HEAT

A DISTRIBUTED AND ACCELERATED TENSOR FRAMEWORK FOR DATA ANALYTICS AND MACHINE LEARNING

Claudia Comito[1], Markus Götz[2,3], Charlotte Debus[2,3], Daniel Coquelin[2,3], Michael Tarnawa[1], Kai Krajsek[1], Philipp Knechtges[4], Martin Siggel[4], Björn Hagemeier[1], Achim Basermann[2], Achim Streit[3]

[1] Julich Supercomputing Centre (JSC), Forschungszentrum Julich (FZJ), Julich, Germany
[2] Helmholtz AI
[3] Steinbuch Centre for Computing (SCC), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany
[4] Institute for Software Technology (SC), German Aerospace Center (DLR), Cologne, Germany

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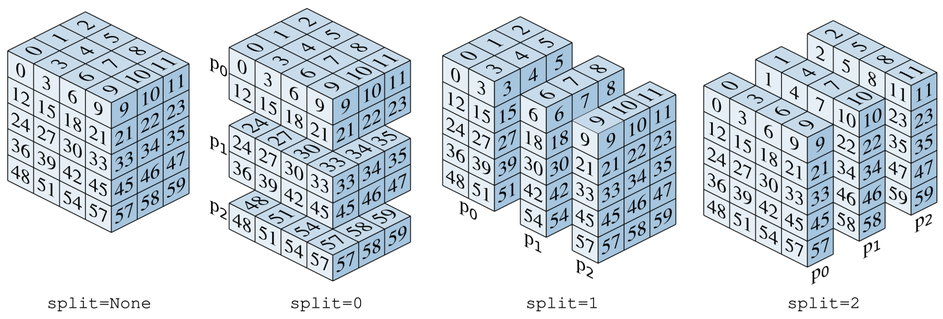


- **Python** framework for data-intensive computing
- Different computational backends
  - Traditional **CPU** computations
  - Acceleration via **GPUs**, IPUs and XPUs
- Transparent scaling to **cluster** systems via MPI
- Decomposition of tensors on multiple processors
  - Definition of `split` axis
  - Computations are performed in parallel
- Interoperable with numpy and PyTorch

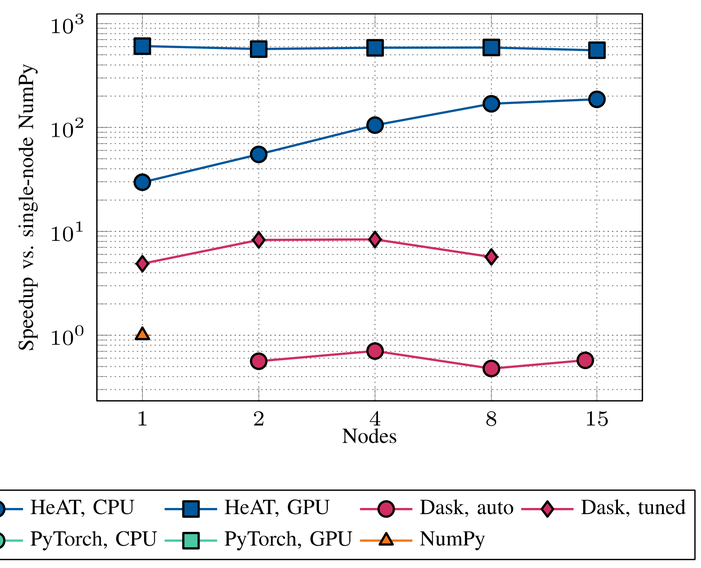
BATTERIES INCLUDED

- Element-wise operations
- Advanced indexing, slicing and broadcasting
- Linear algebra subpackage
- Unsupervised machine learning
  - K-Means/-Medoids/-Means clustering
  - Spectral clustering
  - Self-organizing maps
- Supervised machine learning
  - Logistic/L1-/LASSO-regression
  - k-nearest neighbors
  - Gaussian Naïve Bayes
- Neural networks
  - Data-parallel training (DASO)
  - State-of-the-art layers
  - PyTorch and ONNX compatible

DATA CRUNCHING IN THE WILD

- Study of paraffin-based hybrid rocket engine fuels
- Combustion tests at DLR Institute of Space Propulsion
  - Super-high resolution video cameras
  - 10.000 frames/second
- Identification of combustion phases via unsupervised ML

- Parallel clustering algorithm implementations
- Production runs on high-performance supercomputer



FEEL THE HEAT

```
>>> pip install heat

>> git clone
https://github.com/helmholtz-
analytics/heat.git
```

Scan me

CONTACT

Dr. Claudia Comito, c.comito@fz-juelich.de
Dr. Markus Götz, markus.goetz@kit.edu