Adaptability and Embodiment using Multi-Agent Systems

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1 The Embodiment and the Adaptability

What does *embodiment* mean? Is it a running process? Is it required in order to be adaptive? Is it important to distinguish between high-level and low-level cognition processing in order to talk about embodiment and adaptability? Is there a distinction between social embodiment and self-embodiment? What are the best models for behaviour and embodiment? Those questions have been wandering in our minds for a long time, and they have encouraged us to organise a forum to discuss about the meaning and the role of adaptability and embodiment in Multi-Agent Systems (MAS), our subject of research.

Adaptability and embodiment are key concepts of living systems. These notions are very important when designing adaptive MAS, systems composed of multiple autonomous entities that inhabit a dynamic and unpredictable environment, and usually have goals.

> We define **adaptability** as the property of a MAS of improving its competence based on its experience. **Embodiment** denotes, for us, the ability of such a system to set-up a self-representation in the environment.

The problem of generation and maintenance of an *image* of itself is a deep question in the system design. A large and diverse community in the fields of Artificial Intelligence, Artificial Life and Robotics is concerned with this problem. We consider that the MAS approach is very appropriate for studying the notions of adaptability and embodiment, due to the need of flexible systems, which are able to modify the relationships between their components and determine their behaviour in an emergent, bottom-up way.

2 The Workshop

We have selected two papers presented during the AEMAS Workshop, an affiliated event of the Advanced Course on Artificial Intelligence, ACAI 2001, celebrated in Prague in July 2001. These papers reflect the diversity of the subjects treated during AEMAS.

- The first paper is signed by Frances Brazier, Maarten van Steen and Niek Wijngaards and treats the problem of distributed shared agents. They consider the notion of embodiment from the point of view of representation of agents. Their paper addresses important issues involved in the replication of software agents.
- Samuel Landau and Sebastien Picault are the authors of the second paper. They are concerned with the adaptiveness of MAS. Their paper describes a model to develop adaptive multi-agent systems, based on an evolutionary approach.

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