



Call for Papers

SS05 – Evaluation Methods for Autonomous Cyber-Physical Systems' Behavior

Organized and Chaired by

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FOCUS. Global competition, shorter product life cycles and highly volatile markets are putting a strain on operations in manufacturing, process, logistics and energy systems. Many industries are facing a shortage of workers today and given these trends, production of essential goods as well as the operation of such systems are going to be at risk due to missing workers and operators.

To tackle these challenges, a higher degree of autonomy in cyber-physical systems (CPS) operations can be considered. Such autonomous CPS represent technical constructs which make decisions without the intervention of humans. In addition, autonomous CPS can be characterized by the ability to execute processes systematically, the ability to adapt to environmental changes and the ability to self-govern resources. However, due to these characteristics, the behavior of such systems is not always easily explainable and predictable. Thus, methods for the evaluation of the behavior of such systems are of increasing importance.

Evaluating these systems encompasses testing, verifying, diagnosing and explaining (inter-)actions as well as analyzing performance. Suitable methods can be data-driven (incl. Generative AI) and knowledge-driven as well as simulation-based. Potential use cases can be, for example, a simulation-based selection of the most appropriate goals to follow by autonomous CPS or explaining actions of autonomous CPS to operators.

TOPICS

Topics for the session include, but are not limited to:

- ❖ Simulation-based evaluation of autonomous CPS' behavior
- ❖ Verification of system goals and requirements
- ❖ Testing intelligent control algorithms (multi-agent systems, reinforcement learning or model-predictive control) for autonomous CPS
- ❖ Data-driven methods for autonomous CPS' identification and adaption
- ❖ Real-time diagnosis and decision making in autonomous CPS' operation
- ❖ Integration of Explainable AI (XAI) for enhanced autonomous CPS' transparency
- ❖ Real-time decision support approaches for autonomous CPS' supervision
- ❖ Evaluation of human-autonomy interaction in remote and autonomous operation
- ❖ (Real-time) Safety and regulatory compliance evaluation of autonomous CPS
- ❖ Performance and test-beds for the evaluation of autonomous CPS
- ❖ Evaluation of degrees of autonomy in autonomous CPS

AIM

This Special Session is designed to unite experts from both the industrial and academic spheres to discuss the latest innovations, developments, research outcomes, and practical successes in assessing the behavior of autonomous CPS. As such, it serves as a venue for presenting recent progress and breakthroughs, sharing novel concepts, and promoting collaborations as well as future research partnerships.

SOLICITED PAPERS

- ◆ Original Research (Regular) ◆ Surveys ◆ Industry practice ◆ Work-in-progress

The working language of the conference is English, For submission rules, please refer to the Author's Instruction on the conference website.

PAPER ACCEPTANCE

Accepted, registered, and presented papers will be copyrighted by IEEE and published in the conference proceedings. The proceedings will be available in the IEEE Xplore® Digital Library. The final manuscript must be accompanied by a registration form and a registration fee payment proof and it is mandatory that at least one author attends and presents the paper at the conference. Failure to adhere to these guidelines may result in paper exclusion from post-conference distribution via IEEE Xplore by the ETFA 2024 Organizing Committee. All conference attendees must pay the conference registration fee and cover their own personal expenses for travel and accommodations.

AUTHOR'S SCHEDULE 2024

❖ Regular and special sessions papers

Submission deadline **April 28th**
Acceptance notification **May 31st**
Deadline for final manuscripts **July 1st**

❖ Work-in-progress/ Industry practice papers

Submission deadline **May 26th**
Acceptance notification **June 17th**
Deadline for final manuscripts **July 1st**