

X-Ray Lung Classification

Team 04
FeedForward



Objective

- Train a binary classifier across 3 hospital silos using Flower, without sharing raw data.
- Achieve high AUROC within a 20 minute training window using EfficientNet-B0 with ImageNet pretrained weights.
- Enable hospitals to collaboratively improve model performance while keeping patient data decentralized and secure.



Problems and Experimentation

Ran over to the less than 1 epoch to 0.75, but the highest accuracy in 15 min job was auroc score **0.68 [EfficientNet-B0]**

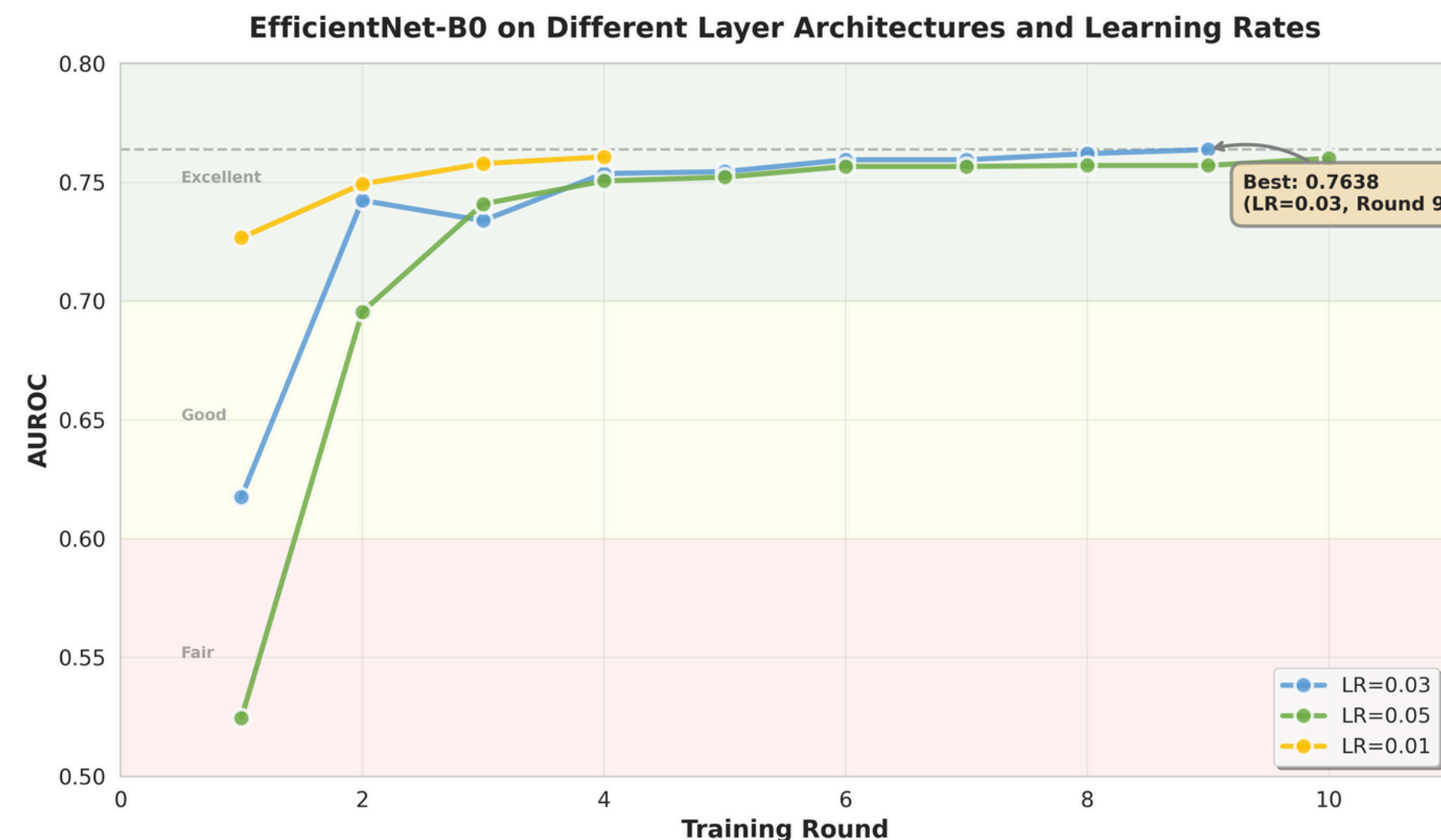
Epochs 5, runs only one round which provides the auroc score of **0.58 [EfficientNet-B0]**

