Call for Papers | ICSA 2024 | Hyderabad/India | June 4-5, 2024

3rd Joint International Workshop on Digital Twin Architecture (TwinArch) and Digital Twin Engineering (DTE) at ICSA 2024

Workshop Organizers

Dr. Pablo Oliveira Antonino, Fraunhofer IESE, Kaiserslautern, Germany

Prof. Dr. Flavio Oquendo, IRISA – Univ. Bretagne Sud, Vannes, France

Prof. Dr. Bedir Tekinerdogan, Wageningen University & Research, Wageningen, The Netherlands

Vinay Kulkarni, TCS Research, Pune, India

Ruth Breu, Department of Computer Science, University of Innsbruck, Innsbruck, Austria

Nour Ali, College of Engineering, Design and Physical Sciences, Brunel University, London, UK

Philipp Zech, Department of Computer Science, University of Innsbruck, Innsbruck, Austria

Tony Clark, College of Engineering and Physical Sciences, Aston University, Birmingham, UK

Balbir Barn, Faculty of Science and Technology, Middlesex University, London, UK

Souvik Barat, TCS Research, Pune, India

Scope

This 3rd Joint International Workshop on Digital Twin Architecture (TwinArch) and Digital Twin Engineering (DTE) will provide researchers and practitioners with a unqiue forum to exchange ideas and experiences, analyze research and development issues, discuss promising solutions, and propose inspiring visions for the future in the field of digital twins and their applications in various fields, from manufacturing to socio-economic systems, from the combined perspective of software architecture and systems and software modeling. It aims to increase the awareness of the role of digital twins in software architecture and systems engineering and to address the importance of the modeling and architecture of digital twins and of complex systems with digital twins.

Topics

We solicit submissions around the following main research topics in the field of digital twins in software architecture (but not limited to these):

Software Architecture Description for and with Digital Twins:

- Architectures of digital twins, including digital threads and digital shadows;
- Architectures for cyber-physical systems with digital twins;
- Integration of multiple stakeholders' concerns into the software architecting process of digital twins;
- AI in the architecture of digital twins, e.g., AI for generating simulation models for digital twins;
- Case studies of software-reliant systems architectures involving digital twins.

From Software Architecture Models to Executable Simulation Models:

- (Semi-)formal approaches supporting architecture models with digital twins at design time / runtime;
- Approaches to (semi-)automatically create simulation models from architecture;
- Architecture frameworks for the development of digital twin architectures from multiple viewpoints;
- Case studies involving simulations to guide systems architecture development.

Digital Twins for Adaptive Systems / Software Architectures:

- Software architecture practices to support adaptations;
- AI technologies for adaptation (e.g., case-based-reasoning, reinforcement learning);
- Cognitive digital twins;
- Case studies of adaptive architectures.

Digital Twins and Continuous Engineering Practices:

- Runtime verification of systems with digital twins;
- Monitoring the quality of systems using digital twins;
- Self-validation of digital twins;
- Case studies of continuous engineering using digital twins.

Models, Methods, and Techniques for Developing Digital Twins:

- Requirements engineering for digital twins;
- Conceptual modeling for socio-techno-economic systems;
- Knowledge management for capturing domain knowledge;
- Methods and models for capturing the inherent uncertainty of business and societal systems;
- Simulation of business and social systems;
- Multi-paradigm modeling and co-simulation techniques;
- Validation and verification of digital twins.

Technology and Its Applications:

- Application of enterprise modeling techniques for digital twin initiatives from different domains;
- Relevance of AI and optimization techniques.

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Submission

- Full research papers (12 pages + 2 extra pages for references), describing a novel idea or approach about software architecture techniques and solutions for or with digital twins;
- Short position papers (8 pages + 2 extra pages for references), describing promising research actions not fully validated;
- Industry papers as case studies (8 pages + 2 extra pages for references) about software architecture solutions for or with digital twins partially or fully validated in a real industry setting, respectively lessons learned from industry;
- Industrial talk submissions: Besides the deadlines for peer-reviewed submissions, the workshop will accept industry talk submissions. Their selection will be managed directly by the workshop chairs. Please note that industry talk submissions will not be included in the proceedings.

Papers will be submitted using EasyChair.

ICSA 2024 will use a two-step process for workshop proceedings. Online proceedings (available before the start of the conference) will include all the papers acceptedfor the workshops and will be published online on the ICSA 2024 website (no proceedings). The accepted papers will be accessible only by the ICSA 2024 workshop participants and the format should conform to IEEE (see the ICSA 2024 submission format).

Selected and extended papers of the workshops will be published in a IEEE volume (up to 8 pages). Workshop papers submitted for the post-proceedings will undergo a minor revision cycle where the extensions with respect to the workshop versions will be checked by the reviewers.

Authors' Schedule (2024) | Important Dates:

- **Paper submission:** ~~**18 February 2024**~~ **25 February 2024**
- **Author notification:** **17 March 2024**
- **Camera-ready paper:** **31 March 2024**

https://www.iese.fraunhofer.de/en/twinarch.html

Fraunhofer universität innsbruck tcs Research Aston University Brunel University London Middlesex University