Workshop on Software Engineering in Cyber-Physical Production Systems (SECPPS), 2nd Edition

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Abstract: This workshop focuses on Software Engineering in Cyber-Physical Production Systems (SECPPS). SECPPS is an interactive workshop opened by keynotes and lightning talks, followed by project showcase presentations, and concluded by extensive discussions in break-out groups. The main output of SECPPS 2022 is an updated research roadmap as well as concrete networking activities to further grow the community in this interdisciplinary field.

Keywords: Software Engineering; Cyber-Physical Production Systems; Workshop

1   Context and Motivation

Software is nowadays the innovation driver in assuring effective and efficient engineering and operation of industrial automation systems. However, the traditional software engineering methods applied in this field are challenged by emerging methods where tremendous progress has been made in the last years in the general field of engineering and operating software-intensive systems. At the same time, the community is currently facing a dramatically increasing complexity in the engineering and operation of systems with the emergence of Cyber-Physical Production Systems (CPPS). To tackle this complexity increase, concepts, techniques, methods, and technologies are required to build systematic and comprehensive views of all aspects of CPPS, e.g., mechanics, electronics, software, and network, not only in the engineering phase, but in the operation phase as well. Moreover, more flexible methodologies are needed to adapt existing systems to ever-changing requirements and tasks, unexpected conditions, as well as structural transformations [Mo14].

The aim of this workshop is to discuss new emerging trends for the engineering and operation of software in the field of CPPS. A particular focus is on the current challenges [Vo15] the community is facing in adopting these emerging software engineering concepts, techniques, and technologies and best practices to tackle the open challenges.

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2   Program, Format, and Topics

SECPPS employs an interactive format to stimulate group discussions which potentially lead to further inter-disciplinary research activities such as joint publications, projects, demonstrators, and research networks.

To reach this goal, two keynote speakers, one from the SE community as well as one from the CPPS community, present current research efforts in the two fields in order to set the stage for the workshop. The keynotes are followed by lightning talks and project showcase presentations to complement the presented viewpoints. For each presentation, questions, challenges, and provocative statements are collected to be potentially discussed in break-out groups in the afternoon sessions. The collected data from the morning sessions is clustered in common topics which are discussed in break-out groups in the afternoon. The results of the break-out groups are presented by the group leaders and reflected in the large audience to come up with an update of the collaborative research roadmap established in the workshop's first edition in 2021 and networks to identify further potential collaborations are initiated.

We foresee the following initial list of topics for discussions at the workshop:
- Engineering Process (Requirements, Design, Implementation, Verification & Validation, ...)
- Operation and Evolution (Data-driven, Continuous Integration, DevOps, Digital Twins, Agile, ...)
- Languages (DSLs, GPLs, standards, ...)
- Modeling (MDD, MDE, Transformations, Interoperability, Code generation, ...)
- Teaching (How to train SE in other disciplines, open courseware, ...)
- Management (Variability, Modularization, Configuration, Versioning, ...)
- Usability and SE Tools (Adoption, User Interactions, Needs, ...)
- Emerging Technologies (Cloud, AI, IoT, ...)
- Intelligent Organization (Multi-Agent Systems, Flexible Architectures, Adaptive Systems, ...)
- Interdisciplinary Collaboration (Interfaces, Conflict Management, Optimization, Distributed Work, ...)

3   Website and Further Information

See `https://rickrabiser.github.io/secpps-ws/` for more information.

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