TensorLy: Tensor Learning in Python

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High level API for tensor method and deep tensorized architectures

Tensor decomposition | **Tensor regression** | **Tensor + Deep**

Basic tensor operations

Kronecker $\otimes$, Khatri-Rao $\odot$, unfolding $\mathbf{X}_{[n]}$, $vec(\hat{\mathcal{X}})$, n-mode product, $\cdots$

Unified backend

NumPy | SciPy | PYTORCH

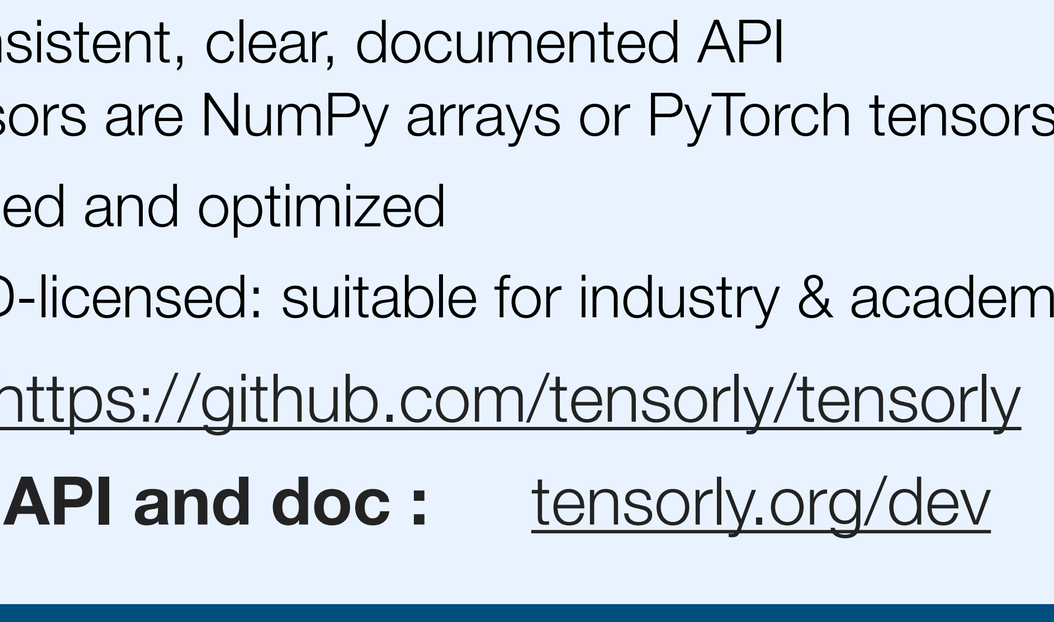
- Flexibly backend system
- Easily extensible
- Consistent, clear, documented API
  tensors are NumPy arrays or PyTorch tensors
- Tested and optimized
- BSD-licensed: suitable for industry & academia

https://github.com/tensorly/tensorly

API and doc : tensorly.org/dev

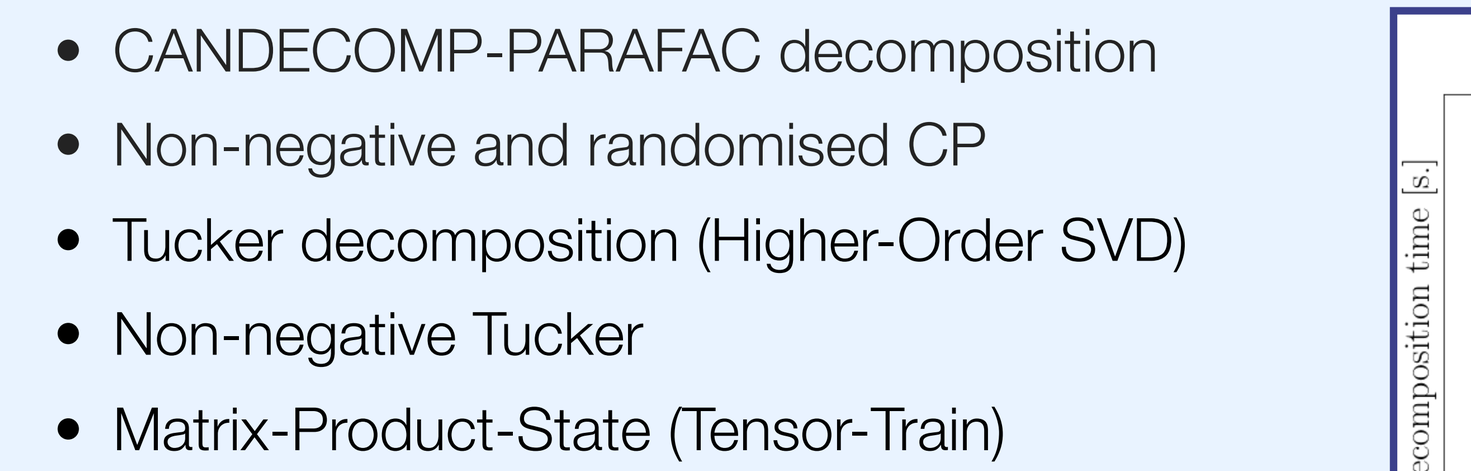
Tensor algebra, decomposition and regression

- CANDECOMP-PARAFAC decomposition
- Non-negative and randomised CP
- Tucker decomposition (Higher-Order SVD)
- Non-negative Tucker
- Matrix-Product-State (Tensor-Train)
- Robust Tensor PCA
- Tensor ridge regression (Tucker and Kruskal)



Decomposing a 1-billion element tensor

Deep tensorized architectures



- Speeding up convolutions with tensor decomposition
- Tensor contraction and regression networks, …

ResNet-101+TRL on ImageNet