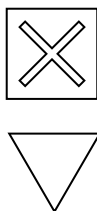
Better learning, and accuracy observed on training the multiple rounds with **1 epoch (Achieving above 70)**, Next Task to get more Rounds Trained and Better Convergence



Model Selection and Experimentation

- Applied Differential learning rates - classifier (12x), first conv (2.5x), backbone (0.12x)
- Learning rate scheduler - 15% linear warmup + cosine decay (min_lr=0.05)
- Starting with a small LR (warmup) so training doesn't explode early, then slowly reduce LR (cosine decay) so the model trains gently at the end
- autocast + GradScaler, halves memory and doubles throughput with float16

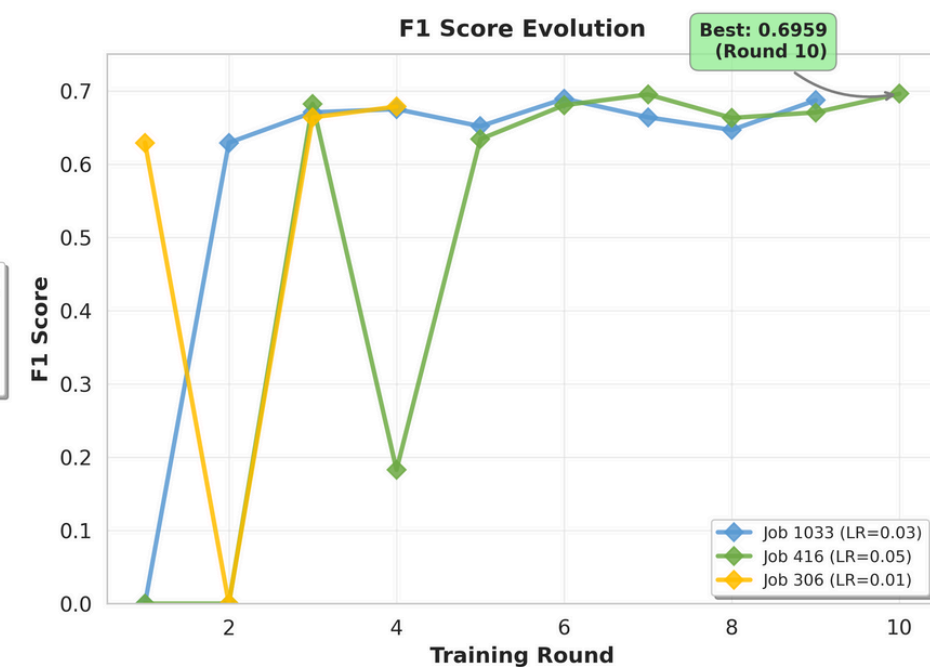
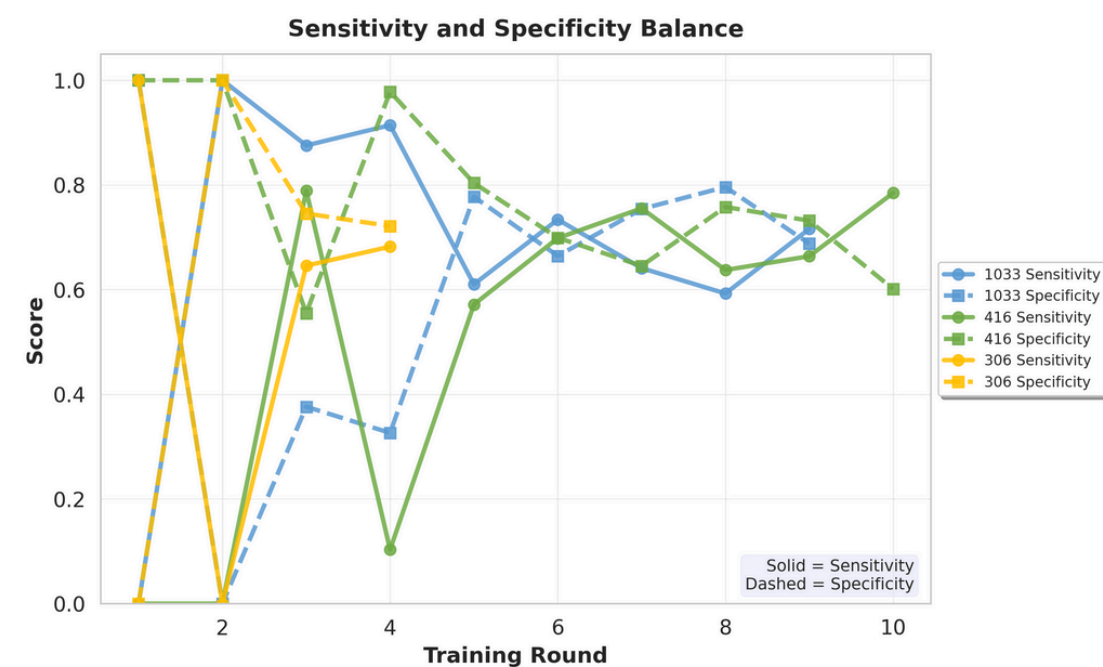
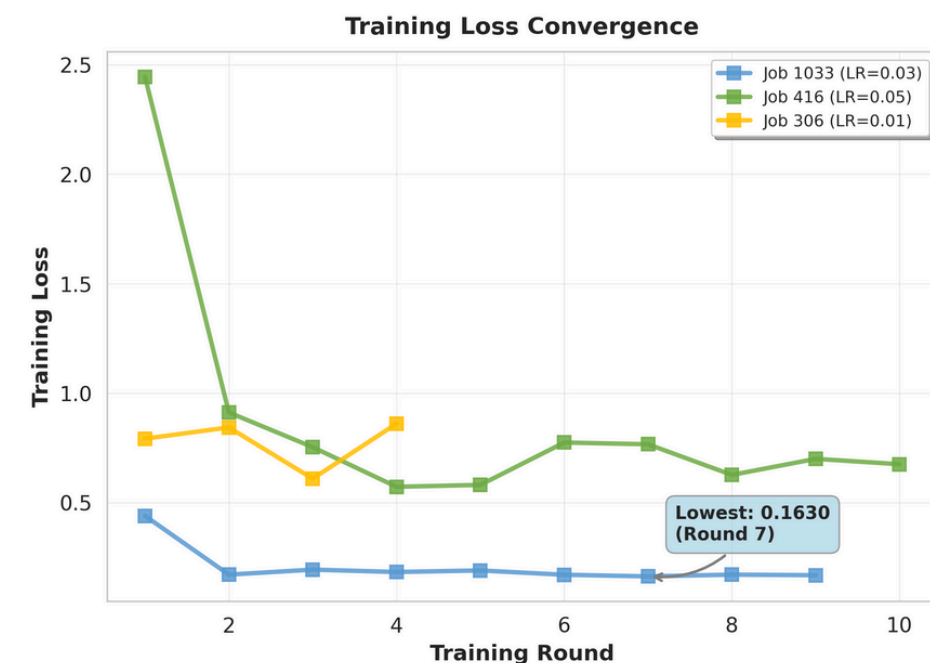
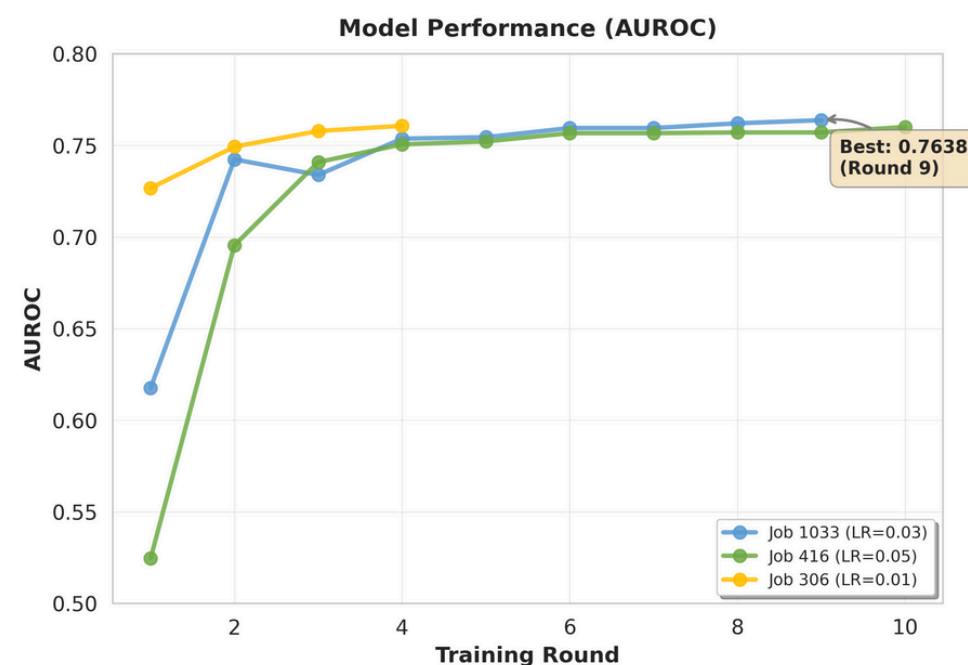




