UCAI 2021: Workshop on User-Centered Artificial Intelligence

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ABSTRACT

The proliferation of AI-based techniques poses a range of new challenges for the design and engineering of intelligent and adaptive systems since they tend to act as black boxes and do not offer the user sufficient transparency, control, and interaction opportunities, which are considered major goals of user-centered design in the HCI field. This workshop aims at sharing and discussing recent developments at the intersection of HCI and AI, and at exploring novel methodological, technical, and interaction approaches. Researchers with diverse disciplinary backgrounds can and should contribute to advancing the research agenda in this emerging field of research.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; • **Computing methodologies** → **Artificial intelligence**.

1 THEMATIC SCOPE

The *Workshop on User-Centered Artificial Intelligence* (UCAI 2021) will address topics at the intersection of human-computer interaction (HCI) and artificial intelligence (AI) with the aim of strengthening user-centered aspects in the design of AI-based systems. A major topic in this regard is empowering users by making intelligent and adaptive systems more transparent, interpretable and scrutable. From a user- and activity-centric perspective, it is furthermore important to design the user interaction with intelligent systems in their application context in a more effective, comprehensible and accountable manner, thus engaging users beyond checking final system outputs. Counteracting potential biases in data and algorithms is another important goal to increase trustworthiness and fairness. There are also methodological gaps in evaluating AI-based systems with respect to user experience, acceptability and ethical impact.

Therefore, the workshop welcomes a range of topics of interest, including but not limited to:

- transparent and explainable AI-based systems
- personalization, recommendation and adaptation
- UI paradigms for interacting with intelligent algorithms
- presentation and interaction design for AI-based systems
- user control of intelligent algorithms
- mixed-initiative interaction
- user-centric evaluation of AI-based systems
- ethical and legal aspects of AI-based systems

2 GOALS, PLANNED PROGRAM AND AUDIENCE

The *goals* of this workshop are 1) strengthening the community of researchers within the GI and the HCI section for this important and emerging area of research by fostering knowledge exchange and facilitating networking, 2) providing a platform to present and discuss scientific work on recent developments relevant with respect to the topics of the workshop, and 3) developing a research agenda for future work on interactive AI-based systems.

The second edition of the UCAI workshop, which had to be held online last year, is planned as a full-day on-site event in conjunction with the MuC 2021 conference in Ingolstadt. The workshop will be split in two parts:

The *first part* of the workshop will be devoted to the presentation of scientific work addressing concepts, ongoing developments and empirical evaluations within the thematic scope. To engage participants with the broader scope of UCAI research, we plan to have a keynote speech and possibly a panel discussion. To gain more in-depth insights into current research projects, we will publish a Call for Papers on the workshop website (https://ucai-sig.org/events/ucai21/) and distribute it accordingly. We will accept position papers of 2 pages and full papers of 4-6 pages in length (excluding references), submitted via *ConfTool* until June 11th, 2021. Papers will be peer-reviewed by at least two reviewers from a program committee consisting of the workshop organizers and others. In accordance with the timeline published for MuC 2021, acceptance notifications will be sent out July 2nd, 2021. Camera-ready versions will be due July 9th, 2021.

Authors of accepted full papers will be invited to orally present their work at the workshop, including discussion with the audience. In a poster session (and possibly during coffee), authors of accepted position papers will be asked to present their work. We plan to take and classify notes for the interactive second part of the workshop.

The *second part* of the workshop will focus on discussion, networking, and, in particular, the development of a research agenda on future work, i.e. aspects we were only able to address to a limited extent in the first edition of the workshop due to last year's virtual format. For this, we will discuss topics identified in the first part with the workshop audience in order to adapt or extend them. Next, single topics will be discussed in smaller groups in order to characterize important elements, finding main opportunities, and identifying pain points for the agenda for future research on user-centered AI-based systems, which we will put together afterwards and make accessible via the workshop website.

After the workshop, we plan to publish accepted papers in the *MuC Workshop Proceedings* accessible through the GI digital library, as we have done in last year's edition of the workshop.

We welcome participants both from academia and industry. The *target audience* of the workshop are, for instance, HCI practitioners and developers that aim at using AI techniques as well as researchers including (PhD) students active at the intersection of HCI and AI, or in one of the specific disciplines.

3 SUMMARY OF ACCEPTED SUBMISSIONS

This year, the UCAI workshop received nine submissions, of which three full and four position papers were accepted.

3.1 Full Papers

The three full papers focus on a broad spectrum of user-centered AI, from the use of explanations in conversational user interfaces, via guidelines for design decisions in XAI systems, to the comparison of AI algorithms in a user-centered system for small data analysis.

