The Commission Perspective: FP7 Challenge 2 Cognitive Systems, Interaction, Robotics

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FP7 – Challenge 2

2007 – 2008: **Cognitive Systems, Interaction, Robotics**

motivation: *artificial systems should be able to function effectively in circumstances that were not planned for explicitly when the system was designed*

3 strands of activity

- systems design
  engineering principles
- structuring research
  evaluating performance
- coordinating policy (EU level)

Work Programme 2007-08

Target outcome a)

IPs, STRePs

artificial systems that:

- can achieve general goals in a largely unsupervised way, and persevere under adverse or uncertain conditions; adapt, within reasonable constraints, to changing service and performance requirements, without the need for external re-programming, re-configuring, or re-adjusting.

and/or

- communicate and co-operate with people or each other, based on a well-grounded understanding of the objects, events and processes in their environment, and their own situation, competences

Cognitive Systems, Interaction, Robotics: 2007-08

Focus on one of 3 areas

- robots handling different objects and operating autonomously or in cooperation with people
- robots or other systems monitoring and controlling material or informational processes
- multimodal interfaces and interpersonal communication systems understanding language, gestures

emphasis is scientific and technological advance – not about application development; role of applications is to provide research questions and to demonstrate the impact of conceptual or technical innovation.

Cognitive Systems, Interaction, Robotics: 2007-08

A key question:

How should systems pertaining to these areas be designed and built so that they are more robust , flexible, effective, natural and where necessary or desirable, safer and more autonomous than what is possible today?

Cognitive Systems, Interaction, Robotics: 2007-08

Work should (as appropriate):

- develop and apply engineering approaches,.. that ensure reliability, flexibility, robustness… criteria for benchmarking
- contribute to theory: … learning and interpretation of sensor data, design and architectures…
- **explore**:
  - use of advanced components, platforms,…based on new materials or hardware design (incl. biomimetic),..
  - new/bio-inspired information processing paradigms, models of natural cognition, emergent behaviour,..
  - new approaches to language understanding and generation

Cognitive Systems, Interaction, Robotics: 2007-08

Challenges

- a key issue is how these systems should work – greatly improving robustness etc. requires rethinking the way systems are engineered
- theories are needed - systems theories, software architectures, control theories, modelling theories, etc - that will allow us to build these types of systems
- engineering progress will depend on advancing scientific understanding of what both natural and artificial systems can and cannot do, and how and why
- integration of disciplines: artificial intelligence, computer vision, natural language, robotics,… computational neuroscience, cognitive science, psychology,…philosophy of mind,…mathematics,…

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Target outcome b)

NoEs

covering: learning in artificial systems, robotics, artificial cognitive systems, language and interaction support technologies

A principled methodology:

analysing *what is needed to achieve our long term goals (as opposed to asking how do we improve what we have already achieved)*;

R&D towards developing:

a shared understanding of detailed requirements and approaches to meeting them;

methods and experimental scenarios for evaluating performance, eg, how to demonstrate generality, how to measure robustness, etc.

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Target outcome c)
CSAs

Coordination at EU-level

→ who is supporting this type of research in the EU?

→ gather momentum and focus efforts of the many and varied relevant research communities

→ Aim at generating additional funding support and/or new funding initiatives

Cognitive Systems, Interaction, Robotics: 2007-08

Hints

- identify the type(s) of system(s) you want to build and explain why you cannot build it/them now – what sort of know-how is expected and how will it be relevant for others?
- be highly **interdisciplinary** – ideas come from perspective!
- you may aim to complement or extend current projects – rather than try to be different (see links at end) but, be ambitious – aim beyond incremental progress!
- involve **only** those partners needed to achieve the goals and **no more**
- industrial partners must have a vested **business interest** in the research output

key issue is how these systems should work – rethinking the way systems are engineered

Cognitive Systems, Interaction, Robotics: 2007-08

Call information:

Call 1: Dec 22, 2006, closes May 8, 2007

Funding: ≤ 100 M€

Call 3: Dec 2007, closes Mar 2008

Funding: ≤ 100 M€

Cognitive Systems, Interaction, Robotics: 2007-08

Links

More (FP6 project descriptions, presentations,…) at
- http://www.cognitivesystems.eu
- http://cordis.europa.eu/ist/ic

See also
- http://www.eucognition.org
- http://www.roboticsplatform.com

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Info day in Luxembourg: Jan 24, 2007 !!