

Collaboration with Intelligent Systems: Machines as Teammates

Douglas C. Derrick
University of Nebraska at Omaha
dcderick@unomaha.edu

Joel S. Elson
University of Nebraska at Omaha
jselson@unomaha.edu

Isabella Seeber
Grenoble Ecole de Management
isabella.seeber@grenoble-em.com

Lena Waizenegger
Auckland University of Technology
lana.waizenegger@aut.ac.nz

Technological advancements, including advances in artificial intelligence on multiple fronts, allow humans to work with machines as teammates. Our reliance on and trust in these intelligent systems changes how we work, process information, decide, and act. Next-generation automated systems are designed to augment human expertise, amplify human intelligence, enhance productivity, and improve decision making.

Intelligent Systems are evolving from automated tools to collaborative partners and can learn from experience and acquire new abilities. Additionally, future systems may be able to take advantage of new computer architectures which eliminates the redundancies and bottlenecks of von-Neumann-style computing machines. Future intelligent systems will use technology such as distributed computing architectures and quantum computing, for example.

Humans still use automated agents for simple, utilitarian tasks, but these types of assistants can undertake more extensive and more critical tasks. As our artificial partners increase in ability and become more ubiquitous, we need to explore new dimensions of human-computer collaboration based on natural communication patterns and consideration of individual differences.

This mini-track examines the emergence of this new type of collaboration and its implications for individuals, teams, and organizations. It is focused on the intersection of human-machine collaboration.

Specifically, this mini-track focuses on:

1. Human collaboration with artificial agents and intelligent systems in teams, crowds, and with individuals
2. Design and evaluation of smart technology as team members, including agent-based support (e.g., robots, chatbots) for decision-makers

3. Individual differences that impact collaboration with and acceptance of artificial intelligence
4. Usability and design research for human collaboration with automated teammates
5. Automation and digitalization of collaborative processes
6. Agent-based support for group facilitation including innovative facilitation methods, techniques, patterns, and procedures to improve (a)synchronous collaboration between co-located and distributed people, teams, or groups
7. Studies and frameworks that examine trust in, satisfaction with, and expectations of artificial intelligence
8. Design features for automated teammates that improve human collaboration with them
9. Studies of group dynamics when an artificial teammate is on the team
10. Methods and technologies for eliciting and capturing tacit knowledge from experts (i.e., externalization) and sharing / incorporating that knowledge into collaborative efforts with automation

This year, we have five excellent papers that cover a variety of important topics. The first paper, “Hello World! I am Charlie an, Artificially Intelligent Conference Panelist,” presents a case study exploring the development and effectiveness of an AI-driven conversational agent as a conversational panelist. Next, the paper “Digital Facilitation Assistance for Collaborative, Creative Design Processes” provides insight into the capabilities of digital assistants for task, process, and interaction facilitation in collaborative and creative endeavors. The third paper, “Between Anthropomorphism, Trust, and the Uncanny Valley: a Dual-Processing Perspective on Perceived

Trustworthiness and Its Mediating Effects on Use Intentions of Social Robots,” utilizes a dual processing theory approach to investigate whether an uncanny valley of trust can be observed for social robots and how this effect differs between the intuitive and deliberate processing systems. In the fourth paper, “Human-AI Collaboration in Healthcare: A Review and Research Agenda,” the authors conduct a literature review on human-AI collaboration in the healthcare space to identify research gaps and propose future research directions for humans collaborating with intelligent systems. Finally, the paper “Implementing an Intelligent Collaborative Agent as Teammate in

Collaborative Writing: toward a Synergy of Humans and AI” looks at integrating an artificial intelligent agent into a collaborative writing process following a design science research process; identifying requirements for the agent to be considered a teammate, proposing design principles for the agent, and evaluating these by implementing them in an online web-application.

We thank the authors for submitting their work to make this an engaging mini-track. We hope you enjoy the papers and their presentations at this year’s online conference and look forward to future collaboration opportunities.