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Introduction (EN)

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Multi-agent systems (MAS) serve to provide various approaches, models and tools that go toward addressing the complexity of today's computer systems (openness, scalability, interdependence, etc.). It is for this reason that the multi-agent paradigm leads designers to consider these systems as groups of autonomous agents offering local reasoning, while only presenting partial glimpses of the overall system to which they belong. Since they possess neither all of the knowledge nor all of the skills required to achieve the various local and global objectives, these agents thus interact, cooperate and self-organize.

The Journées Francophones sur les Systèmes Multi-Agents (JFSMA) is the annual community gathering for French-speaking researchers who are studying, using and furthering the multi-agent paradigm. Its multidisciplinary foundations have led to a wide range of approaches resulting in numerous agent, interaction, organizational and environmental models.

This special issue of the ROIA journal strives to illustrate this diversity by drawing on the revised and extended versions of eight articles that were presented during the 29th edition of the JFSMA.

Mickaël Bettinelli, Michel Occello and Damien Genthial propose an agent architecture in order to resolve the issue of generating coalition structures. Their studies are rooted in a circular economy problem encountered while establishing a component reuse strategy in a production system. The underlying model is based on the principles of attraction stemming from research in the domain of human and social sciences.

Rémy Chaput, Jérémy Duval, Olivier Boissier, Mathieu Guillermin and Salima Hassas focus on taking moral values into consideration within artificial systems. More specifically, they present a multi-agent approach that combines symbolic reasoning with reinforcement learning in order to enhance the ethical behavior of such systems. This contribution is evaluated by running a simulation on an energy distribution problem within the context of a Smart Grid.

Jean-Paul Delahaye and Philippe Mathieu put forward an experimental study of convergence phenomena within the framework of ecological competitions pertaining to the iterated prisoner's dilemma. Competition and cooperation are two fundamental

concepts in the multi-agent community. As the title of the article suggests, their work considers the opposing ideas of individualism versus communal solidarity.

Félix Quinton, Christophe Grand and Charles Lesire take an active interest in multi-robot patrolling, wherein communications have a limited range. Their article presents an auction-based algorithm designed to address the issue of assigning site observation tasks to different robots. The authors introduce a variant into the bidding calculation in order to maintain the connectivity between robot agents.

Alexandre Bonnefond, Olivier Simonin and Isabelle Guérin-Lassous investigate various flocking models derived from the field of "artificial life", and propose a set of extensions for improving two of them. They strive to alleviate any potential communication issues that may be caused by the presence of physical obstacles and thereby avoid, for example, the regular fragmentation that robot formation tends to be subjected to.

Gauthier Picard presents two distributed approaches for scheduling observation tasks in a constellation of satellites where users have exclusive access to certain segments of the orbit. The methods put forward in this article are experimentally evaluated using scenarios generated on the basis of real Earth observation logs.

Alaa Daoud, Flavien Balbo, Paolo Gianessi and Gauthier Picard propose a resource allocation system that is applied to the placement of passengers in a fleet of vehicles. Passenger allocation to the vehicles is decentralized, and the various coordination strategies among vehicle agents are evaluated experimentally.

Ellie Beauprez, Anne-Cécile Caron, Maxime Morge and Jean-Christophe Routier address the issue of task reallocation for load balancing within distributed models of big data processing. The relevance of their contribution lies in a decentralized approach that leads agents to establish competing bilateral negotiations, thereby enabling a continuous improvement in overall completion time.

This corpus of articles serves to illustrate the wealth of sources of inspiration when it comes to research within the French-speaking multi-agent community, particularly as regards the human, economic and social sciences. While the diversity of the applications presented does indeed reflect numerous elements that promote the development of models and tools, contributions dealing with multi-agent software engineering are unfortunately lacking. This line of work saw its golden age in the early 2000s, although the complexity in the design of future applications will undoubtedly provide this niche with a new impetus.

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