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IEEE Transactions on Industrial Informatics



Special Section on

Cyber-Physical Systems and Cooperating-Objects: the New Frontier for Embedded Systems

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Background: Although the IT transformation in the 20th century appeared revolutionary, a bigger change is probably yet to come. The terms *Cyber-Physical Systems (CPS)* and *Cooperating-Objects* have come to describe the research and technological effort that will tightly conjoin real-world physical objects and computing systems. The integration of physical processes and computing is not new. Embedded systems have been in place since a long time to denote systems that combine physical processes with computing. The revolution will come from extensively networking embedded computing devices, in a blend that involves sensing, actuation, computation, networking, pervasiveness and physical processes. Such systems pose considerable technical challenges, ranging from the distributed programming paradigms to networking protocols with timeliness as a structuring concern, including systems theory that combines “physical concerns” (control systems and signal processing) and “computational concerns” (complexity, schedulability, computability, scalability, etc.). Applications of Cyber-Physical Systems and Cooperating Objects include, among others, critical infrastructure control (electric power, water resources, gas and fuel distribution, transportation, etc.), process control and manufacturing, highly dependable medical devices and systems, traffic control and safety, advanced automotive systems, energy conservation and environmental control.

This special section aims at presenting some of the most significant research works representing the state-of-the-art in scientific foundations and technologies that integrate computing systems with physical and engineered systems.

Topics include, but are not limited to, the following aspects of cooperating objects :

- Real-time wireless sensor/actuator networks
- Coordination middleware and programming for pervasive computing
- Distributed real-time middleware
- Querying and searching sensor data
- Mobile ecosystems of sensors/actors, including mobile robotics
- Key applications (manufacturing, medical, power grid, auto) and case studies

Submissions to this special section must represent original material that has not been neither submitted to, nor published in, any other journal. Extended versions of papers previously published in conference proceedings, digests or preprints may be eligible for consideration, provided that the authors inform the special section editors at the time of submission.

Manuscript preparation and submission: Follow the guidelines in “Information for Authors” in <http://iee-ies.org/tii/>

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Paper submission deadline: September 30, 2010

Expected publication date: August 2011 (tentative)

Note: The recommended papers for the section are subject to final approval by the Editor in Chief. Some papers may be published outside the special section, at her/his discretion.