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3rd IEEE International Conference on Industrial Cyber-Physical Systems (ICPS)

Special Session on

"Coupling CPS and AI in Manufacturing Systems"

organized by

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Call for Papers

Scope of the Special Session

AI is among those exponential technologies that notably revolutionize contemporary industries. Cyber-Physical Systems by their nature are predestined for embedment of AI. Merging the potential of AI and CPS brings a diversity of challenges to be addressed, which range from methodical, through functional and technological, to legal and ethical. The first issue to be tackled is the AI-aided diagnosability and adjustability of CPS and the operating processes. Coupling of humans and AI sets another dimension of the problem, which opens opportunities coming from the hybridization of AI and human intelligence. Networking and connectivity of CPS enable knowledge sharing, and followingly - distributed and collaborative AI. This brings specific technological issues, related to the interoperability of distributed knowledge and intelligence, like: setup of protocols, semantic matching, transparency and visibility, system-wide consistency of data and knowledge, synchronization and timing, valuation of interactions and related settlements, and so on. To this end, specific technologies are being investigated, like distributed ledger technology. Finally, ecosystemic capabilities become feasible, based on the ecosystem-wide learning and exogenous intelligence.

Topics of interest for this special session include

- AI-aided diagnosability of CPS
- AI-enabled adaptive processing in CPS
- AI-aided predictive maintenance in CPS
- AI-aided predictive quality in CPS
- AI-enhanced cross-systems diagnosability and adjustability
- Augmented optimization of processes operated by collaborating CPS
- Knowledge representations in CPS
- Sharing knowledge between CPS
- Shared learning of collaborating CPS

- Synergizing Human and Artificial Intelligence based on CPS
- Applying distributed ledgers for collaborative learning of CPS
- AI-enabled ecosystemic intelligence in Production Internet

Submissions Procedure: All the instructions for paper submission are included in the conference website https://events.tuni.fi/icps2020/authors/

Deadlines: The same as the general conference deadlines

CVs of the proposers

Rodolfo E. Haber (www.csic.es) obtained a Ph.D. in Industrial Engineering from the Universidad Politécnica de Madrid, Spain, in 1999. He is Vice-Director of the Centre of Automation and Robotics-CAR, UPM-CSIC. As a researcher he is now involved in European projects such as 'Power2Power' (826417), DIH AIR4S and IPAE started in 2018. He is the author of 3 books, 20 book chapters, more than 60 articles in indexed journals (h-index=31 GS) and dozens of conference papers. Member of IFAC's TC Committee 3.1 Computers for Control (2005-), ASME TC for Model Identification and Intelligent Systems (2007-), and IEEE TC on Industrial Cyber-Physical Systems (2018). He is a member of the technical board of the Spanish Platform for Advanced Manufacturing (MANUKET). His main research interests are in the field of computational intelligence for modeling, control and optimization, IoT sensors, networked, adaptive and embedded systems, cyber-physical systems and artificial cognitive systems.

Stanisław Strzelczak (www.pw.edu.pl) obtained his Ph.D. in Industrial Engineering from the Warsaw University of Technology (WUT) in 1987. He founded and leads the Lab of Industrial Ecosystemics at the Faculty of Production Engineering at WUT. As a researcher, he currently leads the global research project 'Industry 4.0 in Production and Aeronautical Engineering' (IPAE). Before he led or participated in several international R&D projects (Japan, EU, China). He edited and authored 12 books and over 130 papers in journals and proceedings, published worldwide (in English, Japanese, Polish, Russian and Chinese). Member of IFIP TC 5.7 Advances in Production Management Systems (2006-). His current research focus is on Production Internet, artificial cognitive systems, and AI-enabled dynamic and evolutionary capabilities in Internet-based industrial ecosystems.