Collaboration with Automation: Machines as Teammates

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Advances in artificial intelligence promise a future of computing that will transform the relationship between human and machine from tool to collaborative partner. This future has been referred to as the "cognitive computing" era and is characterized by a class of systems that learn and interact naturally with us to perform knowledge work. Next generation automated systems are designed to augment human expertise, amplify human intelligence, enhance productivity, and improve decision making.

This "Cognitive Computing Era," is characterized by computer systems that can learn from experience and acquire new abilities. Additionally, future cognitive computing systems may be able to take advantage of new computer architectures and not limited by the redundancies and bottlenecks of von-Neumann-style computing machines. Future cognitive computing systems will make use of technology such as distributed computing architectures and quantum computing for example. Cognitive computing builds upon the foundations of artificial intelligence and machine learning; it is the collection of computer services and componentry required to deliver cognition as a service, which powers cognitive systems that augment and scale human expertise. Humans still use automated agents for simple, utilitarian tasks, but these types of assistants are able to undertake larger and more important tasks.

As cognitive systems advance and become more ubiquitous, we need to explore new dimensions of human-computer collaboration based on natural communication patterns and consideration of human 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 at the intersection of human-machine collaboration. Specifically, this mini-track focuses on:

1. Human collaboration with artificial agents and intelligent decision support for teams, crowds, and individual decision makers

2. Design and evaluation of smart technology as team members including agent-based support (e.g., robots, chatbots) for decision makers

3. Usability Engineering aspects for human collaboration with automated teammates

4. Automation and digitalization of collaborative processes

5. 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

6. Individual differences that impact collaboration with and acceptance of automated agents

7. Studies and frameworks that examine trust in automated agents and its impact on collaboration with automation

8. Design features for automated teammates that improve human collaboration with them

9. 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 four great papers that cover a variety of important topics. The first paper, "SPAM – A Process Model for Developing Smart Personal Assistants" discusses a process for developing a class of cognitive computing systems. Next, "The Power of Computer-Mediated Communication Theories in Explaining the Effect of Chatbot Introduction on User

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Experience" provides insights about the theories that underpin chatbots and their impact on users. The third study, "Practice Makes Perfect: Lesson Learned from Five Years of Trial and Error Building Context-Aware Systems" explains lessons learned and provides guidance for how to build cognitive context aware cognitive systems. Finally, "Conceptualization of the Human-Machine Symbiosis – A Literature Review" proposes a framework for the design of close and long-term human-machine interactions.

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 the conference and look forward to the collaboration and insights.