Introduction to the Selected Papers from ICCPS 2016

Since their inception more than a decade ago, terms such as "cyber-physical systems" (CPS) or "cooperating objects" have come to describe research and engineering efforts that tightly conjoin real-world physical processes and computing systems. The integration of physical processes and computing is not new; embedded computing systems have been in place for decades controlling physical processes. The revolution is steaming from the extensive networking of embedded computing devices and the holistic cyber-physical co-design that integrates sensing, actuation, computation, networking, and physical processes. Such systems pose many broad scientific and technical challenges, ranging from distributed programming paradigms to networking protocols, as well as systems theory that combines physical models and networked embedded systems. Notably, as the physical interactions imply that timing requirements are considered, real-time computing systems methodologies and technologies are also pivotal in many of those systems. Moreover, many of these systems are often safety-critical, and therefore it is fundamental to guarantee other non-functional properties (such as safety, security, and reliability), which often interplay among them and with timeliness requirements.

CPS is a growing key strategic research, development, and innovation area, and it is becoming pivotal for boosting the development of the future generation of highly complex and automated computing systems, which will be pervasive in virtually all application domains. Notable examples are aeronautics, aerospace and defence systems, robotics, autonomous transportation systems, the Internet of Things, energy-aware and green computing, smart factory automation, smart grids, and advanced medical devices and applications.

This special issue contains a selection of extended versions of the best papers presented at the Seventh ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2016), which was held with the Cyber-Physical Systems Week in Vienna, Austria, on 11–14 April 2016. This selection reflects effectively the growing pervasiveness of these systems in various applications domains. These papers excel at describing the diversity of methodologies used to design and verify various non-functional properties of these complex systems.

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Guest Editors

https://doi.org/10.1145/3179997