Benchopt:
How standard is the performance of ResNet18 on CIFAR10?

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ResNet18 on CIFAR10

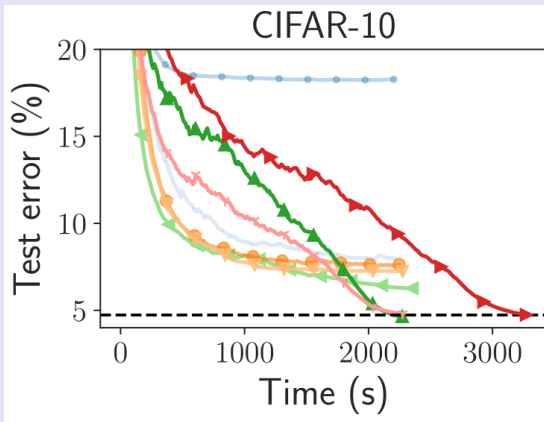**CIFAR10:** Image classification of 32×32 images from 10 classes.

ResNet18: *de facto* baseline for this task for many developments:

▶ Optimizers,   ▶ Data Augmentation,   ▶ Architecture,   ▶ ...

$\Rightarrow$ However, replicating SOTA for this architecture
is actually quite hard!

and many failed...

The goal of **Benchopt** is to make this step as easy as possible.

CIFAR-10

Legend:
- Best Adam
- SGD + data aug. + momentum
- Lookahead
- Vanilla SGD
- SGD + data aug. + momentum + cosine LR sched.
- SGD + data aug.
- Best SGD
- Best SGD (TF/Keras)

Extra comparisons

▶ Multiple datasets: MNIST, SVHN, CIFAR10, CIFAR100, ...

▶ Matching `PyTorch` and `Tensorflow`.

Component	PyTorch	TensorFlow/Keras
Bias in convolutions	✗	✓
Decoupled weight decay scaling	**Multiplied by learning rate**	Completely decoupled
Batch normalization momentum	**0.9**	0.99
Conv2D weights init.	**Fan out, normal**	Fan average, uniform
Classification head init. (weights)	**Fan in, uniform**	Fan average, uniform
Classification head init. (bias)	**Fan in, uniform**	Zeros
Striding in convolutions	**Starts one off**	Ends one off
Variance estimation in batch norm	unbiased (eval)/biased (training)	biased

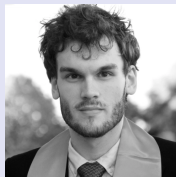▶ Evaluated the impact of cross-validation,

Benchmarks

You can run a similar benchmark with the correct baseline from:

    https://github.com/benchopt/benchmark_resnet_classif

Most of the heavy liftinghave been done together with:

Zaccharie Ramzi

Pierre Ablin

Arxiv paper: https://arxiv.org/abs/2206.13424