Artificial Fish Locomotion and Sensing

Fact Sheet

Project Information

Funded under
FP7-ICT

Overall budget
€ 2 473 534

EU contribution
€ 1 829 000

FILOSE

Grant agreement ID: 231495

Closed project

Start date
1 February 2009

End date
31 May 2012

TALLINNA TEHNIKAÜLIKOOL
Estonia

Project description

Cognitive Systems, Interaction, Robotics
New technologies for underwater robotics

Fish LOcomotion and SEnsing (FILOSE) is addressing the bottlenecks of underwater robotics, namely the problems of how fish do and robots could sense the underwater environment and how they achieve high adaptability and reliability in these very unstable surroundings. Solving these problems will lead to new underwater technologies that serve people better. The overall aim of FILOSE is to acquire a deeper understanding of the principles underlying fish locomotion and sensing, in order to develop new technologies for underwater vehicles on the basis of biological evidence. The FILOSE project results can be applied and used in the following fields: underwater humanitarian demining, environmental monitoring,
search and rescue, anti-terrorist activities, surveillance of harbors, coast security, entertainment, edutainment and fishery.

The overall aim of FILOSE is acquiring a deeper understanding of the principles underlying fish locomotion and sensing, in order to develop new technologies for underwater vehicles on the basis of biological evidence. More specifically, FILOSE focuses on shedding light on how fish exploit lateral line sensing in underwater environments. The lateral line provides fish with the ability to detect hydrodynamic patterns in the surrounding environment, thereby playing a key role in adapting to environmental changes. FILOSEs main goals are captured by the following objectives: 1. investigate fish locomotion in a controlled hydrodynamic environment, in particular addressing the issue of how fish react to changes in hydrodynamic patterns; 2. develop a novel mechanical design of an underwater fish robot, characterized by high maneuverability and low complexity; 3. develop a MEMS-based artificial lateral line; 4. develop a control method for the artificial fish, aimed at reproducing locomotion patterns found in biological fish and based on a central pattern generator (CPG); 5. develop a method to characterize and classify hydrodynamic images, making use of a mechanosensory array; 6. develop a classification method to couple detected hydrodynamic events with locomotion patterns found in biological fish; 7. conduct comparative experiments in a controlled hydrodynamic environment to assess behaviour of an artificial fish equipped with artificial lateral line sensing with respect to the behaviour of a biological fish. We believe that the proposed investigations are key to building underwater robots that improve on the existing by exhibiting a greater degree of autonomy, adaptability to environmental changes, maneuverability, stability and overall lower complexity, as well as moving more efficiently and quietly.

Programme(s)

Topic(s)

Call for proposal

FP7-ICT-2007-3

Funding Scheme

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Higher or Secondary Education Establishments

EU contribution
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