Collective Cognitive Robots

Fact Sheet

Project Information

Funded under
FP7-ICT

Overall budget
€ 3 755 902

EU contribution
€ 2 869 998

Coordinated by
UNIVERSITAET GRAZ
Austria

Start date
1 April 2011

End date
30 September 2014

Project description

Cognitive Systems and Robotics

The CoCoRo project aims at developing a swarm of autonomous underwater vehicles (AUVs) that are able to interact with each other and which can balance tasks such as ecological monitoring, searching, maintaining, exploring and harvesting resources in underwater habitats. The swarm will maintain swarm integrity under conditions of dynamically changing environments. This will be achieved by letting the AUVs interact with each other and exchange information, resulting in a cognitive system that is aware of its environment, of local individual goals and threats and of global swarm-level goals and threats. This can be exploited for improving the robustness, flexibility and efficiency of other technical applications in the field of ICT.
This ambitious project aims at creating a swarm of interacting, cognitive, autonomous robots. We will develop a swarm of autonomous underwater vehicles (AUVs) that are able to interact with each other and which can balance tasks (interactions between/within swarms). These tasks are: ecological monitoring, searching, maintaining, exploring and harvesting resources in underwater habitats. The swarm will maintain swarm integrity under conditions of dynamically changing environments and will therefore require robustness and flexibility. This will be achieved by letting the AUVs interact with each other and exchange information, resulting in a cognitive system that is aware of its environment, of local individual goals and threats and of global swarm-level goals and threats. Our consortium consists of both, biological and technical institutions and is therefore optimally qualified to achieve this goal. By a combination of locally acting and globally acting self-organizing mechanisms, information from the global level flows into the local level and influences the behaviour of individual AUVs. Such a cognitive-based scheme creates a very fast reaction of the whole collective system when optimizing the global performance. As shown by natural swimming fish swarms, such mechanisms are also flexible and scalable. The usage of cognition-generating algorithms can even allow robotic swarms to mimic each other's behaviour and to learn from each other adequate reactions to environmental changes. In addition, we plan to investigate the emergence of artificial collective pre-consciousness, which leads to self-identification and further improvement of collective performance. In this way we explore several general principles of swarm-level cognition and can assess their importance in real-world applications. This can be exploited for improving the robustness, flexibility and efficiency of other technical applications in the field of ICT.

**Fields of science**

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- - - -

**Programme(s)**

**Topic(s)**

**Call for proposal**

FP7-ICT-2009-6

**Funding Scheme**
Coordinator

UNIVERSITAET GRAZ

Address
Universitätsplatz 3
8010 Graz
Austria

Activity type
Higher or Secondary Education Establishments

EU contribution
€ 810 420

Website Contact the organisation

Administrative Contact
Thomas Schmickl (Dr.)

Participants (4)

UNIVERSE LIBRE DE BRUXELLES

Belgium

EU contribution
€ 508 530

Address
Avenue Franklin Roosevelt 50
1050 Bruxelles

Activity type
Higher or Secondary Education Establishments

Website Contact the organisation

Administrative Contact
Christine Courillon (Prof.)

UNIVERSITY OF STUTTGART

Germany

EU contribution
€ 514 668

Address
Keplerstrasse 7
70174 Stuttgart

Activity type
Higher or Secondary Education Establishments

Website Contact the organisation

Administrative Contact
Michael Matthiesen (Mr.)
SCUOLA SUPERIORE DI STUDI UNIVERSITARI E DI PERFEZIONAMENTO S ANNA
Italy
EU contribution
€ 529 640
Address
Piazza Martiri Della Liberta 33
56127 Pisa
Activity type
Higher or Secondary Education Establishments
Website
Administrative Contact
Paolo DARIO (Prof.)

UNIVERSITY OF YORK
United Kingdom
EU contribution
€ 506 740
Address
Heslington
YO10 5DD York North Yorkshire
Activity type
Higher or Secondary Education Establishments
Website
Administrative Contact
Chris Barber (Mr.)

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