Invited session

Efficient Human-Robot Collaboration: Design and Implementation Strategies for Manufacturing, Maintenance, and Logistics Operations

INVITATION CODE: a962c

Organizers

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The rapid evolution of industrial processes is increasingly driven by the integration of human-robot collaboration (HRC). This session will explore how HRC can optimize performance and improve flexibility across manufacturing, maintenance, and logistics operations. Emphasizing design principles and implementation strategies, it focuses on creating efficient collaborative environments where humans and robots work together to enhance productivity and resilience.

In manufacturing, collaborative robots are transforming production floors by combining the strength, speed, and precision of robots with the cognitive skills, creativity, and adaptability of humans. HRC in manufacturing allows for more agile production systems that can respond to changes in demand with greater flexibility, optimizing operations that require both human oversight and robotic precision. In maintenance, HRC enables robots to assist human workers in performing complex repairs and inspections, especially in hazardous environments. In logistics operations, HRC advances systems that reduce human effort in repetitive tasks (e.g., sorting, picking, packing), mitigating the risk of personnel injury while achieving greater precision and speed.

The integration of I4.0 technologies and advanced sensor systems enhances efficiency and ensures smooth HRC in Industry 5.0 environments. This session will also address key parameters and best practices related to ergonomics, human perceptions (acceptance, trust, motivation, attitudes), safety protocols, and worker training to ensure successful HRC implementation. Additionally, ethical discussions will explore the potential displacement of workers and strategies for balancing the roles of robots and humans, emphasizing the empowerment and augmentation of human capabilities and sustainable employment rather than automation. Human-centered design will play a crucial role in facilitating this transition by addressing both technological advancements and workforce needs.

This session aims to provide designers and practitioners with clear guidelines and strategies for successfully integrating HRC in future industrial environments. It will bring together studies that highlight best practices, innovative solutions, and challenges in deploying HRC across manufacturing, maintenance, and logistics operations. We welcome paper submissions from researchers, engineers, designers, and industry practitioners on topics contributing to this dynamic field.

Potential topics include but are not limited to:
- Ergonomic design for human-robot collaboration
- Human-centered design of HRC systems for assembly, disassembly and logistics operations
- Robotic support for maintenance operations
- Cobots in hazardous maintenance environments
- Sociotechnical HRC systems towards balanced and optimal HRC in manufacturing
- Design guidelines for flexible and responsive HRC systems
- Learning and training of workers for effective HRC systems
- Real-time interaction, safety and risk management in HRC systems
- HRC ethics and occupational implications for human workforce

Draft papers reporting original research (limited to 6 pages in IFAC format) are welcome.

When you submit your paper to the IFAC system, you will be required the invitation code to associate your paper to the invited track: https://ifac.papercept.net

IMPORTANT DATES:
Draft papers submission deadline: **30.11.2024**
Final papers submission deadline: **28.02.2025**
Early registration opens: **28.02.2025**

Conference website:
https://conferences.ifac-control.org/mim2025/

Accepted papers will be published open access in Elsevier's IFAC-PapersOnLine.
Post-conference special issues for extended versions of accepted papers are planned in IFAC and other high-ranked journals.