Heterogeneous 3-D Perception Across Visual Fragments

Fact Sheet

Project Information

Funded under
FP7-ICT

Overall budget
€ 3 168 235

EU contribution
€ 2 400 000

Closed project

Coordinated by
UNIVERSITA DEGLI STUDI DI GENOVA
Italy

Start date
1 March 2008

End date
28 February 2011

Project description

Cognitive Systems, Interaction, Robotics
Developing of the perceptual agent capable to acheive a full 3D awareness for interaction control/planning in the peripersonal space

The research intends to investigate the interplay existing between vision and motion control, and to study how to exploit this interaction to achieve a knowledge of the surrounding environment that allows a robot to act properly. Robot perception can be flexibly integrated with its own actions and the understanding of planned actions of humans in a shared workspace. The research relies upon the assumption that a complete and operative cognition of visual space can be achieved only through
active exploration of it: the natural effectors of this cognition are the eyes and the arms. Crucial but yet unsolved issues we address are object recognition, dynamic shifts of attention, 3D space perception including eye and arm movements including action selection in unstructured environments. We propose a flexible solution based on the concept of visual fragments, which avoids a central representation of the environment and rather uses specialized components that interact with each other and tune themselves on the task at hand.

In addition to a high standard in engineering solutions the development and application of novel learning rules enables our system to acquire the necessary information directly from the environment. The study and models of human/primate behavior, based on specific experiments, guide many of our envisaged solutions. Three main objectives will be addressed:
- A robotic system for interactive visual stereopsis {composed of: an anthropomorphic mechatronic binocular system; and software vision modules based on cortical-like population, to be used as an experimental platform}.
- A model of a multisensory egocentric representation of the 3D space {constructed on binocular visual cues, signals from the oculomotor systems, signals about reaching movements performed by the arm}.
- A model of human-robot cooperative actions in a shared workspace {relaying on the concept of shared attention to understand the intention or goal of the communicating partner}.

Programme(s)

Topic(s)

Call for proposal

FP7-ICT-2007-1

Funding Scheme

CP - Collaborative project (generic)

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