



# UCAI 2024: 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 either act as black boxes or, more generally, not offer the user sufficient transparency, control, and interaction opportunities, which are considered major goals of user-centred design in the HCI field. This workshop aims to share and discuss recent developments at the intersection of HCI and AI and to explore novel methodological, technical, and interaction approaches. Researchers and practitioners with diverse disciplinary backgrounds can and should contribute to addressing the challenges in this emerging field of human-centred artificial intelligence.

## CCS CONCEPTS

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

## KEYWORDS

User-Centered, Artificial intelligence, Human-Computer Interaction

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## 1 SCOPE

The Workshop on User-Centered Artificial Intelligence (UCAI 2024) will address topics at the intersection of human-computer interaction (HCI) and artificial intelligence (AI) with the aim of strengthening user-centred aspects in the design of AI-based adaptive systems. This topic complements the general UMAP theme in the sense that most user-centred AI interactions involve adaptation to users and modelling user information in some format. At the same time, not

every adaptive system is focused on the specific interactions appearing in a user-centred AI system. Challenges of such adaptive AI systems occur at the contextual level (legal limitations of AI), engineering level (black box, data bias), design level (how to present, etc.), and within the interactions between those levels. 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
- algorithmic affordance and interaction affordance
- 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
- folk theories and user beliefs about AI-based systems
- techniques to audit AI-based systems
- hybrid intelligence systems
- effects of generative AI models on research, practice, and education
- application of AI-based systems to predict human states and behaviours

## 2 GOALS, PLANNED PROGRAM AND TARGET AUDIENCE

The goals of this workshop are strengthening the community of researchers working at the intersection of AI and HCI in general and connecting researchers, especially within the UMAP community, for this important and emerging area of research by fostering

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knowledge exchange, facilitating networking, and providing a platform to discuss recent developments relevant to the topics of the workshop.

The fifth edition of the UCAI workshop is planned as an interactive half-day on-site event in conjunction with the UMAP 2024 conference in Cagliari, Italy. All information on the previous four editions of this workshop can be found on the UCAI website (<https://uca-sig.org/events/>). We accepted provocation and position papers of 2 pages and short research papers of up to 7 pages in length (excluding references), submitted via *EasyChair*. Submissions could describe early research findings, lessons learned, demos of current or visions of future user-centred AI-based systems, and broader research agendas of individuals and collectives. Papers were peer-reviewed by at least two reviewers from the program committee (see Table 1. In past workshops, we followed different setups for submission. In 2023, we only looked for provocation and position papers, of which we accepted 11 contributions. In the years before 2020–2022, we accepted both research papers and position papers. In 2022, we accepted three full papers and one short paper. In 2021, we accepted three full papers and four position papers. In 2020, we accepted six research and two position papers.

At the workshop, we focused on knowledge exchange, networking, and discussion, for which the accepted papers served as a point of departure. We identified common topics in advance and discussed them in smaller groups in order to characterize important elements, find main opportunities, and identify pain points. In previous editions of this workshop, this commonly led to one session with short paper presentations and one session with interactive group work and plenary discussions.

We welcome participants both from academia and industry. The target audience of the workshop is, for instance, AI and HCI practitioners and developers that aim at using interactive 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 five submissions, of which two full and two position papers were accepted. In the following, we briefly summarize these contributions.

#### 3.1 Full Papers

**Towards Exploring Personalized Hyperlink Recommendations Through Machine Learning:** This paper addresses the challenge of navigating the overwhelming amount of links available in internet searches. The authors introduce the HypeRec system as a browser extension to guide users in choosing hyperlinks on a current website based on their interests and preferences. The recommendation engine utilized NLP techniques to predict the user's ratings for the text content underlying a proposed hyperlink. The paper presents an offline test of the proposed algorithm compared to other algorithms based on a dataset collected from 40 participants exploring and evaluating 50 websites. The results reveal the potential of the new NLP-guided technique but also emphasize the limitations of the small sample analyzed and the need to fine-tune the approach further.

#### **Representation Debiasing of Generated Data Involving Domain Experts:**

This paper tackles the issue of mitigating representation biases in data underlying a machine learning model. The authors propose a human-in-the-loop system for domain experts to control data generation and augmentation processes. The paper presents the design of an interactive system that facilitates this process via 1) a bias awareness visualization tool, 2) a multivariate constraint planner to iteratively control and adjust the data generation, 3) a conditional sampling interface to give the user insights into the underlying data, and 4) a what-if exploration to check the impact on model predictions. Finally, the authors report on an exploratory user study with five healthcare domain experts, leading to three additional system improvements.

