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1 Software environment

1.1 NEST and PyNN

The default configuration for BrainScaleS (BSS) requires PyNN 0.7 (deprecated); if we want to do tests on the local host with Nest, we need to use version 2.2.2.

`https://github.com/nest/nest-releases/blob/master/nest-2.2.2.tar.gz`

`https://github.com/NeuralEnsemble/PyNN/releases/tag/0.7.5`

1.2 Cypress

Cypress is a spiking neural network simulation framework developed (and for use) with C++. This allows for fast(er?) network building times and all the beauty that comes with a typed, compiled language. This framework can serve as a PyNN wrapper allowing the use of multiple back-end simulators (Nest, Brian, SpiNNaker, BrainScales, etc.); furthermore, the mindset for assembling networks is similar to PyNN 0.8 and up. Unfortunately, Cypress supports Nest only with PyNN 0.8 which makes it a bit incompatible with the default configuration for BrainScales

`https://github.com/hbp-unibi/cypress`

1.3 DEAP

Distributed Evolutionary Algorithms in Python (DEAP) is a library which allows the user to easily perform multiple types of evolutionary algorithms. Since it is a Python library it would allow to easily integrate the PyNN-BSS workflow.

`https://deap.readthedocs.io/en/master/index.html`

1.4 Open Beagle

Open Beagle is an evolutionary computing framework for the C++ language. The design/usage philosophy is similar to DEAP and the interaction with Cypress would hopefully be easy.

`https://github.com/chgagne/beagle`

1.5 PaGMO

PaGMO is a C++ (and Python) library for parallel optimization. The main advantage could be that we may use the Python interface for PyNN while keeping the high-performance C++ back-end. Additionally, if this is not possible we could still use C++ with Cypress? Another benefit is that we could jump from Genetic Algorithms to another optimization algorithm such as Particle Swarms or Simulated Annealing.

`https://esa.github.io/pagmo2/`