Learning with noisy weights and gradients

Deep learning has been successfully applied to many pattern recognition tasks. However, deep learning usually necessitates precise weights and gradients. In contrast, synaptic transmission in biological neural networks is noisy. In addition, 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 effects of noisy parameters and noisy gradients when training neural networks with gradient descent.

Goals & Tasks

- Review literature on noisy network training.
- Train neural networks on simple tasks with high-precision and noisy parameters/gradients.
- Compare and analyze results, extract effects.

Qualifications

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

Contact

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