Collaboration with Cognitive Assistants and AI

Eva Bittner
University of Hamburg
Bittner@informatik.uni-hamburg.de

Philipp Ebel
University of St. Gallen
Philipp.ebel@unisg.ch

Sarah Oeste-Reiß
University of Kassel
oeste-reiss@uni-kassel.de

Matthias Söllner
University of Kassel
soellner@uni-kassel.de

1. Introduction

In the field of information systems, as well as in the computer science domain, artificial intelligence (AI) constitutes one of the most rapidly growing streams of research. This is mainly due to the fact that technological innovations enable the development of productive AI solutions (e.g. inherent in cognitive assistants) that provide compelling benefits in various fields of application.

However, despite the recent advances, we are still far away from a strong or general AI comparable to a human intelligence, especially when it comes to intelligence across certain domains or tasks. Therefore, the importance of the engagement of humans into the decision process of AI systems is widely acknowledged in research and practice. Although a considerable amount of exploration regarding such Human-AI-Collaboration has been conducted, the breadth and scope for dialogue and experimentation needs to be broadened. This minitrack aims to provide a place for such dialogue and support of a diverse community interested in taking the challenge further.

The three papers that have been selected provide an excellent starting point for research concerning the collaboration between humans and AI systems.

The first paper "*The Advent of Digital Productivity Assistants: The Case of Microsoft MyAnalytics*" examines digital work environments that allow for great flexibility on the one hand but contribute to blurring work/life boundaries on the other hand. The paper presents a case study among three organizations about Digital Productivity Systems (DPA) that create awareness about collaboration behavior and suggest improvements. By combing auto-ethnographic insights with interview data, the paper explores how PDSs work to influence collaboration and productivity management behavior. Barriers to DPAs' effective use as a partner in personal productivity management are also identified.

The second paper "*Understanding Human-AI Cooperation Through Game-Theory and Reinforcement Learning Models*" introduces game theory as a useful tool for researching human-machine interaction as well artificial agents that cooperate with humans in complex environments. The paper presents an empirical study to understand how different modern reinforcement learning algorithms and game theory scenarios could create different cooperation levels in human-machine teams. To this purpose the paper examines three different reinforcement learning algorithms (Vanilla Policy Gradient, Proximal Policy Optimization, and Deep Q-Network) and two different game theory scenarios (Hawk Dove and Prisoners dilemma) in a large-scale experiment. The results indicate that different reinforcement learning models interact differently with humans with Deep-Q engendering higher cooperation levels. The results highlight the importance of social and task framing in human-artificial intelligence systems.

The third paper "*Deep learning object detection as an assistance system for complex image labeling tasks*" deals with an area of application of deep learning and points out that robustness and accuracy of fully automated systems are often insufficient for practical use. The paper proposes as solution, that integrating results from Artificial Intelligence (AI) and human intelligence in collaborative settings might bridge the gap between efficiency and accuracy. The study results presented in the paper prove increased efficiency when supporting human intelligence through AI without negative impact on effec-

HĭCSS

tiveness in a fine- grained car scratch image labeling task. By referring to the benefits of 'AI in the loop of human intelligence' approaches, the contribution of the paper refers to potential practical application scenarios and envisions the implementation of assistance systems supported by computer vision.

In sum, the three paper that have been selected for presentation within this mini-track, show the plethora of research avenues that the collaboration between humans and machines holds. We look forward to the presentations of these papers at HICSS 54.