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Information Control Problems in Manufacturing (INCOM 2024)

Vienna, Austria, 28-30 August 2024

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This proposal is endorsed by TC 5.1 Manufacturing Plant Control
and TC 9.2 Systems and Control for Societal Impact

Special Session Proposal:

Human Work and Skills Advances Related to Smart Manufacturing

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Keywords: Human work; Skills; Digitalization; Smart manufacturing; Human in the loop; Industry 5.0.

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ABSTRACT

The work environment is changing. Some smart manufacturing work environments involve digitization, automation, machines and robotics, artificial intelligence (AI), which replace (Autor, 2014) or fundamentally change human work. These changes influence smart manufacturing environments by reducing the demand for labor and wages (Acemoglu & Restrepo, 2018), especially for repetitive tasks, while creating opportunities for shifting workers' involvement towards more cognitively demanding ones. As a result, we enter a new and dynamic industrial age in which machines and computers, often driven by AI can substitute, complement and expand human work. In parallel, AI-enabled machines and cobots benefit from their interaction with human workers to expand their own capabilities. Such reshaping in worker roles and profiles require new and shifting human skills and competencies. Furthermore, two parallel trends continue to dominate the smart work

setting. First, technology continues to govern how workers communicate and socialize (Ray & Thomas, 2019; Sela et al, 2022). Second, new work arrangements (e.g., freelance, gig-work, task, project-based work) are increasingly prevalent and are expected to reach a record high by 2030 (Barlage, van den Born, & van Witteloostuijn, 2019).

This rapid change has major implications on the human operator. Human operators in smart work environments, are incorporating information, data and implementing AI more than ever before. We observe AI-based applications assisting workers in daily tasks, project management, decision-making and collaboration, thus enabling smarter time-critical tasks in industrial and managerial settings. As a result, emerges the need for new collaboration mechanisms, tasks and skills to support social interactions with peers, robots and AI-enabled systems. Thus, the need to examine and evaluate the ever-changing human-centered perspective and required skills in order to make necessary adjustments. The shifting smart manufacturing setting, requires a continuous evolution in skills in order to adjust to these rapid changes. New tools, frameworks and methods are required to support the human work in managing technology and digitized work streams. Also, a re-organization of the working environment and organization will be required. With these new developments, studies in the human-related factors should be carried out, on both the theoretical and practical levels, highlighting the interdependences between digital technologies and human skills, and providing high-tech and industrial firms with state-of-the-art methods and tools to drive their workforce towards agile human-centered smart manufacturing environments.

This special session calls for high-quality contributions investigating the main research challenges, reviews, case studies and applications related to the following topics (but not limited to):

- Human centered systems to assist workers in their increasingly complex tasks.
- Original industrial and real-world case studies to test the adoption execution of human skills in smart manufacturing settings.
- Implementing new technologies to meet the demand vs. supply of new skills in smart manufacturing settings.
- Multidisciplinary approaches to design human work in smart tech-based and unique work settings.
- New skills affecting the performance of smart manufacturing environments.
- Skills and competencies for the digitized smart work environment.
- Work organization in smart manufacturing environments.
- Industrial Smart Work: Theory and Practice.
- Human-AI Work adoption framework.
- Human-AI Work skills and competencies assessment.
- Human-AI synergies and collaboration partners.
- Requirements, designs, and assessment approaches for human-centred smart manufacturing.
- Joint, collaborative or sliding decision making between humans and AI-enabled systems in manufacturing.

Time schedule

January 31, 2024	Deadline for paper submission
March 15, 2024	Notification of acceptance/rejection
April 15, 2024	Final paper submission
28-31 August 2024	18th IFAC Symposium (INCOM 2024): Vienna, Austria

Manuscript Preparation

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For Manuscript submission please look at <https://ifac.papercept.net/conferences/scripts/start.pl>

Upon submission, make sure to use the **Invited session identification code: to be announced latter**

For any further information, please contact the Special Session Technical Committee

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