Proposal for Special Session at IEEE CASE 2021

Goal:

Data-driven methods are of significance for smart manufacturing. They are able to learn knowledge from data, and guide the optimization operation of smart manufacturing system. Nowadays the customized requirements are increasing, and resources has higher degree of the diversity and coupling. Thus, multiple and frequent uncertainties have gradually emerged in the inner and outer manufacturing systems. Experience and intuition of humans, highly complementary to machine capabilities, enable humans to play various important roles in the smart workshop, such as decision makers and operators. Therefore, the effect of humans cannot be ignored during the optimization of smart workshop. The new characteristics make urgent requests for the integration of humans, cyber systems and physical systems.

These demands mentioned above highlight the necessity of applying emerging technologies to the human-cyber-physical integration, e.g., artificial intelligence, digital twin and human-machine collaboration. By improving the comprehensiveness, real-time performance and foreseeability of optimization methods, it can realize the intelligent optimization with self-adaptation, self-organization and self-learning. In this session, we welcome all contributions that apply the related methods to addressing the smart manufacturing optimization problems, including but not limited to:

- Intelligent decision making and optimization with human-machine collaboration
- Intelligent optimization based on human-machine hybrid-augmented intelligence
- Intelligent optimization considering human factors
- Intelligent optimization based on HCPS
- Intelligent optimization based on digital twin
- Digital twin platform for smart workshop with combination of virtuality reality as well as interactive sensing
- Data-driven intelligent optimization
- Data-driven knowledge management for smart workshop

Session Title: Human-cyber-physical collaborative optimization for smart manufacturing systems

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Contributions:
1. "Human-machine interactive mechanism of collaborative dynamic scheduling for smart shop floor" by Dongyuan Wang/ Fei Qiao

2. "A deep reinforcement learning approach for solving dynamic job shop scheduling problems." by Yun Zhang/ Xinyu Li

3. "Digital twins-based rapid designing of smart phone assembly line" by Douxi Yan/Jiewu Leng

4. "Application Research of Augmented Reality Technology in Smart Factory." by Luyao Xia / Hao Zhang

5. "Active Scheduling Optimization Method for Complex Assembly Process Based on Multi-agent Reinforcement Learning." by Wei Wu/ Jianfeng Lu

6. "Q-learning based adaptive scheduling for smart manufacturing " by Jingwen Cai /Yumin Ma

7. "Distributed dynamic scheduling of manufacturing systems based on Multi-agent Deep Reinforcement Learning" by Juan Liu/ Fei Qiao