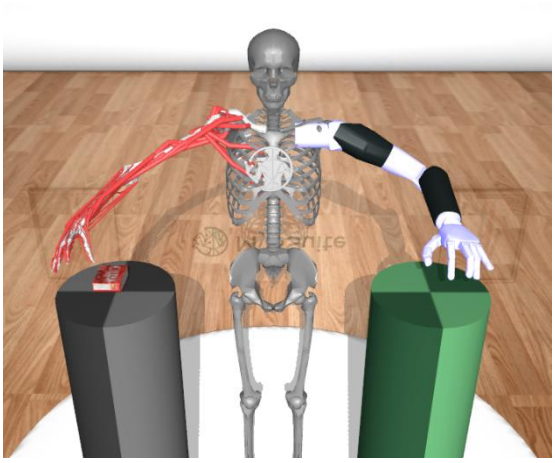
Development/Implementation of Reinforcement Learning based framework for contact-rich manipulation of a musculoskeletal hand model

Human has the capability of using our hand for dexterous contact-rich manipulation tasks such as grasping and fine manipulations.
However, it still remains unclear how we plan and control our hand motions by exciting muscles through neuro signals, in particular, how the motor system manages muscle dynamics, redundancy, and tactile sensory feedback during complex manipulations. The goal of this project is to develop and re-implement the framework of the SoTA learning-based algorithms using MyoSuite models in MuJoCo. The study will also investigate the capability and limitation of these algorithms to gain insights into high-dimensional system planning.



MyoChallenge 2024

Type: Forschungspraxis/Semesterarbeit

Requirements for Students:

Tasks:

- Review of the SoTA algorithms of RL or related methodologies for musculoskeletal models.
- Implementation of frameworks and scenarios of existing methods
- Exploration of performance and limitations of methods

Prerequisites that would be helpful:

- Basic knowledge of musculoskeletal modeling
- Knowledge of RL or related
- Python & MuJoCo & PyTorch

If you are interested in any of these topics and want to know more please get in contact

Contact
Junnan Li (junnan.li@tum.de)

Yansong Wu (yansong.wu@tum.de)

Deadline: Please apply before 01.11.2025