Chair of Computer Architecture and Parallel Systems
TUM School of Computation, Information and Technology
Technical University of Munich

Master Thesis: Efficient Neural Networks Strategy for Hyper-autoencoders on Earth Observation images

On one hand, Earth Observation satellites are hardware-constrained platforms with minimal onboard memory and restricted downlink bandwidth. On the other hand, learned Data Compression, leveraging autoencoder-based architectures, has proven to be a state-of-the-art methodology on the ground. This thesis aims to investigate network compression methods that allow for the use of Deep Learning architectures in hardware-constrained environments such as spaceborne satellites.

Tasks:

- Get familiar with Binary Neural Networks and AdderNets network compression
- Apply these methods to the provided Hyper-autoencoder architectures and datasets
- Evaluate the effectiveness of these methods through a set of metrics
- Identify experiments' bottlenecks and propose potential solutions

Recommended knowledge and experience:

- Python programming experience
- Experience with Git and working with remote clusters
- Familiarity with ML libraries such as PyTorch Lightning, W&B, or Hydra is encouraged

Benefits:

- Involve in the academic environment of the chair of Computer Architecture and Parallel Systems
- Researching rising research topics such as Network Compression
- Getting system performance perspectives on AI application
- Become familiar with modern ML tools and libraries

Application:

If you are interested in this topic, email Cedric Leonard or Dai Liu (find the contact details below).

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