SIMULATION

Call for Papers for Special Issue:

Modeling and Simulation for Software-Intensive Systems: from IoT to Digital Twins

Digital Twins (DT) constitute the latest evolution of software-intensive systems and have been a transformational trend in many domains, such as smart manufacturing, precision healthcare, and smart energy management. By enabling real-time synchronization with its physical counterpart, a DT can provide descriptive, diagnostic, predictive, and prescriptive functionalities. Many of these functionalities are enabled by simulation. Due to the multidisciplinary nature and complexity of DTs, their correct and efficient development is especially challenging.
Cyber-Physical Systems (CPS) are primary candidates for digital twinning. They are well-entrenched in our daily lives as the primary means of combining cyber (digital) reasoning capabilities with real systems, their environments, and their physical surroundings.
The Internet-of-things (IoT) is the collection of physical objects, typically with sensing and/or acting capabilities. As such, IoT is the physical connectivity underpinning CPS and by extension, DTs.

As the next generation of systems is expected to be more value-driven than ever, it is important to shed light on the state-of-the-art results and remaining challenges at each of these three realms, as well as the cross-cutting concerns, such as extra-functional properties and development processes spanning across the three realms. To this end, this Special Issue focuses on new developments in Modeling and Simulation (M&S) in support of the design, operation, and maintenance of modern software-intensive systems, spanning from IoT, through CPS, to DTs, or any combination thereof.

Topics of interest

- Foundations and methods
  - Modeling and simulation methods for the broader Digital Twin, CPS, and IoT domains
  - (Co-)simulation by and for Digital Twins and CPS
  - Verification, Validation, and Uncertainty Quantification (VVUQ)
- Applications and tools
  - Advanced manufacturing, Industry 5.0, Digital Thread, Internet of Production (IoP), etc.
  - Tools, architectures, and infrastructures for Digital Twins, CPS, IoT
  - Case studies, industry applications, and experience reports
- Machine learning and optimization for Digital Twins, CPS, and IoT
  - Inference methods for model and simulator construction
  - AI-augmented methods and explainability
  - Search-based methods and optimization
- Empirical, secondary, and tertiary studies
  - Performance evaluations, energy profiling, user studies
  - Surveys, reviews, mapping studies, meta-reviews
  - Patterns and catalogs
- Human factors and sustainability
  - Simulation for or by the human-in-the-loop
  - Sustainability aspects of complex systems and their engineering
- Lifecycle models, agile methods, DevOps, TwinOps, etc
- Frameworks, standardization, certification

We welcome manuscripts that contribute to the topics of interest in the form of novel research methodologies, reviews, or case studies. This SI does not solicit short papers and vision papers.

Instructions for Manuscript Preparation

For manuscript formatting and other guidelines, please visit the Author Guidelines for SIMULATION page at https://scs.org/publications.
Manuscripts should be prepared and submitted at http://mc.manuscriptcentral.com/simulation. Please note in your online cover letter that the paper is submitted for the special issue **Modeling and Simulation for Software-Intensive Systems: from IoT to Digital Twins**.

Manuscripts must not have been previously published or be submitted for publication elsewhere. Each submitted manuscript must include title, names, authors' affiliations, postal and email addresses, and a list of keywords. For multiple author submissions, please identify the corresponding author.

Journal-first presentation eligibility at the Annual Simulation Conference (ANNSIM)

Papers that are of high quality and (1) are not extensions of previous conference papers and (2) receive a notification of acceptance by March 1, 2024, might be eligible for the journal-first initiative of the 2024 Annual Modeling and Simulation Conference (ANNSIM). Journal-first presentations are presentations of papers at ANNSIM that previously appeared in SIMULATION.
This initiative allows journal paper authors the opportunity to reach a broader audience with their work, and benefits the conference program by including research talks with deeper scientific depth than a traditional conference submission.
Papers are selected from recently accepted/published SIMULATION papers. The acceptance of the invitation is left to the discretion of the authors.

Important Dates

- Submission deadline: ~~November 22, 2023~~ **February 18, 2024 (Extended!)**
- Notification: in 8 weeks

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