CALL FOR PAPERS

2018 Summer Simulation Multi-Conference

50th Summer Computer Simulation Conference

MSCIAAS 2018

Modeling and Simulation of Complex, Intelligent, Adaptive and Autonomous Systems

July 9-12, 2018

Bordeaux, France

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The increasing popularity of the Internet of Things, or IoT metaphor emphasizes that heterogeneous systems are the norm today. A system deployed in a netcentric environment eventually becomes a part of a system of systems (SoS). This SoS also incorporates adaptive and autonomous elements (such as systems that have different levels of autonomy and situated behavior). This makes design, analysis and testing for the system-at-hand a complex endeavor in itself.

Testing in isolation is not the same as a real-system operation, since the system's behavior is also determined by the input, which evolves from the environment. This exact factor is difficult to predict, due to an ever-increasing level of autonomy. Advanced Modeling and Simulation (M&S) frameworks are required in order to facilitate SoS design, development, testing, and integration. In more particular, these frameworks have to provide methods to deal with intelligent, emergent, and adaptive behavior as well as autonomy making them complex.

The subject of emergent behavior and using M&S of evaluating emergent behaviors takes the center stage in such systems as it is unknown how a particular system responds in the face of emergent behavior arising out of interactions with other complex systems. Intelligent behavior is also defined as an emergent property in some complex systems. Consequently, systems that respond and adapt to such behaviors may be called intelligent systems as well.

This track has two objectives.

The first objective aims to focus on M&S of the following aspects of complex SoS engineering and brings researchers, developers and industry practitioners working in the areas of complex, adaptive and autonomous SoS engineering that may incorporate human as an integral part of SoS operations. This objective covers the following topics:

- Theory for adaptive and autonomous systems
- Intelligence-based systems
- Computational intelligence and cognitive systems
- Human-in-the-loop systems
- M&S Frameworks for intelligent behavior
- Methodologies, tools, and architectures for adaptive control systems
- Knowledge engineering, generation and management in IAAS
- Weak and Strong emergent behavior, Emergent Engineering
- Complex adaptive systems engineering
- Self-* (organization, explanation, configuration) capability and collaborative behavior in IAAS
- Applications to robotics, unmanned vehicles systems, swarm technology, semantic web technology, and multi-agent systems
- Netcentric IAAS
- Live, Virtual and Constructive (LVC) environments
- Simulator design for IAAS systems
- Modeling tools for IAAS design
- Modeling, engineering, testing and verification of complex behavior
- Development and testing of complex and distributedsystems
- Modeling, simulating, and testing IoT environments and applications

The second objective is to advance the science of complexity as applicable in M&S discipline. Complexity is a multi-level phenomenon that exists at structural, behavioral and knowledge levels in such SoSs. Emergent behavior is an outcome of this complexity. Understanding emergent behavior as an outcome of this complexity will provide foundation for resilient intelligent systems. Following are some of the topics related to this objective, but not limited to usage of M&S to address:

- Complexity in Structure: network, hierarchical, small-world, flat, etc.
- Complexity in Behavior: Micro and macro behaviors, local and global behaviors, teleologic and epistemological behaviors
- Complexity in Knowledge: ontology design, ontology-driven modeling, ontology-evaluation, ontology transformation, etc.
- Complexity in Human-in-the-loop: artificial agents, cognitive agents, multi-agents, man-in-loop, human-computer-interaction
- Complexity in intelligence-based systems: Situated behavior, knowledge-based behavior, memoic behavior, resource-constrained systems, energy-aware systems
- Complexity in adaptation and autonomy
- Complexity in architecture: Flat, full-mesh, hierarchical, adaptive, swarm, transformative
- Complexity in awareness: Self-* (organization, explanation, configuration)
- Complexity in interactions: collaboration, negotiation, greedy, rule-based, environment-based, etc.
- Complexity in Live, Virtual and Constructive environment
- Complexity in Artificial Systems, Social systems, techno-economic-social systems

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- Complexity in Model Engineering of complex SoS
- Complexity in Model Specification using modeling languages and architecture frameworks such as UML, PetriNets, SysML, DoDAF, MoDAF, UAF, etc.
- Complexity in Simulation environment engineering: distributed simulation, parallel simulation, cloud simulation, netcentric parallel distributed environments
- Complexity in Testing and Evaluation tools for SoS engineering
- Complexity in Heterogeneity: Hardware/Software Co-design, Hardware in the Loop, Cyber Physical Systems, the Internet of Things
- Metrics for Complexity design and evaluation
- Verification, validation and accreditation of Complexity in SoS
- Application of Complexity aspects in domain engineering: Financial, Power, Robotics, Swarm, Economic, Policy, etc. SoS Failure due to Complexity

Submission Guidelines

Original, high-quality technical papers are solicited for review, possible presentation and subsequent publication in the conference proceedings. For further instructions, please refer to the Submission Instructions in the SCS Conference Proceedings Management System web site. Contributed papers are 12 pages long with single column format. For author guidelines on how to submit a paper go to: http://scs.org/authorskit/. They will be peer reviewed and – if accepted and presented at the conference – possibly submitted to the ACM and IEEE Digital Libraries. Papers must not have appeared before (or be pending) in a journal or conference with published proceedings, nor may they be under review or submitted to another forum during SummerSim'18 review process. At least one author of an accepted paper must register for the symposium and must present the paper at the symposium.

Symposia or Workshops Proposition

A call for Symposia or Workshops is open (see important dates), to raise visibility on topics of focused interest in a particular scientific or applications area. Proposals for special Symposia or Workshops should be submitted by e-mail to Saurabh Mittal (smittal@mitre.org).

Important Dates

Full Paper submission: March 2, 2018
Author Notification: May 4, 2018
Submission of WIP papers: May 11, 2018
Notification of WIP papers: May 18, 2018
Camera-ready Paper: May 25, 2018

Contact

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