Fraunhofer

ITWM

FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS ITWM

Carme
Open Source Eco System

MACHINE LEARNING AT SCALE: OPEN SOURCE TOOLS

Carme: Open source ML ecosystem

- An open source framework for multi-user, interactive Machine Learning on distributed systems
- **www.open-carme.org**

TensorQuant: A simulation toolbox for DNN quantization

- Simulates Deep Learning on embedded hardware
- **www.github.com/cc-hpc-itwm/TensorQuant**

DeToL: Deep Topology Learning

- Automatically find the best-performing DNN architectures for a given dataset
- Auto-tune hyper-parameters with Bayesian optimization

DLPS: Deep Learning Parameter Search

- Automatic hyper-parameter search for DNN models on AWS or HPC systems

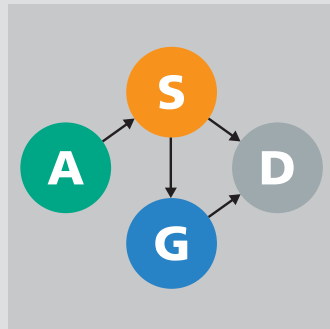**Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM**

Fraunhofer-Platz 1
67663 Kaiserslautern
Germany

Contact
Dr. Peter Labus
Phone +49 631 31600-49 82
peter.labus@itwm.fraunhofer.de

Dr. Franz-Josef Pfreundt
Phone +49 631 31600-44 59
pfreundt@itwm.fraunhofer.de

www.itwm.fraunhofer.de

SCALABLE MACHINE LEARNING SOLUTIONS BUILD ON OUR GENUINE HPC-TOOLS

CARME – OPEN SOURCE ECO SYSTEM

An open source framework for multi-user, interactive Machine Learning on distributed systems

----

Carme key-features

- Open source
- Interactive, secure multi user environment
  - ML and Data Science users want interactive
  - GUI access to compute resources
- User management
  - Integrates into existing LDAP
- Container management
- Scheduler
  - Integrates into existing SLURM
- Data management and I/O
- ML and DS GUI → Interactive web-interface
- Scalable framework
  - Distributed multi-GPU Deep Learning
- Cluster maintenance and monitoring

www.open-carme.org
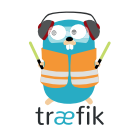
TENSORQUANT

A simulation toolbox for deep neural network quantization

Open-source tensorflow plugin

- Simulates training and inference of DNNs on hardware with sparse and quantized tensor operations.

Answers open questions like:

- How accurate is a given model with 8-bit fixed point arithmetic?
- How much sparsity can be enforced during training?

www.github.com/cc-hpc-itwm/TensorQuant