Libraries Used

1.Numerical and Data Handling Libraries:

- NumPy: Fundamental package for numerical computations in Python.

import numpy as np

from numpy import \*

- Pandas: Provides data structures and data analysis tools.

import pandas as pd

2. Operating System Utilities:

- os: Miscellaneous operating system interfaces.

import os

3. \*\*File Handling\*\*:

- zipfile: Work with ZIP archives.

from zipfile import \*

import zipfile

4. Image Processing:

- OpenCV: Library of programming functions mainly aimed at real-time computer vision.

import cv2

- PIL: Python Imaging Library, adds image processing capabilities.

from PIL import Image

5. Data Visualization:

- Matplotlib: Plotting library for creating static, animated, and interactive visualizations.

import matplotlib.pyplot as plt

%matplotlib inline

- Seaborn: Statistical data visualization based on Matplotlib.

import seaborn as sns

6. Progress Bar:

- tqdm: A fast, extensible progress bar for loops and file processing.

from tqdm import tqdm

7. Machine Learning and Deep Learning:

- TensorFlow and Keras: Open-source platform for machine learning, used for implementing neural networks.

import tensorflow as tf

from tensorflow import keras

from keras.models import Sequential

from keras.layers import Dense, Flatten, MaxPooling2D, Convolution2D

from tensorflow.keras.applications import InceptionV3

from tensorflow.keras.layers import Dense, GlobalAveragePooling2D, Dropout

from tensorflow.keras.models import Model

from tensorflow.keras.optimizers import Adam

from tensorflow.keras.callbacks import EarlyStopping, ReduceLROnPlateau

from tensorflow.keras.models import load\_model

from keras.preprocessing.image import ImageDataGenerator, load\_img, array\_to\_img, img\_to\_array

8.Scikit-Learn:

- train\_test\_split: Function for splitting data arrays into two subsets: training data and testing data.

from sklearn.model\_selection import train\_test\_split

- confusion\_matrix: Compute confusion matrix to evaluate the accuracy of a classification.

from sklearn.metrics import confusion\_matrix

9.Google Colab Specific:

- Google Drive Mounting: For accessing files on Google Drive.

from google.colab import drive

drive.mount('/content/drive')

- Colab Patches: Tools for displaying images in Google Colab.

from google.colab.patches import cv2\_imshow

10. IPython Display:

- IPython Display: Provides tools for displaying rich media (like images) in IPython environments.

python

from IPython.display import display

Summary

This comprehensive list covers all the libraries used for:

- Numerical and data handling (`NumPy`, `Pandas`).

- File system operations (`os`, `zipfile`).

- Image processing and handling (`cv2`, `PIL`).

- Data visualization (`Matplotlib`, `Seaborn`).

- Progress tracking (`tqdm`).

- Machine learning and neural networks (`TensorFlow`, `Keras`, `Scikit-Learn`).

- Google Colab specific functionalities (`google.colab`, `IPython`).

Reference

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* [Comprehensive review of coronavirus disease 2019 (COVID-19)](https://docs.google.com/document/d/1R427L1aFWxBMIc5CpGRpPbPTAZVC4UQbYxAPx0OoJ64/edit#heading=h.zdtf2bcfadz0)
* [] B. Abhijit, et al., A deep learning based approach for automatic detection of COVID-19 cases using chest X-ray images, Biomed. Signal Process Control 71 (Part B) (2022) 103182.](https://www.sciencedirect.com/science/article/abs/pii/S1746809421007795)
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