FridaOyucho /
PNEUMONIA-DETECTION-USING-DEEP-LEARNING-

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The 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 of images classified into two categories: pneu,onia and normal. This project aims to build and optimize convolutional neural network(CNN) models to achieve high d

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⑂ main ▾   ⑂ 1 Branch   ⬦ 0 Tags   ⑂   ⬦   🔍 Go to file   t   Go to file   +   Add file ▾   Code   ⋯
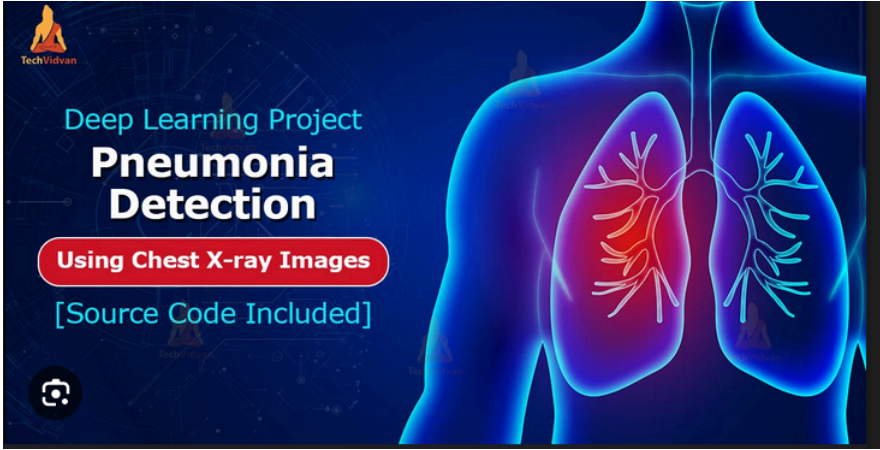
👤 **FridaOyucho** Delete Documents/Image_Classification directory   7bd45ff · 17 hours ago   ⏱

🗎 Presentation.pdf	second commit	18 hours ago
🗎 README.md	Updated README.md	17 hours ago
🗎 notebook.pdf	notebook commited	18 hours ago

📖 **README**   ✎   ☰

PNEUMONIA-DETECTION-USING-DEEP-LEARNING-

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Project Overview

The 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 of images classified into two categories: pneu,onia and normal. This project aims to build and optimize convolutional neural network(CNN) models to achieve high diagnostic accuracy.

Business problem
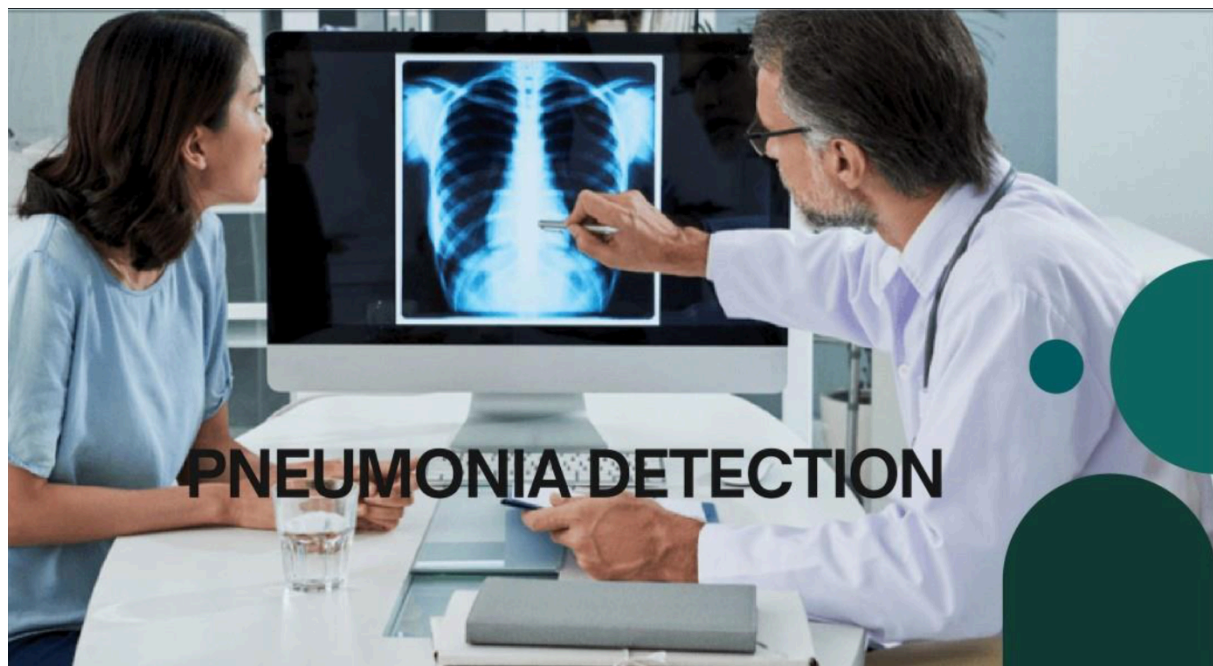
Early detection and treatment of pneumonia are essential for avoiding complications and enhancing clinical results. Chest X-rays are a frequently used imaging modality for diagnosing pneumonia. Healthcare professionals, patients, hospitals, researchers and government agencies stand to benefit from these advancements, using the advanced technology models to deepen disease understanding and ensure regulatory compliance.

