

Smart Remanufacturing Technologies (Code: 8wf47)

Goal

Remanufacturing allows End-of-Life (EOL) products to be rebuilt into as-new condition with equivalent or better performance and warranty compared to the original products. By prolonging the useful life of products with significantly increased resource efficiency and reduced waste, remanufacturing enables more sustainable production and provides substantial economic, environmental, and social benefits. However, current remanufacturing industry relies heavily on inefficient and costly manual operations due to the highly variable conditions of EOL products, the complicated remanufacturing processes, and the stochastic process plans, resulting in significant limitations of the expected benefits of remanufacturing. In recent years, the rapid development of smart manufacturing technologies has shown a great potential to address these challenges. Applying various emerging digital and smart technologies (CPS, IoT, digital twin, AI, etc.) in typical remanufacturing processes such as inspection, disassembly, cleaning, reprocessing, reassembly, and testing could not only improve the efficiency and cost-effectiveness of remanufacturing processes, but also transform the traditional remanufacturing industry into a new paradigm, i.e. smart remanufacturing.

Therefore, this special session aims at bringing together specialists in remanufacturing, smart manufacturing, robotics, information and communication technology, operations research, AI, and other related domains to present the state-of-the-art theoretical development and applications of various smart remanufacturing technologies. Topics include but not limited to:

Topics:

- Industry 4.0/5.0 technologies for smart remanufacturing
- Novel theories, methods, and frameworks for smart remanufacturing
- CPS and IoT enabled smart remanufacturing systems
- Modelling and design of smart remanufacturing systems
- Data analytics and AI for smart remanufacturing
- Knowledge management for smart remanufacturing processes
- Human-robot collaborative assembly/disassembly in smart remanufacturing
- Digital twin applications in smart remanufacturing
- Scheduling and planning for smart remanufacturing processes
- End-of-life product inspection and modelling for smart remanufacturing
- Predictive maintenance for smart remanufacturing
- Additive manufacturing for product repair and remanufacture
- Industrial applications of smart remanufacturing

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