IEEE Transactions on Cognitive and Developmental Systems

Special Issue on Bio-inspired Social Robot Learning in Home Scenarios

I. Aim And Scope

There has been considerable progress in robotics in the last years allowing robots to successfully contribute to our society. We can find them from industrial environments, where they are nowadays established, to domestic places, where their presence is steadily rising. The proposed special issue intends to explore the following question: "How well prepared are learning robots to be social actors in daily-life home environments in the near future".

The special issue is therefore not only an opportunity to address this focuses on the latest scientific contributions on bio-inspired learning and social robotics, but also links them with a clear focus to push the presence of robots in people's daily-life environment. Thus, one main goal of the special issue is offering a common foundation for roboticists from different fields of expertise to contribute beyond the current state-of-the-art of learning methods in robotics especially applied to home scenarios and recent developments in assistive

Roboticists are aware of the big challenges that involve working with service and assistive robots in home environments to develop real robot domestic applications. For instance, the RoboCup initiative founded a specific league "RoboCup@Home league" to aim the development of highly interactive intelligent robots to perform tasks in new and complex environments while being able to anticipate and resolve conflictual situations that may lead to mistakes or incomplete performance. Such complex learning tasks in home environments include among others learning to:

- Provide help in home services.
- Wipe/tidy up a table, floor, or room.
- Cook a meal.
- Be of assistance for elderly people.
- Be a conversational companion.

Each of these domestic activities have been mostly investigated and developed as more simple restricted tasks in controlled environments. However, the learning and further development of real complex tasks in actual dynamic scenarios is still an open issue in robotics. Intelligent robots operating around us should be able to know where it is located itself, detect people, learn and recognize faces, learn new objects, understand action-object opportunities, and furthermore they should learn to behave cooperatively in domestic scenarios.

In order to accomplish these complex domestic tasks successfully, robots and roboticists have to deal with many challenges such as perception, pattern recognition, navigation, and object manipulation, all of that in varying environmental conditions. Such challenges can only be addressed if the robot constantly acquires and learns new skills, either autonomously or from parent-like trainers. The special issue principally targets bio-inspired developmental learning and psychologically motivated approaches for domestic environments. These bio-inspired learning approaches are motivated by how humans develop knowledge through interactions with their environment.

II. Themes

This special issue aims to report state-of-the-art approaches and recent advances on developing learning approaches in domestic robotic applications. Indicative example approaches with particular interest for this special issue include, but are not limited to:

- Interactive reinforcement learning.
- Policy and reward shaping.
- Neural learning of object affordances and contextual affordances.
- Predictive learning from sensorimotor information.

- Learning understanding of environment ambiguity.
- Learning with hierarchical and deep neural architectures.
- Bootstrapping complex action learning in robots.
- Learning supported by external trainers, by demonstration and imitation.
- Parental scaffolding as a bootstrapping method for learning.

In this context, learning can be understood as a perceptual or behavioral problem which can be addressed by bio-inspired social methods and different forms of learning.

III. Submission

The special issue will be open for all submissions which will be independently peer-reviewed. Manuscripts should be prepared according to the "Information for Authors" of the journal, found at http://cis.ieee.org/publications.html, and submitted through the IEEE TCDS Manuscript center: https://mc.manuscriptcentral.com/tcds-ieee under the category: "SI: Social Robots". Papers submitted must not have been published previously, though they may represent significant extensions of prior work.

IV. Important Dates

31 January 2017 – Deadline for manuscript submission.

15 April 2017 – Notification of authors.

15 May 2017 – Deadline for revised manuscripts.

15 June 2017 – Final decisions.

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