ICONS 2023

Forward

The Eighteenth International Conference on Systems (ICONS 2023), held between April 24th and April 28th, 2023, continued a series of events covering fundamentals on designing, implementing, testing, validating, and maintaining various kinds of software and hardware systems. The topics were addresses from theory to practice, in terms of methodologies, design, implementation, testing, use cases, tools, and lessons learnt.

In the last years, new system concepts have been promoted and partially embedded in new deployments. Anticipative systems, autonomic and autonomous systems, self-adapting systems, or on-demand systems are systems exposing advanced features. These features demand special requirements specification mechanisms, advanced behavioral design patterns, special interaction protocols, and flexible implementation platforms. Additionally, they require new monitoring and management paradigms, as self-protection, self-diagnosing, self-maintenance become core design features.

The design of application-oriented systems is driven by application-specific requirements that have a very large spectrum. Despite the adoption of uniform frameworks and system design methodologies supported by appropriate models and system specification languages, the deployment of application-oriented systems raises critical problems. Specific requirements in terms of scalability, real-time, security, performance, accuracy, distribution, and user interaction drive the design decisions and implementations.

This leads to the need for gathering application-specific knowledge and develop particular design and implementation skills that can be reused in developing similar systems.

Validation and verification of safety requirements for complex systems containing hardware, software and human subsystems must be considered from early design phases. There is a need for rigorous analysis of the role of people and process causing hazards within safety-related systems; however, these claims are often made without a rigorous analysis of the human factors involved. Accurate identification and implementation of safety requirements for all elements of a system, including people and procedures become crucial in complex and critical systems, especially in safety-related projects from the civil aviation, defense health, and transport sectors.

Fundamentals on safety-related systems concern both positive (desired properties) and negative (undesired properties) aspects. Safety requirements are expressed at the individual equipment level and at the operational-environment level. However, ambiguity in safety requirements may lead to reliable unsafe systems. Additionally, the distribution of safety requirements between people and machines makes difficult automated proofs of system safety. This is somehow obscured by the difficulty of applying formal techniques (usually used for equipment-related safety requirements) to derivation and satisfaction of human-related safety requirements (usually, human factors techniques are used).

We take here the opportunity to warmly thank all the members of the ICONS 2023 technical program committee, as well as all the reviewers. The creation of such a high-quality conference program would not have been possible without their involvement. We also kindly thank all the authors who dedicated much of their time and effort to contribute to ICONS 2023. We truly believe that, thanks to all these efforts, the final conference program consisted of top-quality contributions. We also thank the members of the ICONS 2023 organizing committee for their help in handling the logistics of this event.

We hope that ICONS 2023 was a successful international forum for the exchange of ideas and results between academia and industry and for the promotion of progress in the area of systems.

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