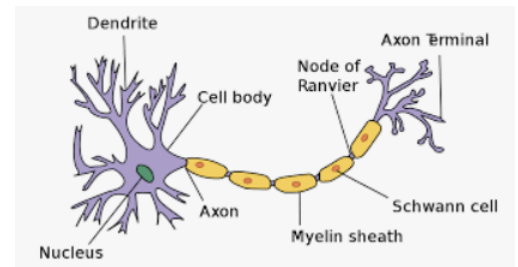


Spiking Neural Networks with Random Backpropagation

BACKGROUND

Backpropagation is one of the most popular and powerful learning algorithms for Artificial Neural Networks. Despite variants exist for Spiking Neural Networks such as Backpropagation Through Time (BPTT) exist, learning in Spiking Neural Networks remains difficult due to the complexity of spiking neurons. Here, variants of Backpropagation that use random weights are a promising and possibly biologically plausible variant.



YOUR TASK

In this project you will implement the Backpropagation with random weights as a learning rule for Spiking Neural Networks in the simulation tool NEST (C++). Afterwards you will test and benchmark (Python) the implemented learning procedure on various learning tasks such as Regression, MNIST handwritten number recognition and others. The performance shall be compared to other State of the Art Learning Algorithms.

REQUIRED SKILLS

- C++ and Python
- Experience with Machine Learning / Deep Learning
- Knowledge of Backpropagation for Artificial Neural Networks
- Experience with Spiking Neural Networks is a plus

FURTHER READING

www.nest-simulator.org

<http://neuralnetworksanddeeplearning.com/chap2.html>

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