

## Tentative Outline

**Special Thematic Issue for Current Topics in The Open Automation and Control Systems Journal**

**Special issue on human-friendly collaborative robots for industrial applications**

*Guest Editor: Dr. Mizanoor Rahman*

### **Aims & Scope:**

Human workers frequently need to perform various difficult tasks in industries such as manipulation of heavy materials, cleaning floors, etc. Performing difficult tasks manually is tedious, less efficient and harmful to human health. As alternative, autonomous robotic devices can be utilized to perform these tasks where robots utilize intelligence and controls associated with information technologies to eliminate the necessity of human intervention in the processes. However, autonomous robots are usually less flexible and less adaptable in changing situations. It is posited that human-robot collaboration can be flexible and adaptable, and thus can be a better solution toward performing such difficult tasks. In such a case, safety and human-friendliness of the collaboration system are necessary. Previous research shows that collaborations between agents sharing similar mental models perform better than collaborations between agents having more accurate but less similar mental models. Thus, human's collaboration with robots demands that robotic principles and working procedures should be compatible with human cognition, where cognition refers to the science that is concerned with human thinking and other sciences related to such thinking. Such compatibility is especially required if the collaboration is expected to be guided by the principles set in ISO/TS 15066 for collaborative robots. However, collaborative robotics for industrial applications has not reached its maturity yet, and there are various issues with collaborative robots that need to be addressed to make collaborative robots more human-friendly, safe and cognitively compatible with human co-workers for industrial applications.

This special issue deals with human-friendly collaborative robots in industrial settings. Therefore, all researchers, scientists and practitioners working in the area of collaborative robotics for industrial applications are encouraged to submit their original and unpublished works to this special issue. However, human-robot collaborations for other applications can also be considered.

**Keywords:** Collaborative robot, human-robot collaboration, cognition, human-friendliness, flexible automation, industry

### **Subtopics:**

The subtopics of interest for this special issue include, but are not limited to:

- Human-robot/automation/system interaction and interface
- Human factor modeling and inclusion of such models in collaborative robotic system design
- Cognitive automation
- Safety, protective devices and mechanisms, and hazard and risk analysis for human-robot collaboration
- Human trust in collaborative robots
- Human perception and psychophysics, and robot perception for human-robot collaboration
- Mixed initiatives between human and robot
- Task allocation and scheduling between human and robot
- Autonomy distribution between human and robot
- Human-robot and robot-human handovers
- Human-robot hybrid cell and collaboration in cellular and constrained spaces
- Control, motion planning, artificial intelligence, machine learning and intelligent decision-making algorithms and strategies to improve human-robot collaboration performance
- Evaluation methods and metrics for human-robot collaboration
- Innovative design and mechanism of human-robot collaboration system

- Active and passive compliance in human-robot collaboration system
- Benchmarking methods and metrics of human-robot collaboration system
- Human-robot symbiosis
- Cyber-physical-social system (CPSS) for human-robot collaboration
- Human-robot adaptive ecology
- Human-in-the-loop Internet of Robots (IoR)

#### **Schedule:**

- ✧ Manuscript submission deadline: April 30, 2018
- ✧ Peer Review Due: June 30, 2018
- ✧ Revision Due: July 31, 2018
- ✧ Announcement of acceptance by the Guest Editor: August 31, 2018
- ✧ Final manuscripts due: September 30, 2018

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