MIDI 2022 Conference

Special session

Title: Advances in Collaborative Robotics

Proposers: Jan Klimaszewski, PhD, Jakub Możaryn, PhD, Krzysztof Wildner, PhD

Institution: Warsaw University of Technology, Faculty of Mechatronics

The last decades brought new human-machine collaboration (HMC) areas in the same working space, with examples in the industry, education, agriculture, healthcare services, security, and space exploration. For example, collaborative robotics aims to facilitate human-machine cooperation and introduce robots to the direct human space while maintaining safety rules. It is necessary to develop more natural human-machine interfaces to achieve these goals. In addition to ensuring human safety, these interfaces shall allow the machine to be equipped with more agile functions and skills. They are designed to follow special safety measures, handling human collision detection and allowing human behaviour prediction. By perceiving the situations, adaptive machines can adjust to accomplish collaborative tasks. This Special Session aims to collect and describe various innovative technologies to make the collaborative robots and adaptive machines more safe and agile.

The Special Session will cover topics in the context of recent advances and future trends in interfaces for collaborative robotics and adaptive machine interfaces, including, but are not limited to the following:

- Safety in collaborative robotics.
- Human - machine collaboration modelling and dynamics.
- Intelligent control strategies, especially adaptive and predictive controls.
- Human behaviour prediction in collaborative tasks.
- Artificial intelligence, machine learning, and vision-based algorithms.
- Bio-inspiration in human-robot or robot-robot collaboration.
- Human - machine interface design.
- Electronic skin interfaces.
- Collaborations in/with heterogeneous realities (e.g., real robot–virtual human collaboration).