Data Understanding

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

Objectives

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

Methodology

Data modelling was based on clients tested for pneumonia with Xray test results as either normal or Pneumonia

1. Data preparation and understanding

- To understand the structure of the dataset first we examined the directory structure and counted the number of images in each class for training, validation, and testing sets.

2. Exploratory Data analysis was done on: the training, validation and test datasets. This was done by: - visualizing outputs in Barcharts, to understand the distribution of data - Visualization of images to understand the dimensions and pixels values of images in order to perform preprocessing.

3. Data Preprocessing was done to prepare the data for modeling(Resizing the images and Normalization)

4. Data modelling was done using two models with hyperparameter tunings to improve their performances:

- Baseline Convolutional Neural Network Model(CNN)
- Tuned Convolutional Neural Network Model(CNN)
- Complex Model
- ResNet50V2 Model

Results
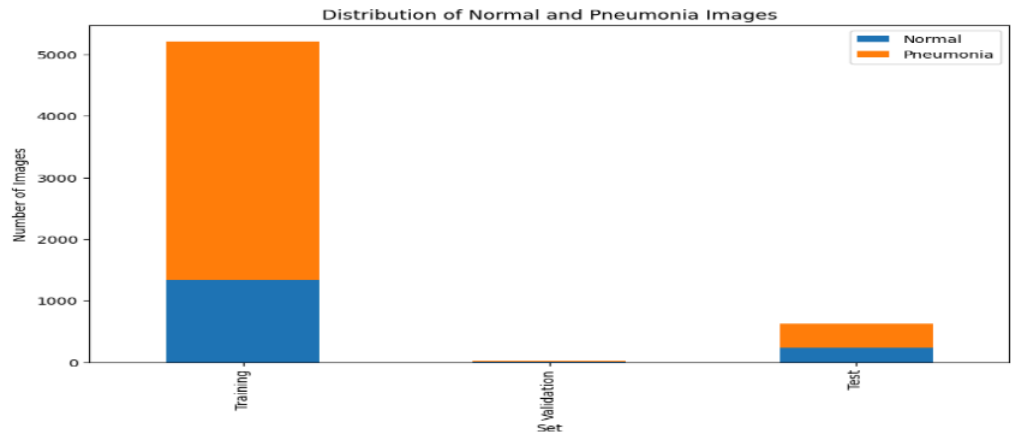
We visualzed the data from the three datasets to check for class imbalance. From the barchart, the data was highly imbalanced.

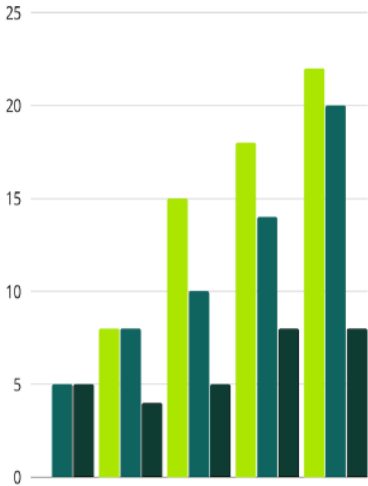### Results Evaluation

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

Modelling:

Duration:

- Baseline Model took 2hrs 42mins 18secs
- Tunned baseline model: 8hrs 44mins 19secs for the best trial
- Complex architecture: 2hrs 20mins 15sec
- ResNET59V2 model: 1hr 30mins

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

Releases

No releases published

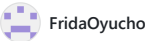## Packages

No packages published

Contributors 3

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