

LFMA: Parameter-Efficient Fine-Tuning

via Layerwise Fourier Masked Adapter with Top-k Frequency Selection

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⚠ The Problem

Efficiency Bottleneck: Full Fine-Tuning (FFT) of Large Foundation Models is prohibitively expensive.

Existing Limitations:

- **LoRA:** Reduces parameters but imposes a low-rank constraint, limiting expressivity.
- **FourierFT:** Operates in frequency domain but uses *Uniform Updates*, wasting resources on noise and low-info frequencies.

📊 Results: Vision (ViT-Base)

Average accuracy across 7 diverse datasets (CIFAR, Pets, etc.).



⚙ Methodology: LFMA

We propose **LFMA** based on the principle of *Spectral Sparsity*. We only fine-tune the high-energy frequency components.



📊 Results: NLP (GLUE)

Comparison on RoBERTa-Base (GLUE Benchmark).

Method	Params (M)	Score
Full FT	125	85.2
LoRA	0.3	85.2
FourierFT	0.024	85.0
LFMA (Ours)	0.015	84.4