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Special Issue on Human-Cyber-Physical Systems for Intelligent Manufacturing

Intelligent manufacturing (IM) emerges as the full integration of advanced information and manufacturing technologies. It not only affects the way products are manufactured but also creates new opportunities for the design of smart products, processes, services, and systems. IM represents the Fourth Industrial Revolution and provides a framework to address the challenges arising in the integration of cyber systems and physical resources. Cyber-physical system (CPS) is a key enabling technology to realize IM. However, recent research on the CPS for IM mainly focuses on the communication, computation, and automation of physical resources (e.g. different machines, robots, and manufacturing units), which overlooks the significant effect on human operators and decision-makers. Although some heavy physical labor work and simple repetitive operations have been replaced by machines or robots, humans are still essential elements of IM because their experience and tacit knowledge are non-substitutable for dealing with high-level and uncertain tasks. Thus, understanding the role of humans in IM is becoming a crucial research area.

Human-cyber-physical System (HCPS) is valued for its potential to illustrate the complex interactions among humans, cyber systems, and physical resources. It highlights human cognition and behavior as a key inclusive part of the system instead of an external factor. On the one hand, HCPS increases the ability of systems to handle uncertain and complicated problems through human-machine interaction. On the other hand, HCPS enhances the cognition abilities of humans through advanced information technologies and artificial intelligence. From a lifecycle perspective, HCPS can facilitate IM in three dimensions which are intelligent products, production, and services.

The objective of this special issue is to present the latest advances and developments of methods, techniques, and tools dedicated to the HCPS for IM. Topics of interest include, but are not limited to:

- Design and implementation of HCPS for manufacturing systems
- Co-design and optimization of HCPS for Industry 4.0 and beyond
- Autonomous cognition in human-cyber-physical-production systems
- Big data analytics in HCPS for IM
- Machine learning and Artificial intelligence in HCPS for IM
- Cloud computing, fog computing, and edge computing in HCPS for IM
- Human-AI hybrid intelligence in product lifecycle optimization
- Human-machine-environment collaborative modeling in the manufacturing process
- Digital twin-based human-machine interaction for human-centric manufacturing
- Knowledge-based HCPS for smart design, manufacturing, and services
- Fuzzy preference modeling and analysis in human-centric decision-making for IM
- Privacy, security, and trust in HCPS for IM
- HCPS applications in intelligent products/production/services

Important Dates
- Paper submission deadline: Nov. 30, 2022
- Completion of the first round review: Jan. 30, 2023
- Completion of the second round review: Apr. 30, 2023
- Final submission due: Jun. 30, 2023
- Tentative publication date: Oct. 30, 2023

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Paper Submission

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