Embodied Motion Intelligence for Cognitive, Autonomous Robots

Fact Sheet

Project Information

EMICAB

Grant agreement ID: 270182

Closed project

Funded under
FP7-ICT

Overall budget
€ 2 040 826

EU contribution
€ 1 549 973

Coordinated by
UNIVERSITAET BIELEFELD
Germany

Project description

Cognitive Systems and Robotics

The EMICAB consortium takes a comprehensive approach to the engineering of artificial cognitive systems. The objective is to integrate smart body mechanics in intelligent planning and control of motor behaviour, accounting equally for problems in neuroscience (multi-sensory integration, internal body models, intelligent action planning) and technology (smart body mechanics, distributed embodied sensors and brain-like controllers). The overall technological goal is a dexterous hexapod robot that exploits its bodily resources for cognitive functions.
The EMICAB consortium takes a holistic approach to the engineering of artificial cognitive systems. Our goal is to integrate smart body mechanics in intelligent planning and control of motor behaviour. To achieve this goal the consortium accounts equally for problems in neuroscience (e.g. multi-sensory integration, internal body models, intelligent action planning) and technology (smart body mechanics, distributed embodied sensors and brain-like controllers). Our approach starts with a strongly sensorised bionic body with redundant whole-body kinematics and then designs the technological infrastructure such that cognitive mechanisms emerge from distributed sensorimotor intelligence. The concept is based on neuroscience research on insects whose motor dexterity, adaptiveness and pre-rational abilities in learning and memory rival those of lower mammals: stick insects orchestrate a wide range of dexterous motor behaviours and flies can maintain object locations in short-term memory during navigation tasks, just to mention paradigms that are studied by UNIBI and JGUM. The partners UNICT and SDU will devise bio-inspired models and, in turn, guide ongoing experimental research in order to achieve the overall technological goal: a dexterous hexapod robot that exploits its bodily resources for cognitive functions. Two levels of analysis and modelling will be accounted for: the smart brain that captures various aspects of motion intelligence (motor learning, context-dependent actions, multi-sensory integration) and the smart body equipped with distributed proprioceptors and muscle-like compliance, allowing for novel, highly adaptive, neurobionic control strategies. The EMICAB robot will draw from its complex body features and learn by use of a manipulable internal body model. This will be monitored by an ambitious set of benchmarking scenarios. We expect mutual benefit for applied research on autonomous mobile robots and for basic research in neuroscience.

**Fields of science**

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**Programme(s)**

**Topic(s)**

**Call for proposal**

FP7-ICT-2009-6
Funding Scheme

Coordinator

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Activity type
Higher or Secondary Education Establishments

EU contribution
€ 531 600

Participants (3)

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Activity type
Higher or Secondary Education Establishments

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EU contribution
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Activity type
Higher or Secondary Education Establishments