Mixed Precision Training - FP16 and FP32

Mixed Precision: Use **FP16 for compute** , **FP32 for stability**

Memory Reduction

2x smaller

Speed Boost

2-3x faster

(with Tensor Cores)

Challenge

✓ **Solution**

FP16 range limited → gradient underflow/overflow issues

Loss scaling: multiply loss by 1000-10000 to prevent underflow

Master Weights Strategy

FP32 Master Copy → FP16 Forward/Backward → FP32 Updates

AMP Tools

`torch.cuda.amp`

`TF mixed_precision`

Best Hardware

Modern GPUs (Volta+) with Tensor Cores

Accuracy Impact

Minimal loss (<0.1%) for significant speedup