Autonomous remanufacturing

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1 Introduction

The availability of several raw materials has become a growing concern within the last few decades [1], whilst the generation of waste materials has significantly increased [2]. As a result, the adoption and implementation of end-of life (EoL) strategies to save raw materials, manufacturing costs and energy consumption has become one of the major concerns for governments, policymakers, industrialists and researchers around the world. In this context, remanufacturing has become a widely investigated research topic.

Defined by [3] as “the process of returning a used product to at least its Original Equipment Manufacturer’s (OEM) performance specification from the customers’ perspective, and giving the resultant product a warranty that is at least equal to that of a newly manufactured equivalent”, remanufacturing is recognised as a new type of industry with great potential in the twenty-first century [4] and considered one of the future trends of the manufacturing industry [5]. Remanufacturing plays a key role as an EoL strategy, potentially able to increase the firm’s profitability, create new job opportunities, and reduce environmental impacts [6].

Disassembly is “the process of systematic removal of desirable constituents (components and/or materials) from the

original assembly so that there is no impairment to any useful constituent” [7]. Because the components must be disassembled prior to remanufacturing, disassembly is a critical and unavoidable step in the reprocessing of EoL products. Disassembly planning is the first consideration in each remanufacturing process [8]. Disassembly planning is focused on designing a detailed plan for removing specific components or sub-assemblies from a whole product or assembly [9]. It is a comprehensive field of research covering three main sub-problems: Disassembly Sequence Planning [10], Disassembly Line Balancing [11] and Disassembly Path Planning [12].

Disassembly operations are traditionally performed by humans. However, due to their complexity, low efficiency, and long times and costs, they are ideal candidates for automation. Automation is particularly desirable and economically viable in the disassembly of large and complex products [13], and when the operations and materials involved imply a hazard for the operator. In this context, robotic disassembly [14], cognitive robotics [15] and human-robot collaboration in remanufacturing [16] are promising avenues in disassembly processes for remanufacturing.

This special issue focuses on autonomous remanufacturing. Specifically, we encourage contributions that deal with new models, methodologies, techniques, experimental applications and/or advanced remanufacturing systems to extend the state-of-the-art in remanufacturing in terms of novel approaches, with significant impact in the remanufacture domain.

2 Invited contributions

Submissions to this special issue are encouraged from all theoretical and experimental perspectives drawing in autonomous remanufacturing, namely disassembly planning, robotic disassembly, human-robot collaboration, collaborative robots and others. Authors must clearly outline why their research is new and interesting for research and practice and how it relates to the theme of this special issue.

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We invite submissions in all areas focused on the theme of “Autonomous Remanufacturing”, including but not limited to the following list of topics:

- Robotic disassembly
- Human-robot interaction
- Collaborative robots
- Robotic inspection and testing
- Disassembly sequence planning
- Disassembly line balancing
- Disassembly path planning
- Disassembly mechanisms
- Disassembly re-planning
- Evolutionary optimization
- Optimisation methods for remanufacturing

3 Submissions guidelines

Please submit papers via the journal’s online submission system (<https://www.editorialmanager.com/jamt/>). To indicate submission to this Special Issue, please select “S.I.: Autonomous Remanufacturing” from the drop-down menu on the page labelled “Additional Information”. Please observe the instructions regarding the format and size of contributions to *The International Journal of Advanced Manufacturing Technology*.

All papers will be reviewed anonymously (double-blind process) by at least two referees with regard to relevance, originality and research quality. In addition to the editors of this special issue, distinguished international scholars will be involved in the review process.

4 Important dates

- Paper submission opens: June 1, 2020
- Deadline for paper submission: February 28, 2021

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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