

学术报告会

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Cyber-Physical Systems as Technological Driver for Industry 4.0

Prof. Paulo Leitão

The Polytechnic Institute of Bragança, Portugal



Abstract:

Global markets are imposing strong changing conditions for industrial companies running their businesses, facing strong pressures related to the customization of products in high flexible production systems. Industry 4.0 is an initiative that promotes the computerization of traditional industries, aiming intelligent factories characterized by adaptability, efficiency, functionality, reliability, safety, and usability, as well as the integration of customers and business partners in business and value processes. Cyber-physical systems constitute a technological basis to address this challenge, providing significant benefits in several emergent application domains, such as smart grids, smart buildings, smart transportation, smart healthcare, and particularly in smart manufacturing. This presentation discusses the concept of cyber-physical systems and possible application domains, and presents their current trends, technologies and challenges. Particularly, it discusses how industrial agents technology can support the development of intelligent, dynamic and self-* large-scale cyber-physical systems, covering the inter- and intra-enterprise integration and running in ubiquitous environments. For this purpose, it will be discussed the advantages of combining multi-agent systems with complementary paradigms, particularly service-oriented architectures, cloud computing, fog computing and biological inspired techniques, such as swarm intelligence and self-organization.

Biography:

Paulo Leitão received the MSc and PhD degrees in Electrical and Computer Engineering, both from the University of Porto, Portugal, in 1997 and 2004, respectively. From 1993 to 1999 he developed research activities at the CIM Centre of Porto, from 1999 to 2000 at IDIT - Institute for Development and Innovation in Technology, and since 2009 at LIACC - Artificial Intelligence and Computer Science Laboratory. He joined the Polytechnic Institute of Bragança, Portugal, in 1995, and currently he is Coordinator (Associate) Professor at the Department of Electrical Engineering of that institute. His research interests are in the field of intelligent & distributed manufacturing control, reconfigurable manufacturing systems, cyber-physical systems, factory automation, multi-agent and holonic control systems, and bio-inspired engineering. He participate / has participated in several national and international research projects. He is member of the International Program Committee (IPC) of several scientific events, has published more than 160 papers in high-ranked international scientific journals and conference proceedings (per-review), and co-author of three patents. He received four paper awards at INFOCOMP'13, INCOM'06, BASYS'06 and IEEE INDIN'10. He served as co-chair of several international conferences. Dr. Leitão is Senior member of IEEE, member at large of the Industrial Electronics Society AdCom, chair of the IEEE Standards Association P2660.1 Working Group and past Chair of the IEEE IES Technical Committee on Industrial Agents.