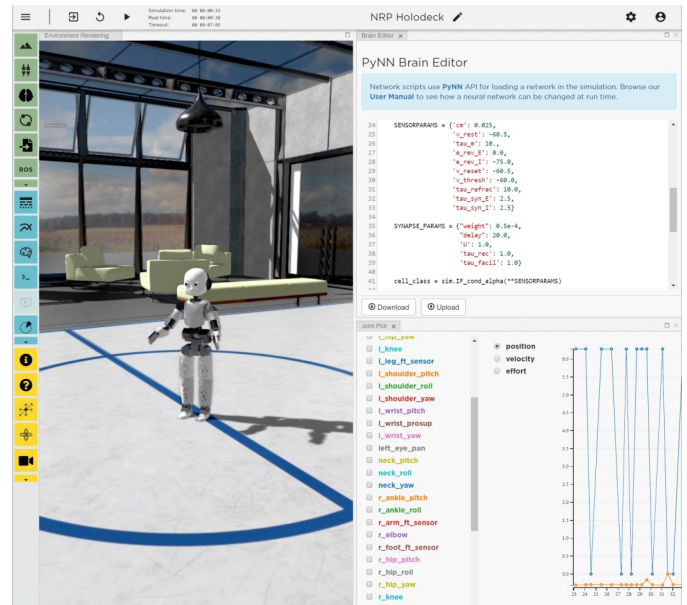


Cloud-Based Robotics for Machine Learning

BACKGROUND

Deep neural networks require massive amounts of training data. This makes it especially challenging to apply them in robotics where data gathering additional data implies setting up and running a physical robot for considerably amounts of time. This is not only costly but also usually impossible in mission-critical environments. Robot simulations have therefore become an essential tool in machine learning. To support complex tasks that required long training, they need to support automated and distributed execution. The Neurorobotics Platform (NRP) [1, 2] is a cloud-based simulation environment that is specifically tailored to



connecting simulated models of the brain to simulated robots. While its main fields of application are neuroscience and brain-inspired learning, its cloud-based architectures make it also ideally suited for deep learning tasks. The goal of this project is to add the technical infrastructure required for better support of training deep neural networks.

YOUR TASK

You will develop an API that enables convenient access to the NRP from Python and provide a data storage module that seamlessly integrates with common deep learning toolkits. The framework will be evaluated on a benchmark task from robotics control.

REQUIRED SKILLS

- Good knowledge of Python and the typical deep learning tool chain
- Basic experience in setting up distributed services and Docker containers is of advantage

FURTHER READING

- [1] <http://www.neurorobotics.net>
- [2] Falotico, Egidio, et al. "Connecting artificial brains to robots in a comprehensive simulation framework: The neurorobotics platform." *Frontiers in neurorobotics* 11 (2017): 2.

CONTACT

Florian Walter

✉ florian.walter@tum.de

Technical University of Munich
Department of Informatics
Robotics, Artificial Intelligence and Real-Time Systems
www6.in.tum.de

