

Model Optimization and Tuning Phase

Project Name: COVID-19 Chest X-Ray Image Classification

Overview :

The Model Optimization and Tuning Phase is a critical step in deep learning. Its purpose is to maximize accuracy, improve generalization, and minimize overfitting by adjusting hyperparameters such as learning rate, batch size, dropout rate, and optimizer. Since this project deals with image classification, optimization focused on CNN architecture and transfer learning settings.

Final Model Selection :

VGG16(Transfer learning) -

- Achieved the highest validation accuracy (~95.43%) and accuracy(~96.84%)
- Transfer learning allowed leveraging ImageNet pretrained weights, boosting performance on a limited dataset.
- Robust to class imbalance due to data augmentation and dropout tuning.
- Deployment-ready: integrated into Flask + Ngrok web app for real-time medical image prediction.
- Generalized well to unseen test images, ensuring reliability in practical use.