Transfer Learning Strategies

Leverage knowledge from source task to improve target task performance

Transfer Learning Process

Source Task

Pre-training on large datasets

ImageNet, Wikipedia

Knowledge Transfer →

Target Task

Fine-tuning or feature extraction

Limited data scenarios

- Particularly effective when target task has limited data
- Source and target tasks should be related for best results
- Reduces training time significantly
- Reduces computational requirements

Key Technique in Modern Deep Learning Applications

Transfer Learning Performance Comparison

❌ **Training from Scratch**

Small Dataset (500 images)

Training Time: 8 hours

Accuracy: 65%

Epochs: 200

VS

✅ **Transfer Learning**

Same Dataset (500 images)

Training Time: 1 hour

Accuracy: 92%

Epochs: 20

💡 **8x faster training** and **27% higher accuracy** with pre-trained ImageNet model