Pneumonia Detection from Chest X-Rays

In this mini project, you will design, train, and evaluate convolutional neural networks (CNNs) to classify chest X-ray images into the following classes: *Normal* and *pneumonia*. This project aims to provide practical experience with CNN architectures in the context of a real-world medical imaging application.

Project Sections

1. **Load Data and Preparation**

    Load data from: Chest X-Ray images

2. **Model Building**

    Develop Three CNN Models: Create three distinct CNN architectures to classify the X-ray images.

    Hyperparameter Tuning: Experiment with learning rate, batch size, or layer configurations to optimize model performance.

    Early Stopping: Implement early stopping to prevent overfitting during training and save the model at its best validation performance.

    Compile Each Model: Use an appropriate optimizer and loss function for multiclass classification.

3. **Model Evaluation**

    Train and Compare: Train each model and evaluate performance by comparing validation accuracy and validation loss across epochs.

    Plot Performance: Plot training and validation accuracy and loss curves for each model to analyze performance trends and identify the best model.

4. **Prediction and Visualization**

- Make Predictions: Use the best-performing model to make predictions on the test set.
- Visualize Results: Visualize sample predictions using `matplotlib`, including true labels and predicted labels.