Pneumonia Detection using Inception-V3

# 1. Overview

This project fine-tunes a Inception-V3 model using the PneumoniaMNIST dataset to detect pneumonia in chest X-ray images.  
The model uses binary classification with sigmoid activation and binary crossentropy loss. Class imbalance is addressed using class weights and data augmentation.

# 2. Project Structure

pneumonia-Inception-V3/  
├── Pneumonia\_Inceptionv3.py # Main script  
├── requirements.txt # Dependencies  
├── README.md # Overview and instructions  
├── hyperparameters.txt # Notes on parameters  
├── InceptionV3\_pneumonia.keras # Saved model (optional)  
└── images/  
 └── confusion\_matrix.png # Output plot (optional)

# 3. Key Files

• pneumonia\_InceptinV3.py: Contains all code for loading, preprocessing, training, evaluating the model.  
• requirements.txt: Lists necessary Python libraries.  
• hyperparameters.txt: Contains notes on learning rate, batch size, etc.  
• README.md: Instructions and description of the project.

# 4. How to Run

1. Clone the repository or download the code.  
2. Install dependencies:  
 pip install -r requirements.txt  
3. Run the main script:  
 python pneumonia\_Inceptionv3.py

# 5. Hyperparameters Used

• Learning Rate: 1e-4 (initial), 1e-5 (for fine-tuning)  
• Batch Size: 32  
• Epochs: 10 (initial) + 5 (fine-tuning)   
• Loss Function: binary\_crossentropy  
• Metrics: Accuracy, AUC, Precision, Recall

# 6. Results Summary

Example Results (vary slightly by run):  
• Accuracy: ~0.89  
• AUC: ~0.89  
• Precision: ~0.89  
• Recall: ~0.89