



Scheda di Offerta Tesi

Titolo (provvisorio): Changes of endpoint proprioceptive acuity during motor adaptation to dynamic environments

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Descrizione

Motivazione e campo di applicazione

Proprioception is the sense of the position of parts of the body and strength of effort being employed in movement. Up to date, there is extensive literature on force field motor adaptation, but to the best of our knowledge, nothing on the sensory and proprioceptive adaptation mechanisms. Therefore, we aim to investigate the evaluation of endpoint proprioceptive acuity in the course of dynamic tasks, in order to understand to which extent acuity is influenced by the adaptation process.

Obiettivi generali e principali attività

The goal of the present study is to develop and validate a protocol to investigate how the proprioceptive acuity is influenced by adaptation processes. For this study, we use a bilateral haptic interface where subjects grasp the handles of two planar direct-drive manipulanda. The types of dynamic task investigated in this study are monolateral and bilateral movements under the action of unstable force fields. In this task, one of the two hands is selected as the proprioceptive target and the other hand is prompted to reproduce as accurately as possible the position of the other hand (position matching paradigm). Catch trials are used for evaluating the progress of the adaptation process and EMG signals are recorded.

The study will concern the design of the protocol, the implementation of such algorithms on the robotic device, the data collection and analysis and lastly, it will conclude with statistical interpretation of the obtained results.

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

Students will learn:

1. Design of the experimental protocol
2. Software implementation on the robot (Simulink)
3. Data collection (EMG, Robot)
4. Data analysis (Matlab)
5. Statistical analysis (Matlab, R, SPSS or others)

Luogo/i in cui si svolgerà il lavoro:

â€œ IIT â€œ centre for human technologies, Erzelli & DIBRIS

Informazioni aggiuntive

Numero massimo di studenti: 2