Software Engineering on Cyber Physical Systems

Research Oriented Topic
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Abstract:

Cyber-physical systems are engineered systems that are built from, and depend upon, the seamless integration of computational algorithms and physical components. With the proliferation of smart embedded and mobile devices, CPS are becoming large-scale pervasive systems, which combine various data sources to control real-world ecosystems.

Different CPS components play important roles in a successful CPS development, the software plays the most important role among them. Acquiring and using high-quality CPS components is the first step; however, designing and implementing the right software to integrate and use them effectively is essential. Cyber-Physical Systems require more advanced modeling techniques to capture physicality including time and space, reliability in terms of probabilistic models, connectivity in terms of communication links, adaptivity, context awareness, interoperability, and autonomy. This requires a comprehensive integrated modeling framework for specification, modeling of architecture, and tracing their relationships.

The specific aspects that the review would focus is on analysis, design, development, verification and validation, quality assurance of CPS software and CPS software engineering modelling challenges, opportunities, and issues. In this review, we also discuss about smart CPS which aims to bring together academics and practitioners from several disciplines with the overall objectives: (i) to increase the understanding of problems of Software Engineering (SE) for smart CPS, (ii) to study the underlying foundational principles for engineering smart CPS, and (iii) to identify and define promising SE solutions for smart CPS.

References:


