Title (tentative): Perception during interaction and its neural bases

Thesis advisor(s): Casadio Maura, Alessandra Sciutti (IIT)

E-mail: Maura.Casadio@unige.it

Address: Via Opera Pia 13, 16145 Genova (ITALY)

Phone: (+39) 010 33 52749

Description

Motivation and application domain

Perception is a complex process, where prior knowledge is incorporated into the current percept to help the brain cope with sensory uncertainty. This implies that two individuals could perceive differently the very same physical stimulus, e.g. the duration of an interval of time may look longer to one than to the other. Yet, humans are very good at achieving a tight coordination in space and time. This project aims at understanding how a shared perception is achieved, by modelling how visual perception of time and space changes during interaction and investigating the neural bases of such modulation.

General objectives and main activities

The objective of the research is modeling how being involved in an interaction modifies the perceptual mechanisms supporting visual perception of space and time, with the aim of generalizing the existing Bayesian models describing perception in individual settings to collaborative scenarios.

In particular, it will be of interest to assess whether during interaction a mutual adaptation occurs at the perceptual level, leading to a shared perception. The possibility to uncover the neural bases involved in the modulation of space perception occurring during social interaction will be explored. The activities will include human psychophysical perceptual and motor testing, comparing perceptual skills in the same task (e.g., size perception) performed in an individual or an interactive setting. The protocol will be designed so as to be portable also to fMRI testing. The results will be used to develop a model of shared perception, and to set the basis for the investigation of the neural bases of such mechanism.

Training Objectives (technical/analytical tools, experimental methodologies)

Engineering tasks related to this study will include: psychophysical and kinematic data collection, development of the software for human perceptual testing, fMRI oriented experimental design. Research skills such as methods design, data analysis, data interpretation, statistical testing, modeling and signal processing will also be learned and exercised during this project.

Place(s) where the thesis work will be carried out: IIT (Erzelli)

Additional information

Maximum number of students: 1