

Local Learning with Low-Precision Parameters

Deep learning has been successfully applied to many pattern recognition tasks. However, deep learning usually necessitates precise weights and gradients. In contrast, synaptic weights in biological neuronal networks are imprecise and error signals are coarse and noisy. In addition, tunable high-precision weights and high-precision gradients are expensive in hardware systems.

In this project, we will investigate the impact of low-precision parameters on gradient-based training of neural networks. We hypothesize that low-precision parameters are less impactful on shallow networks and will investigate recent approaches for local gradient-based learning in combination with low-precision parameters.

Goals & Tasks

- Review literature on low-precision learning.
- Perform simulations on benchmark tasks, compare different network architectures and local learning approaches.

Contact

Robert Legenstein
robert.legenstein@tugraz.at

Qualifications

- Interest in deep learning (and potentially computational neuroscience).
- Experience with Python, Pytorch or Tensorflow.
- Course Deep Learning is recommended.
- Registered to one of the following:
 - ✓ **Bachelor Thesis**
 - ✓ **Seminar Project**
 - ✓ **Master Thesis**