Pneumonia Image Classification Project

Motivation

Problem Statement

The project aims to develop a machine learning model to classify pneumonia from chest X-ray images using transfer learning.

End user	Medical professionals, radiologists, and healthcare providers.
Goal of end users	To accurately and quickly diagnose pneumonia from chest X-rays.
Obstacle to be solved	The challenge of accurately identifying pneumonia from X-ray images due to variability in image quality, patient conditions, and the subtle nature of pneumonia signs in early stages.

Data Collection and Augmentation

Images Collected

The dataset is being sourced from an existing repository, as indicated by the usage of `tf.keras.utils.image_dataset_from_directory` to load images from specified directories (`Data/Training` and `Data/Validation`).

Description of Splitting Images into Classes/Labeling Images

- Images are stored in directories with inferred labels, meaning each subdirectory within `Data/Training` and `Data/Validation` represents a different class (e.g., 'Pneumonia' and 'Normal').
- The `image_dataset_from_directory` method infers the class labels from the directory structure.

Example:

```python
train_ds = tf.keras.utils.image_dataset_from_directory(
    directory='Data/Training',
```

```
    labels='inferred',

    label_mode='int',

    batch_size=12,

    image_size=(150, 150))  ```
```

Data Augmentation Description

- Data augmentation techniques are applied to artificially increase the size of the training dataset and improve the model's robustness.
- The code snippet indicates the use of augmentation layers, including random flipping and random rotation, though the full augmentation pipeline isn't shown in the extracted text.

Example augmentation layers (inferred from partial code):

```python
augmentation_layers = [

    layers.RandomFlip("horizontal"),

    layers.RandomRotation(0.1),

]  ```
```