Special Session on General Intelligence in Embodied Agents

within: 2013 IEEE Symposium on Computational Intelligence for Human-like Intelligence (CIHLI)

One critical aspect of human-like intelligence is the capability to control bodies in the pursuit of a variety of human-like goals in environments, especially environments resembling the everyday human world. The achievement of this capability may be pursued via robotics, or via embodying synthetic intelligent software in virtual agents in virtual worlds such as 3D videogame-like worlds. Controlling embodied agents carrying out a variety of complex goals in complex environments is a difficult problem, requiring robust generalization and transfer learning ability, and practical creativity. Confronting this problem places various sorts of stringent requirements on the underlying computational intelligence system, which different architectures may seek to fulfill in different ways.

The focus of this special session is on *how architectures designed with artificial general intelligence in mind, cope with the challenges involved in achieving goals involving controlling bodies in worlds, especially worlds bearing some resemblance to the everyday human world.*

Topics

This Special Session is open to contributions on any topic directly related to the interfacing between artificial general intelligence architectures and the problem of controlling bodies in worlds resembling the everyday human world. Contributions presenting empirical or mathematical results are very welcome; contributions

describing new approaches at an earlier stage of development are welcome as well, if the ideas are novel and clearly presented and argued for.

Specific topics of interest include (but are definitely not limited to):

- **Symbol grounding:** Learning of groundings for words and/or syntactic and/or semantic relationships, via experience interacting with objects and entities in a world
- **Adaptive perception**: Perception of objects and events in a world, in a manner that displays some adaptiveness, i.e. ability to perceive objects and events qualitatively different from those for which a system was previously trained or programmed
- **Adaptive control**: Learning patterns of actuator control in a manner that displays strong adaptiveness, i.e. ability to learn to carry out actions qualitatively different from those for which a system was previously trained or programmed
- **Entity identification**: Identification of which groups of percepts or atomic objects in a world are sensibly grouped together as a coherent "entity"
- **Event identification**: Identification of which groups of temporal happenings in a world are sensibly grouped together as a coherent "event"
- **Spatial, temporal and spatiotemporal reasoning**: Inference about objects and events in a world, in a manner that takes careful account of the spatial and temporal relationships between them
- **Self-modeling**: Building a model of the agent's mental and physical self based on the agent's observations of its own interactions in the world
- **Modeling of other Agents**: modeling of other agents, in terms of their likely behaviors in various contexts in the world
- **Theory of mind**: modeling of other agents, in terms of the

knowledge and beliefs on which their actions are based
- **Autonomy**: the capabilities of an embodied AGI to find itself its own motivations and goals.
- **Sensorimotor integration**: methodologies for linking perception with action in an embodied AGI.

Special Session Chair

Ben Goertzel, Novamente LLC and Hong Kong Polytechnic University, (ben@goertzel.org)

Special Session Organizing Committee

The organizing committee comprises leading researchers with expertise in both AGI and cognitive robotics.

- **Itamar Arel**, University of Tennessee, Knoxville TN, USA
- **Joscha Bach**, Humboldt University, Germany
- **Antonio Chella**, University of Palermo, Italy
- **David Hanson**, Hanson Robotics, Austin TX, USA
- **Matthew Ikle'**, Adams State College, USA
- **Stephen Reed**, TexAI, Austin TX, USA
- **Brandon Rohrer**, Sandia Labs, New Mexico, USA
- **Pei Wang**, Temple University, Philadelphia, USA