#### 3.2 Position Papers

##### **The Need for User-centred Assessment of AI Fairness and Correctness:**

This position paper discusses how the quality issues of AI systems (bias, truthfulness, robustness) can currently not be fairly assessed, specifically not by lay users of the systems. It argues that, despite developments in this area, important issues still remain, such as definition issues (what and when is an AI fair), the trade-off issues (between accuracy and fairness, for instance), the dominance of the technical perspective of the AI experts over user-centred perspectives, and the inherent lack of skills among lay users. The authors call for a user-centred approach to the quality assessment of AI and formulate the foundational research questions for this perspective.

##### **"How Good Is Your Explanation?": Towards a Standardised Evaluation Approach for Diverse XAI Methods on Multiple Dimensions of Explainability:**

This position paper discusses the benefits of a multidimensional use of XAI methods regarding the data, models, predictions, and end-users, as well as the lack of adequate quality assessment for such multidimensional explanations. While user-centric measurements such as trust, understandability and usefulness are essential, they do not capture the full scope of quality assessment. On the other hand, objective measures, algorithmic assessment, or task-based performance measures are limited in a multi-explanation approach since effects cannot be traced back to one explanation. The authors call for a normalized XAI evaluation approach considering both subjective and objective quality metrics on multiple dimensions of explainability. They further present the first requirements for the setup of such a framework, such as holistic measurements, flexibility, model-agnostic property, and intra-system vs inter-system comparison.

### 4 ORGANIZERS

The workshop is co-organized by the GI special-interest group Nutzerzentrierte Künstliche Intelligenz (NKI). Members of the organization committee are:

**Daniel Buschek** is a professor for mobile intelligent user interfaces at the University of Bayreuth. 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. Daniel has been co-organizing the UCAI workshop since its first edition in 2020.

**Julian Frommel** is an assistant professor in Interaction/Multimedia at Utrecht University. His overall research goal is to contribute to the theoretical understanding, design, and implementation of interactive digital systems that provide safe, healthy, meaningful, and enjoyable experiences for users. Specifically, his research also investigates how interactive systems can help mitigate the negative outcomes of interacting with systems, such as being targeted or exposed to toxicity and harassment in digital spaces. Julian has joined the UCAI committee in 2023. Besides UCAI, he has co-organized multiple other workshops, e.g., at CHI (Combating Toxicity, Harassment, and Abuse in Online Social Spaces: A Workshop at CHI 2023) and CHIPLAY (Workshop on Understanding and Combating the Problematic Side of Play).

**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. Hanna has been co-organizing the UCAI workshop since its second edition in 2021.

**Hendrik Heuer** is a computer science professor at the Center for Advanced Internet Studies (CAIS) and Bergische Universität Wuppertal. His research is focused on trustworthy artificial intelligence. He is working on ways to fight disinformation and to make text more accessible. Hendrik has been co-organizing the UCAI workshop since its third edition in 2022.

**Aletta Smits** is an associate professor at HU University of Applied Sciences Utrecht. Her research focuses on algorithmic affordances: user interface mechanics that afford users of smart systems to communicate with the algorithm and exert tangible control over its outcomes. Aletta is joining the UCAI team in 2024. She also has prior workshop organization experience, e.g., with the 1st International Workshop on Algorithmic Affordances in Recommender Interfaces held in conjunction with INTERACT 2023.

## 5 PROGRAM COMMITTEE

Table 1 lists all the program committee members.

**Table 1: Members of the UCAI program committee**

Name	University
Aletta Smits	HU University of Applied Sciences Utrecht
Andrea Papenmeier	University of Twente
Arthur Fleig	University of Bayreuth
Benedikt Loepp	University in Koblenz
Claudia Müller Birn	Freie Universität Berlin
Daniel Buschek	University of Bayreuth
Eelco Herder	Utrecht University
Florian Fischer	University of Bayreuth
Gabriela Carolina Molina León	University of Bremen
Hanna Hauptmann	Utrecht University
Hanna Schraffenberger	Radboud University
Hendrik Heuer	Center for Advanced Internet Studies & University of Wuppertal
Jo Pfau	Utrecht University
Julia Neidhardt	Vienna University of Technology
Julian Frommel	Utrecht University
Jörg Cassens	Universität Hildesheim
Koen van Turnhout	HU University of Applied Sciences Utrecht
Philipp Krieter	IU International University of Applied Sciences
Priyan Vaithilingam	Harvard
Wolfgang Würndl	Technical University of Munich