

Smart manufacturing control and optimization towards Industry 4.0/5.0 **(Code: 75m2j)**

Goal:

Rapidly evolving global initiatives have highlighted a manufacturing future that is connected, smart, resilient, human-centric, and sustainable for rapidly producing high-value-added products and services defined by end-users. Manufacturing systems, therefore, have to change: (1) new manufacturing control strategies are required to enable flexible production of heterogeneous manufacturing jobs at dynamic batch sizes with mass efficiency (mass personalization/individualization); (2) factories need to be resilient and self-organizing to adapt to sudden disruptions in customer demands, factory conditions and supply chain changes; and (3) machines need to be sympathetic with its operators, to name a few.

Topics:

These expected changes are possible, enabled by the recent advances in cybernetics, information theory, and sensing techniques. At the core, fundamental breakthroughs in how manufacturing systems and processes are modeled, designed, and controlled need to evolve towards a more adaptive, self-organizing, and contextual-dependent manner. Hence, this special issue welcomes original research work on smart manufacturing control and optimization. We are particularly interested in research work on the following topics:

- Situational-aware manufacturing perception technologies
- Cognitive reasoning and decision-making in manufacturing control and optimization
- Self-organizing manufacturing algorithms
- Reconfigurable, flexible, and resilient manufacturing methodologies
- Decentralized and adaptive control and automation
- Reinforcement learning for dynamic manufacturing optimization
- Agent-based manufacturing modeling, simulation, and control
- Mass personalization
- Digital twin and digital thread for smart manufacturing systems
- Standards-based integration for mass personalization
- Knowledge extraction, management, and transfer in design and manufacturing automation
- Human-AI/machine/robot/automation symbiosis for enhanced shared autonomy

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