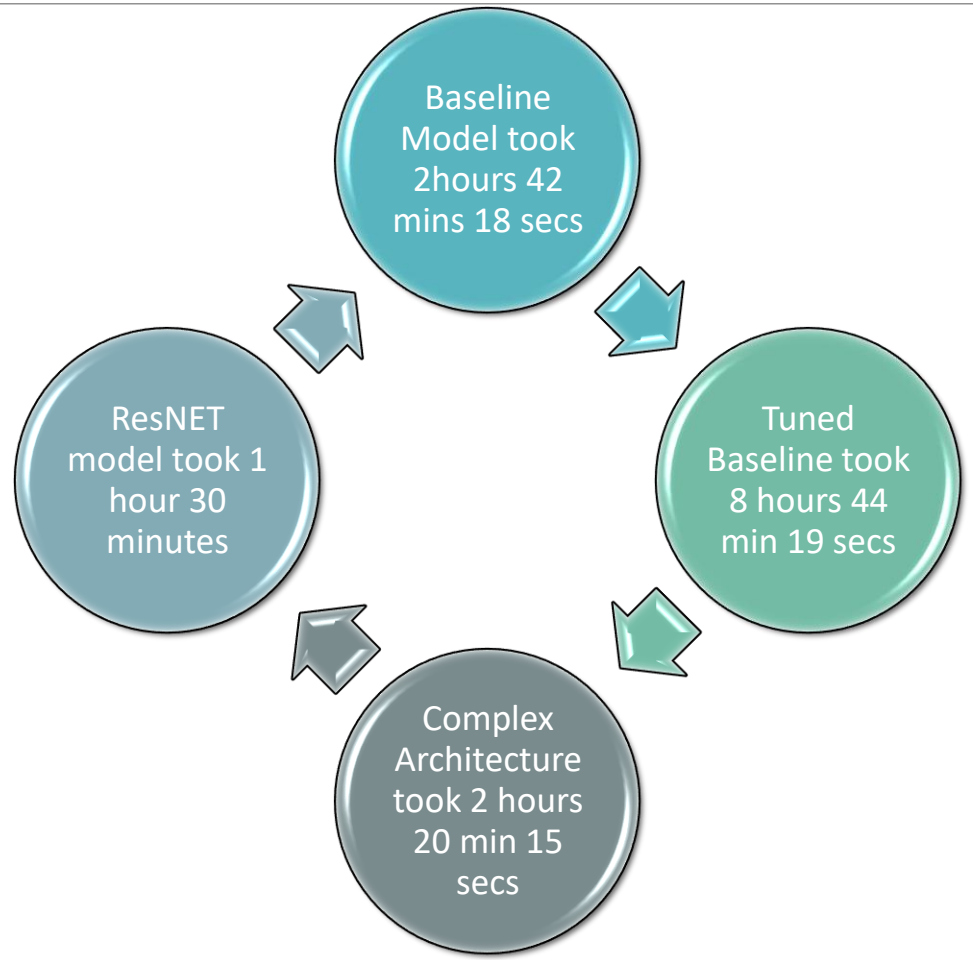
Tuned ResNET50V2



Evaluation

Model Comparison

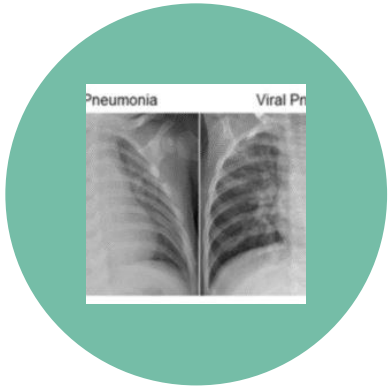
SN:	Model Name	Model Architecture	Training Time	Validation Accuracy	Test Accuracy	Test Loss
1	Baseline Model	CNN with original architecture	5hr 11min	0.875	0.74	3.89
2	Tuned Baseline Model	CNN with original architecture	2hrs 42min	0.875	0.85	3.00
3	Complex Architecture	CNN with modified architecture	10.25min	0.45	0.63	19.45
4	ResNET50V2	Pretrained ResNet50v2	10.25 mins	0.88	0.92	0.23



Recommendations

Next Steps

Extend the model to classify the severity of pneumonia (mild, moderate, severe). This would provide even more actionable insights for doctors.



Enhance model output to differentiate Bacterial and viral pneumonias for effective treatment.

Ability to integrate with hospital systems for automation of the process.

THANK YOU

MEMBERS

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Najma Abdi
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Jubilant Mutuku