

Proposal for Workshop at IEEE CASE 2022

Workshop Title: AI for Efficiency and Sustainability in Industrial Disassembly Processes

Time: 8:30am-11:30am (Eastern Standard Time, EST) , August 20th 2022,

Website: <http://www.case2022.org/>

Goal:

- Efficiency and sustainability will be the key for the future factory, 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 recovered and reused products 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 deep workplace innovation, optimizing human-machine interactions, and 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. Disassembly is an industrial process that will have to be continuously optimized to increase efficiency and sustainability in years to come. Disassembly extracts valuable components/materials from end-of-life goods for reuse and recycling. It is also used in product refurbishment when products are restored to full manufacturer conditions by running quality tests and 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 consists 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 efficiency and reduce the impact of production on the environment. This Workshop aims to collect the latest research and achievements and discuss the progress regarding advanced AI techniques for optimal industrial disassembly processes.

Organizers:

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Presenters:

Ying Tang (8:30-9:00am)

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Haitao Yuan (9:10-9:40am)

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Zizhen Zhang (9:50-10:20am)

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Liang Qi (10:30-11:00am)

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Ziyan Zhao (11:00-11:30am)

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Topics to be Covered:

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