

Applications of Human-AI Collaboration: Insights from Theory and Practice

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1. Introduction

The field of information systems faces disruptive changes due to the progressive advantages in artificial intelligence (AI). Especially a new notion of AI-enriched collaboration and AI-based teammates emerges. Technological innovations enable the development of innovative AI solutions (e.g. inherent in cognitive assistants) that provide compelling benefits in various fields of application. However, 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. Even though a considerable amount of exploration regarding human-AI collaboration has been conducted, the breadth and scope for dialogue and experimentation needs to be broadened. This minitrack focuses on practice inspired research of human-AI collaboration. Submissions deal with real-world problems for orchestrating collaborative activities to solve tasks by using a combination of human and machine intelligence (hybrid intelligence).

The minitrack intends to shed light on promising and unexplored application areas in which human-AI collaboration creates value (e.g., AI teammates augment humans in coping with collaboration and working challenges). Papers in this minitrack are either inspired by real-world problems or discuss practical applications of human-AI collaboration. The seven papers that have been selected provide an excellent starting point for research concerning the collaboration between humans and AI-based systems.

The first paper “Human-AI Collaboration – Coordinating Automation and Augmentation Tasks in a Digital Service Company” examines how the collaboration between humans and AI unfolds in different organizational coordination mechanisms.

Using Mintzberg’s coordination mechanism, the authors analyzed the division of labor between human and AI in a case company that offers personalized recipes of vegetarian dishes. The findings of the study suggest that certain primary coordination mechanisms (direct supervision and standardization of norms) need to be in place for the AI to perform properly. In addition to that, the authors find that AI can take control over service scaling and service personalization (augmentation), whereas humans are in control of service improvement (automation). In that, the authors deliver a contribution to the automation-augmentation paradox that has been previously discussed in literature.

The second paper “How Can Organizations Design Purposeful Human-AI Interactions: A Practical Perspective From Existing Use Cases and Interviews” focuses on the growing number of humans interacting with AI-based agents more regularly and the resulting need to examine and design human-AI interactions purposefully. The paper draws on existing AI use cases and perceptions of human-AI interactions from 25 interviews with practitioners. From this practical lens on existing human-AI interactions, the paper introduces nine characteristic dimensions to describe human-AI interactions and distinguish five interaction types according to AI-based agents’ characteristics in the human-AI interaction. Besides, the paper provides initial design guidelines to stimulate both research and practice in creating purposeful designs for human-AI interactions.

The third paper “Supporting Online Customer Feedback Management with Automatic Review Response Generation” addresses the issue that businesses in the hospitality industry often lack necessary resources to organize and manage online customer feedback, which plays a significant role in a

business' image and performance. Although AI-based technologies may offer valuable solutions, there is currently little research on if and how AI solutions may support the process of responding to online customer feedback in the hospitality industry. This paper presents and evaluates a concept for assisting customer feedback management with automatically generated responses to online reviews. The proposed solution contributes to ongoing investigations into text generation applications for supporting human authors and also proposes new approaches and potential business models for managing online customer feedback.

The fourth paper “Human-Machine Hybrid Decision Making with Applications in Auditing” addresses the change in work environments toward AI involvement in decision making processes. The authors suggest an innovative process for hybrid decision making between humans and machines. To derive such process for a specific domain, they present a framework for examining the introduction of AI technology into organizational decision making and associated consequences and illustrate it exemplarily within the auditing domain. The paper provides a methodology for the design of decision making process based on decomposing a task into mutually exclusive functions with an emphasis on the decision making partnership between human and the machine. Besides, it proposes a novel procedure to define and assign decision making duties based on the organization objectives and limitations as well as mechanism to provide solutions to the unexpected consequences of technology exposure, such as judgmental bias, lack of accountability, and long-term consequences of replacing experts in the field by data

scientists who have less expertise in the subject matter.

The fifth paper “The Cognitive Effects of Machine Learning Aid in Domain-Specific and Domain-General Tasks” investigate the impact of Machine Learning solutions on cognitive performance, especially when the ML output is not always accurate. In order to do so, the authors examined the cognitive effects of the presence of simulated ML assistance—including both accurate and inaccurate output—on two tasks (a domain-specific nuclear safeguards task and domain-general visual search task). As the authors were able to show, patterns of performance varied across the two tasks for both the presence of ML aid as well as the category of ML feedback (e.g., false alarm). These results indicate that differences such as domain could influence users’

performance with ML aid and suggest the need to test the effects of ML output (and associated errors) in the specific context of use, especially when the stimuli of interest are vague or ill-defined.

The sixth paper “The Effect of AI Advice on Human Confidence in Decision-Making” investigates how AI can support human decision-making processes. Here the authors focus on questions related to the design of different collaborative environments. They conduct a laboratory experiment with 458 participants in the context of AI-assisted human decision-making processes. More precisely, the participants completed an image classification task and were assigned to one of three experimental groups: a) a control group in which participants did not receive any AI advice, b) a treatment group with AI advice and c) a treatment group that received AI advice and information on the certainty of the AI. The results indicate that while AI advice can increase human overconfidence, this overconfidence can be mitigated by adding information on the certainty of the AI.

The seventh paper “Vero: A Method for Remotely Studying Human-AI Collaboration” addresses the challenge that the development of effective human-AI collaboration requires different technical skills that are typically scarce in research as well as practice. The authors develop a novel experimentation method to make the development of effective human-AI collaboration more accessible. The method combines a video conferencing platform, Wizard-of-Oz methods as well as controlled content to simulate a group interaction with an AI teammate. Using a case study, the authors show different advantages of their method, e.g., in terms of flexibility, ease of deployment, and a high-quality interaction experience between the group and the AI agent.

In sum, the seven papers that have been selected for presentation within this HICSS-55 minitrack, show a rich plethora of research that applications of human-AI collaboration hold.