Special Issue – Call for Paper

Special Issue on **Agent-Directed Simulation**

Agent-directed simulation considers full synergistic relations of the modeling and simulation discipline with software agents. It consists of three distinct, yet related areas that can be grouped under two categories as follows:

- ***Contribution of simulation to agents*** *(or agent simulation)*. This is simulation of agent systems (or agent-based models) in engineering, human and social dynamics, military applications etc. It is commonly called "agent-based simulation" when the other aspects of the synergy are not taken into account.
- ***Contribution of agents to simulation*** *which has two aspects:*
    - ***As a support facility***
        - Agents can support *front-end user/system interface functions*, e.g., problem specification; or *back-end user-system interface functions*, e.g., data compression, explanation, problem and/or solution documentation, and solution selection.
        - Agents can also *enhance cognitive capabilities of modeling and simulation systems*, e.g., by providing understanding and multi-understanding abilities.
    - Use of agents for **simulation run-time activities**, e.g., model behavior generation, agent-monitored model update and agent-monitored dynamic coupling.

Topics for this Special Issue include but are not limited to the following:

Theory/methodology

- High-level (declarative and customizable) agent specification languages for modeling and simulation.
- Distributed simulation for multi-agent systems.
- Formal models of agents and agent societies.
- Advanced agent features for agent-directed simulation: e.g.:
    - Holonic agents for cooperation and coopetition modeling and simulation including ethical limits of cooperation.
    - Agents with personality, agents with dynamic personality, agents with emotions, agents having different types of intelligence such as emotional intelligence, agents with multi-intelligence.
    - Influence of cultural backgrounds in agent-directed simulation.
    - Agents with several types of understanding abilities such as multi-vision and switchable understanding abilities, trustworthy agents, and moral agents in simulation.
    - Agents in model specification, design of simulation experiments, and analysis of results.
    - Agents in triggering and monitoring of simulation experiments, including dynamic model composition, run-time submodel selection in simulation with multi-models as well as run-time dynamic coupling.
    - Agents to monitor multi-simulation studies.
    - Verification, validation, testing; quality assurance; as well as failure avoidance in agent-directed simulations.

Technology, tools, toolkits, and environments

- Agent infrastructures and supporting technologies, e.g., interoperability, agent-oriented simulation software engineering environments.
- Modeling, design, and simulation of agent systems based on service-oriented technologies, pervasive computing, web-services, grid computing, cloud computing, autonomic computing, ambient intelligence.
- Agent architectures, platforms, and frameworks.
- Standard APIs for agent simulation programming.

Applications

- Simulation modeling of agent technologies at the organization, interaction (e.g., communication, negotiation, coordination, collaboration) and agent level (e.g., deliberation, social agents, computational autonomy).
- Application of agent simulations in various areas such as biology, business, commerce, economy, engineering, environment, individual, group, and organizational behavior, management, simulation gaming/training, social systems.
- Conflict management simulation with holonic agents.
- Modeling and simulation of emergence.
- Simulation-based anticipatory displays for socio-economic systems as well as engineering systems.

The theme of this Special Issue is based on the observation of the following premises:

- The use of emergent agent technologies at the organization, interaction (e.g., coordination, negotiation, communication) and agent levels (i.e. reasoning, autonomy) are expected to advance the state of the art in various application domains. However, modeling and testing complex agent systems that are based on such technologies is difficult. Using agent-supported simulation techniques for testing complex agent systems is up and a coming field.
- The growth of new advanced computing and communication possibilities along with the rapid rise of e-commerce, cloud computing, Internet of things are providing a new context that acts as a critical driver for the development of next generation systems. These standards revolve around service-oriented technologies, pervasive computing, web-services, Grid, autonomic computing, ambient intelligence etc. The supporting role that intelligent agents play in the development of such systems is becoming pervasive, and simulation plays a critical role in the analysis and design of such systems.
- To facilitate bridging the gap between research and application, there is a need for high-level declarative agent specification languages, methodologies, and tools for all three categories of agent-directed simulation. Existing agent-based simulation tools are still not mature enough to enable developing agents with varying degrees of cognitive capabilities and helping users in problem solving and providing advanced help in monitoring and mediating simulation studies.

Instructions for Manuscript Preparation

- For manuscript formatting and other guidelines, please visit the **Author Guidelines for SIMULATION**

Due Dates

Submission for full papers:	Dec 15, 2015
Notification of Acceptance	Mar 31, 2016
Expected date of publication:	TBD. Papers will be published online as soon as accepted.

Submissions for Full Paper Review

*All manuscripts must be submitted electronically through the paper submission system to the **SIMULATION Manuscript Submission System**. Please note in your online cover letter that your submission is for this special issue.*

Please contact the Guest Editors if you have any questions.

Note: Manuscripts must not have been previously published or be submitted for publication elsewhere. Any paper submitted to an SI which is an extended version of a Conference Papers should be significantly different from the original Conference submission. It is suggested that the paper have at most 30% of overlap with the original submission. Each submitted manuscript must include title, names, authors' affiliations, postal and e-mail addresses, an extended paper, and a list of keywords. For multiple author submission, please identify the corresponding author.

Final paper submissions

Each final submission must be prepared based on the Simulation journal requirements (see **Author Guidelines for SIMULATION** page).

Guest Editors:

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