Model Selection and Experimentation

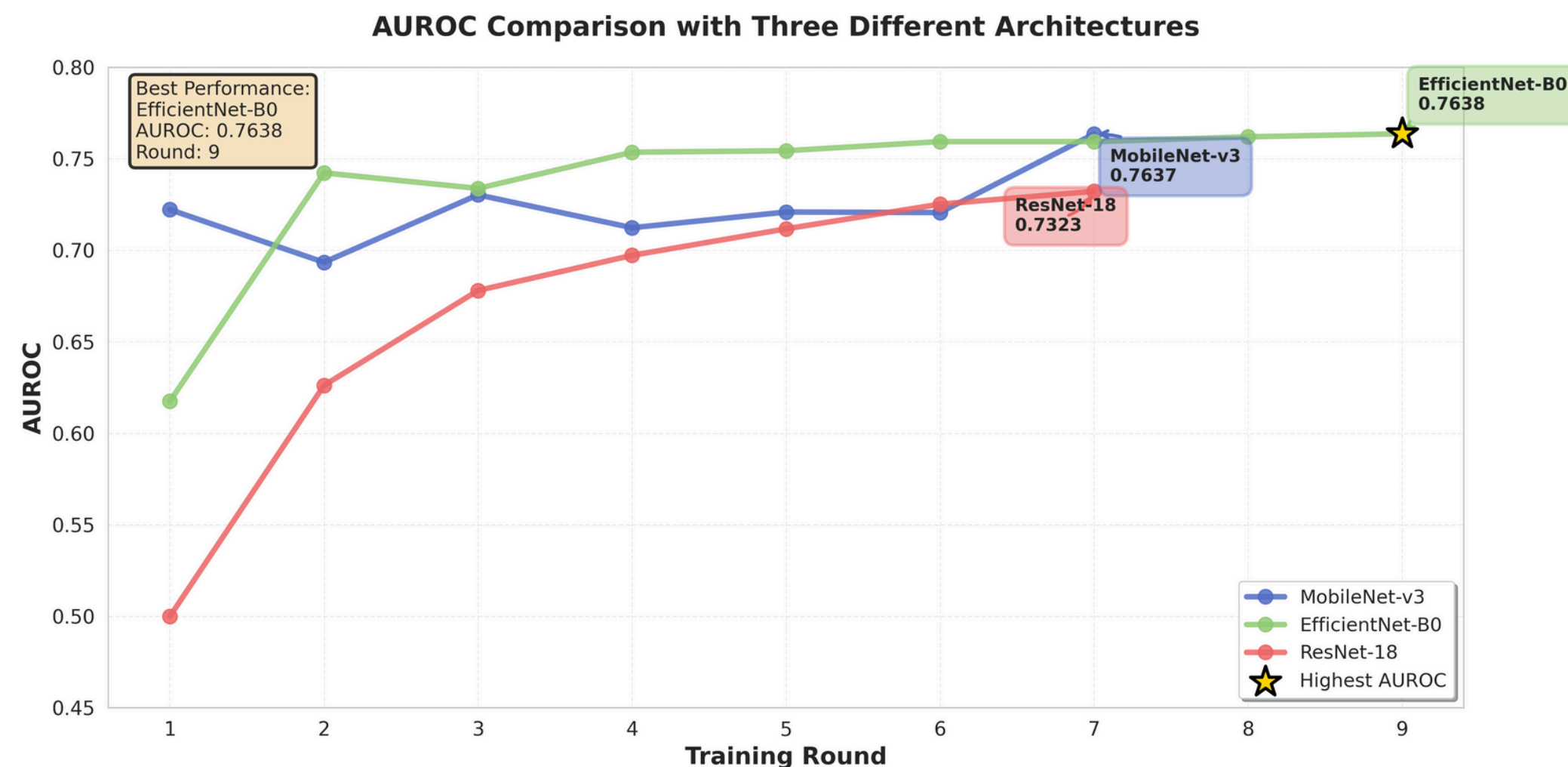
- Optimizer - AdamW with `weight_decay=1e-4`, `amsgrad=True`
- Focal Loss (`gamma=2.0`, `alpha=1.0`) with class weighting
- Adaptive gradient clipping - 3.0 (warmup) \rightarrow 1.5 (after)
- Mixed precision training (FP16) with GradScaler
- Batch size increased from 16 to 32

EfficientNet-B0 Across Varied Architectural Changes and Learning Rates



Model Selection and Experimentation [Tried 3 model]

- Optimized collate function (np.stack for faster conversion)
- DataLoader: num_workers=2, prefetch_factor=1, persistent_workers=False
- drop_last=True for training stability





Thank You

