The Next-Generation Resilient Cyber-Physical Manufacturing Networks (Code: 5deky)

Goal:

A visionary emphasis towards human centricity and resilience for industrial development is heralding a new wave of industrial revolution. Building upon industry 4.0, which is characterized by smart automation and extensive interconnectivity, we see the fifth industrial revolution as a paradigm shift from data-centricity to human-centricity. This phenomenon represents an enhanced cohesion in cyber-physical systems and manufacturing networks beyond mere productivity growth to strive for sustainability and resilience in industrial development through human-centered AI-power robots, network and communication technology and ubiquitously connected Internet-of-Things (IoT).

The special session on *The Next-Generation Resilient Cyber-Physical Manufacturing* aims to bring together discussion on the industry 5.0 concept that envisions increased focus in sustainable development and resilience largely with humans working alongside Industry 4.0 technology including artificial intelligence, robotics, IoT, etc. Specifically, we aim to explore both infrastructure and software development in (a) spatial and temporal planning for manufacturing; (e.g., robot planning, systems scheduling), (b) smart manufacturing execution and control (e.g., autonomous, vision-based human-robot/machine interaction, event-driven dynamic scheduling and control), and (c) diagnostics and adaptation (e.g., anomaly detection, diagnostics, smart metrology), seeking to define the science and technology for realizing intelligent, flexible, and resilient manufacturing networks including a human-centric focus.

Relevant to *IEEE CASE* topic: *Cyber physical production systems and industry 4.0*, the special session hopes to facilitate discussions that develop the foundations for understanding how cyber physical systems and ubiquitous technology can achieve new levels of efficiency, flexibility, human centricity, and reliability in manufacturing at all scales.

Topics:

- Cyber physical production systems
- Cloud technology for smart manufacturing
- Robot control, planning and perception in smart factories
- Agent-based planning strategy for multi-robot systems
- Human-robot collaboration in production line
- Heterogeneous robot coordination in flexible manufacturing
- Immersive interface for intuitive human-centered manufacturing processes
- Digital twins for effective design and development
- Event-driven dynamic scheduling and control
- Anomaly detection, diagnostics and smart metrology
- Vision-based automated and intelligent systems
- Innovation in engineering education on robotics and automation for flexible manufacturing

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