Title (tentative): Including dynamics in a body-machine interface

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Description

Motivation and application domain

Body-Machine Interfaces (BoMIs) decode upper-body motion for operating devices, such as computers and wheelchairs and can be used as an assistive and/or rehabilitative tool for people with motor impairment.

General objectives and main activities

In this study, we want to explore the possibility of developing a dynamic EMG-based BoMI, that could account for time dependency either in the body space (i.e. muscle activity) or in the control space. Furthermore, a VR environment will be developed to provide users with a more immersive experience while utilizing the interface. The novel dynamic control scheme will be tested on healthy users for future implementations on stroke survivors or people with spinal cord injury.

Training Objectives (technical/analytical tools, experimental methodologies)

Engineering tasks related to this study will include: kinematic and elettroniografic data collection, immersive display development, development of the software for real-time control of object dynamics including point mass and simple manipulator structures. Research skills such as methods design, data analysis, data interpretation, signal processing and machine learning methods will also be learned and exercised during this project.

Place(s) where the thesis work will be carried out: Marquette University and the Shirley Ryan Ability Lab

Additional information

Maximum number of students: 1

Financial support/scholarship: fondo giovani (2018)