UNIVERSITA' DEGLI STUDI DI GENOVA
DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E
INGEGNERIA DEI SISTEMI
CORSO DI LAUREA MAGISTRALE IN BIOINGEGNERIA

Dibris

Scheda di Offerta Tesi

Titolo (provvisorio): A Video-Based marker-less body-machine interface

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Descrizione

Motivazione e campo di applicazione

Regaining functional independence plays a crucial role to improve the quality of life of individuals with motor disabilities. Here, we address this problem within the framework of body-machine interfaces (BoMIs). BoMIs enable individuals with restricted mobility to extend their capabilities by mapping their residual body movements into commands to control an external device. In this study, we will test a video-based marker-less interface that can track the position of different parts of the body to control a computer cursor in real-time.

Obiettivi generali e principali attività

The long-term goal is to provide an open source assistive software that allows people to operate a computer cursor by moving different parts of the body. The main objectives of this thesis project are:

• Aim 1: develop the technology for a body-machine interface based on mapping human motion signals onto a variety of control tasks. Computer vision and deep learning based algorithms will be used to track movement signals from a computer webcam. Those signals will be mapped into a lower-dimensional control space for operating a computer cursor.

• Aim 2: investigate and compare the use of different body segments as sources for the cursor control.

• Aim 3: test the robustness and the usability of the marker-less BoMI with different subjects.

The study will begin with control subjects but will be potentially tested also in individuals with spinal cord injury.

Obiettivi di apprendimento (strumenti tecnici e analitici, metodologie sperimentali)

The student will learn to:
- Investigate computer vision and deep learning based marker-less systems
- Develop the control of an external device based on signals coming from kinematic sources
- Improve the knowledge of Python, MATLAB, statistical analysis

Luogo/i in cui si svolgerà il lavoro: DIBRIS, UNIGE - Santa Corona hospital (for test in in individuals with spinal cord injury)

Informazioni aggiuntive

Numero massimo di studenti: 1