Virtual Reality for Neurorehabilitation

M.Sc. Thesis

Contacts

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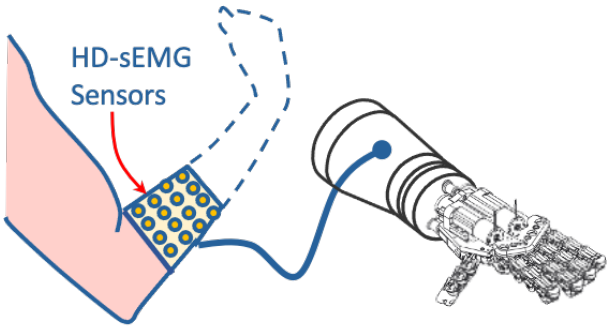

Project Abstract

Despite the advancement of modern bionic hands, current commercial devices still present limited acceptance and percentage of daily use. Main reasons for rejection are related to poor functionality and control intuitiveness. In this project, we want to investigate the effect of novel advanced control techniques in the sense of embodiment.

Background and Motivation

Commercial hand prostheses include sophisticated poly-articular hands, designed to match the appearance and function of human hands through the combinations of multiple motors and sensors. The standard approach to manage their advanced dexterity consists of using a pair of surface electromyographic (sEMG) sensors to control one movement at a time and switch between several motion patterns through different input strategies. While the classical approach often leads to device rejection, the question that arises is whether high density surface electromyographic (HD-sEMG) sensors could improve the sense of embodiment.

Task Description

The task for this project is to develop a virtual reality environment to test and evaluate advanced myoelectric control methods in terms of functionalities and sense of embodiment. The project involves data collection and experimental validation with human subjects.

Technical Requirements

Knowledge of or strong interest in C# and Unity3D are required (potential C++ integrations are possible). Knowledge of VR devices is of benefit.