An Explainability Approach for Conversational User Interfaces in Walk-Up-And-Use Contexts: This paper extends the interface and interactions in conversational user interfaces (CUI) with explanations on the inner state of the conversational agent. The authors design their explainable conversational user interface (XCUI) in a user-centered design process to provide an understanding of the chatbot's inner state (confidence, intent alternatives, entities, context). The final prototype is tested with 49 participants for improvements in satisfaction and task completion time. They show that for some tasks, the XCUI resulted in better satisfaction scores, but not for all tasks that were performed during the study.

Design Decision Framework for AI Explanations: This paper presents a framework on how to design AI explanations with a user-centered focus. The framework covers three phases: domain, explanation, and interface. In the domain phase, designers should leverage interviews, focus groups, and similar methods to identify the data and explanations needs in the domain. In the explanation phase, the domain needs are abstracted in terms of tasks, data, and model. To avoid misalignment, the authors suggest performing controlled user studies and field studies testing the chosen alignment. In the interface phase, the abstractions are connected to best practice explanation and interaction designs based on the literature. Finally, the paper presents how this framework was applied to a software use case.

How can Small Data Sets be Clustered?: This paper discusses the performance of clustering algorithms on small datasets. Small datasets pose great challenges to classical machine learning algorithms, e.g., for clustering. Such datasets are also often integrated into human-centered systems since they require more human involvement to be correctly interpreted. The authors compare three different clustering algorithms: k-means, HAC, and DBSCAN. On a preliminary use case of a small dataset, they show that both k-means and HAC outperformed DBSCAN.

3.2 Position Papers

The four accepted position papers provide interesting discussion points and challenges in the field of user-centered AI, ranging from the need for auditing algorithms, over the need for more unified approaches to research and design of decisions aids, the trade-offs between precision and recall in certain disciplines, to the use of XAI beyond trust and mental model building.

Audit, Don't Explain – Recommendations Based on a Socio-Technical Understanding of ML-Based Systems: This position paper provides a perspective on the systematic use of audits for machine-learning-based systems. The author argues that explanations are not sufficient to capture and control the involvement of different actors, such as the organizations, data providers, users, and developers in these systems. The paper proposes to fill this gap with mandatory audits performed by independent institutions, including predefined punishments for non-compliance with the law.

On the Convergence of Intelligent Decision Aids: This paper argues that different interactive decision aids, such as search, recommendation, and digital advisors, are still mainly studied in separation. The author suggests unifying research on and development of decision aids by bringing both different approaches and evaluation methodologies closer together. The holistic perspective focuses on user characteristics and contextual factors.

Noise over Fear of Missing Out: This paper argues that although many systems optimize for both precision and recall, some tasks and user groups might prefer one over the other. The authors show in a small study how users' fear of missing information leads to higher perceived task support in higher recall systems, while precision was not related to task support. The authors propose that such perceptions and fears might generalize to other high-stake domains.

The Role of Explanations of AI Systems: Beyond Trust and Helping to Form Mental Models: This paper proposes goals for explanations of AI systems that go beyond increasing the user's trust and forming a mental model of the AI. The author presents insights from an already published explainability study for a legal text summarization solution. From the observations, it is concluded that explanations can also help users detect errors in machine-generated output and improve the generated content with the content of the explanation.

4 ORGANIZERS

Continuing the prior successful collaboration, the 2021 edition of the workshop will again be jointly organized by two working groups of the GI Section on Human-Computer Interaction, the SIG *Nutzerzentrierte Künstliche Intelligenz* (NKI) and the SIG *Adaptivität und Benutzermodellierung in interaktiven Softwaresystemen* (ABIS). Members of the organization committee are:

- **Daniel Buschek** leads the Junior Research Group on HCI + AI at the University of Bayreuth, funded by the Bavarian State Ministry of Science and the Arts, coordinated by BIDT. His research combines Human-Computer-Interaction and Machine Learning / Artificial Intelligence, both to improve user interfaces with computational methods and to render intelligent systems more interactive and explorable. Previously, he worked at the Media Informatics Group at LMU Munich, where he also completed his doctoral studies, as well as at the University of Glasgow and Aalto University, Helsinki.
- **Benedikt Loepp** is a postdoctoral researcher at the University of Duisburg-Essen with main research interests at the intersection of HCI and machine learning, focusing on recommender systems, especially interactive approaches and preference elicitation mechanisms.

- **Hanna Hauptmann** is an assistant professor at the Human-Centered Computing Group of Utrecht University. She previously worked at the Data Analysis and Visualization group of the University of Konstanz on human-centered design for interactive intelligent systems by providing, among others, explainable AI, personalization, persuasion, guidance, and gamification. She received her doctoral degree at the Technical University of Munich on building socio-technical systems for healthy nutrition.
- **Wolfgang Wörndl** is a senior researcher and lecturer at the Department of Informatics at Technische Universität München (TUM). His current research focuses on interactive recommender systems in mobile scenarios.