Human EMG Data Classification and Evaluation on a Simulated Skeleton

BACKGROUND
Muscles are actuated by motor neurons which are connected to the spinal cord responsible for basic motion generation. Signals necessary for sensing and control of muscles are mostly transferred by electrical stimuli and therefore can be measured with engineering tools. Here, Electromyography (EMG) is a popular method where sensor pads are located on the human skin to record electrical signals. The generated data can be analyzed to learn about muscle control stimuli and the connectome of the human nervous system.

The Neurorobotics Platform (NRP) is a simulation framework that allows experiments with musculoskeletal models to verify neuronal data, neural learning roles and network architectures in virtual environments.

YOUR TASK
You will filter, analyze and classify the raw EMG data of a human grasping experiment using Machine Learning techniques. The extracted neural stimuli for muscle control shall be evaluated in a virtual experiment in the NRP: Applying your classified data as muscle activations of biologically validated muscle simulations on a human arm skeleton model you will ideally be able to replicate the real experiments.

REQUIRED SKILLS
- Machine Learning for Classification
- Signal Processing
- Python or C++

FURTHER READING

This Thesis will be Co-Supervised by Marc de Kamps from the University of Leeds and may include research stays in his lab.

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