



### AI for Efficiency and Sustainability in Assembly/Disassembly Industrial Processes

**Theme:** Efficiency and sustainability will be key for the factory of the future, whose main focus will be on efficient and sustainable industrial processes. A sustainable production, an efficient use of the resources, and an increase in the products that are recovered and reused will be crucial to reduce the impact of the production on the environment, in compliance with the upcoming Industry 5.0 paradigm. Artificial intelligence (AI) and robotics are leading to a deep workplace innovation, optimizing human-machine interactions, giving more importance to workers. But the environmental goals can only be achieved by rethinking the production processes in order to limit the environmental impact. Assembly and disassembly are two industrial processes that will have to be continuously optimized to increase efficiency and sustainability in years to come. Assembly puts together all the parts of a product in production lines. It involves the highest percentage of the employed workforce in the manufacturing industry. Disassembly extracts valuable components/materials from end-of-life goods, for reuse and recycling. Disassembly is also used in product refurbishment, when products are restored to full manufacturer conditions by running quality tests, replacing broken or defective parts. Refurbishing products is a great opportunity for sustainability as it gives new life to used products instead of producing new ones, thereby providing consumers with quality products at an affordable price. Statistics say that the refurbished market for consumer electronics is estimated to be \$10 billion. Disassembly and assembly consist of a series of tasks performed in lines made up of workstations where workers may be assisted by robots. Making these lines as efficient and sustainable as possible includes the design, the optimization, and the improvement of the collaborations between workers and machines. Artificial Intelligence (AI) can help deal with the complexity of these problems to find and implement solutions that increase the efficiency and reduce the impact of the production on the environment in years to come. The purpose of this Special Section is to collect the latest researches and achievements, and discuss the progresses regarding advanced AI techniques for optimal assembly/disassembly industrial processes.

#### This special section will focus on (but not limited to) the following topics:

- AI applied to the Design for Assembly/Disassembly (DFA/DFD)
- AI for Assembly and Disassembly Line Balancing Problems (ALBP/DLBP), including single-model, mixed-model and multi-model lines
- AI for Assembly/Disassembly Sequence Planning (ASP/DSP)
- AI for Assembly/Disassembly Line Sequencing and Scheduling (ALS/DLS), including stochastic sequencing and scheduling
- AI for sustainable assembly/disassembly lines
- AI methods and new technologies to increase the workers' safety in assembly and disassembly lines
- Human-Robot Collaboration (HRC) in assembly and disassembly lines assisted by AI
- Methods and algorithms that combine AI with solutions based on Internet of Things (IoT) and Edge Computing in assembly and disassembly lines
- Applications that combine AI and 5G in next generation efficient and sustainable assembly and disassembly lines

#### Manuscript Preparation and Submission

Follow the guidelines in "Information for Authors" in the IEEE Transactions on Industrial Informatics <http://www.ieee-ies.org/pubs/transactions-on-industrial-informatics>. Please submit your manuscript in electronic form through Manuscript Central web site: <https://mc.manuscriptcentral.com/tii>. On the submitting page #1 in popup menu of manuscript type, select: SS on **AI for Efficiency and Sustainability in Assembly/Disassembly Industrial Processes**

Submissions to this Special Section must represent original material that has been neither submitted to, nor published in, any other journal. Regular manuscript length is 8 pages.

**Note:** The recommended papers for the section are subject to final approval by the Editor-in-Chief. Some papers may be published outside the special section, at the EIC discretion.

**Timetable:**      **Deadline for manuscript submissions**      **April 30, 2022 (Extended to Jun. 30, 2022)**  
                                 **Expected publication date (tentative)**      **October 2022**

#### Guest Editors:

Dr. Beatrice Lazzerini, Dept. of Information Engineering, University of Pisa, Italy, [beatrice.lazzerini@unipi.it](mailto:beatrice.lazzerini@unipi.it)

Prof. Francesco Pistolesi, Dept. of Information Engineering, University of Pisa, Italy, [francesco.pistolesi@unipi.it](mailto:francesco.pistolesi@unipi.it)

Dr. Michela Dalle Mura, Dept. of Civil and Industrial Engineering, University of Pisa, Italy, [michela.dallemura@unipi.it](mailto:michela.dallemura@unipi.it)

Prof. Gino Dini, Dept. of Civil and Industrial Engineering, University of Pisa, Italy, [gino.dini@unipi.it](mailto:gino.dini@unipi.it)