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Artificial Intelligence for Humankind: A Panel on How to Create Truly Interactive and Human-Centered AI for the Benefit of Individuals and Society

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Abstract. This panel discusses the role of human-computer interaction (HCI) in the conception, design, and implementation of human-centered artificial intelligence (AI). For us, it is important that AI and machine learning (ML) are ethical and create value for humans - as individuals as well as for society. Our discussion emphasizes the opportunities of using HCI and User Experience Design methods to create advanced AI/ML-based systems that will be widely adopted, reliable, safe, trustworthy, and responsible. The resulting systems will integrate AI and ML algorithms while providing user interfaces and control panels that ensure meaningful human control.

Keywords: AI and Society · Explainable AI · Human-Centered Artificial Intelligence · Interactive Machine Learning · Intelligent Systems · Intelligent User Interfaces · Trust and Bias in AI.

1 Motivation

AI is promising revolutions in many areas of our lives. We have observed major advances in machine learning (ML) algorithms over the last years, leading to impressive systems for example in image understanding and natural language recognition. Data is collected at scale and the number of available data sets (public or inside companies) is growing rapidly, as many understand the fundamental value of data. Many applications are, however, not focusing on people, they are not human-centered. In the following, we discuss why advancing AI and ML algorithms and technologies is not sufficient and why it will not be enough to create the AI revolution. In order to make real progress that is meaningful for humans, as individuals as well as for society, we have to understand how to fundamentally change the design of interactive systems with the new potential and capabilities of AI.

2 Understanding The Challenges

This preview of the panel conversation includes a set of statement made by the authors. The challenges that are discussed range from fundamental questions on the impact of AI on humankind to specific issues that relate to the design of tools and systems that are useful for people. One core question is about the role of HCI. Why is HCI key to making AI valuable for individuals and society?

“HCI is the forward-thinking research field that considers not only the quality of technological artifacts but their purpose, value, user experience, and fit for the individual and the society.”

“HCI emphasises the human side of the interaction between people and AI: rather than highlighting algorithmic performance, HCI emphasises how to create a positive impact on human users and society.”

How does HCI add innovation to AI research? What skills are there, that researchers and practitioners in interaction design will bring to the table?

“AI research focuses on the design and evaluation of algorithms, which is important, but a complete system includes some form of user interface and control panel. HCI complements and advances AI research by studying the design and conducting the evaluation of user interfaces. The User Experience Design approach suggests that the goal can be more than autonomous intelligent humanoid robots. IxD [interaction Design] opens the door to supertools, active appliances, tele-bots, and control centers.”

“HCI generates and evaluates simpler, yet more powerful ways to interact with intelligent systems that not only improve human performance, but also satisfaction and control.”

“HCI’s key approaches are creativity, involving different people in the design and research process, and critical thinking. This combination is the essence of innovation, that also benefits AI application research.”

“In addition to strong design and technical skills, they must master diverse qualitative and quantitative methods for designing and assessing the effect of intelligent systems on human users.”

Systems based on AI, machine learning algorithms, and data driven applications have a direct impact on people’s lives. There were many cases that reported bias - in data as well as in algorithms. However, systems should be fair. Is bias inevitable in intelligent systems?

“Biases are not totally inevitable and they may also reflect some existing phenomena. However, we have to put on the table all the needed safeguards to avoid undesirable effects and/or to discover/control direct and hidden bias. Transparency and explainability play an important role in highlighting. Then we have to decide how to manage them.”

There is the hope that artificial intelligence will help us to address and solve the grand challenges of our times. How can we as HCI researchers address sustainability with AI in mind?

“We can design and research persuasive and ethically sound interactive systems that utilise AI for the benefit of different target groups and related stakeholders. All facets of sustainability can be advanced, i.e. ecological, economic and social sustainability, by using AI’s proactive, optimising and bias-free characteristics.”

Another significant challenge is to foster an inclusive society. Here participation is key. How can we ensure eParticipation on a societal level with more and more AI systems available in our lives?

“Various AI systems can proactively bring into people’s attention socially relevant issues. For example, youths’ eParticipation can be advanced by context-sensitive digital services or even embodied agents such as social robots. Such AI systems can use persuasive techniques to nudge people to participate and hence advance inclusion of all people.”

Currently there is generally a separation between creating basic AI technologies and the user experience created. However, this does lead to solutions that are not putting the human at the center. Why is it not possible to separate research in AI-algorithms and in AI-UX?

“If we are going to have explainable AI, then there may be a need to modify and improve the algorithms to make them more explainable. Visual interfaces to support explainability leads to improved algorithms, because developers will get a better understanding of what their algorithms are doing and what happens when their algorithms are incorrect, biased, or vulnerable to adversarial attacks.”

Related to this is the question, are we still in control or if AI is taking over more and more of our choices. How can we balance human control and the need for high levels of automation?

“We want to do more than balance human control and automation. HCAI [Human-Centred AI] can lead designers to high levels of human control and high levels of automation.”

We have to question the way we interact with computer on a fundamental level. Why do should we move from human-computer interaction to a human-computer partnership?

“Human-computer partnerships take advantage of the best human and AI capabilities, while minimizing their limitations, making it possible to upskill humans, not deskill or replace them.”

Rethinking the relationship between computational devices, algorithms, data, individuals, and society is a prerequisite to a potential AI revolution.

3 Reading List in Human Centered AI

With the following reading list We like to highlight a broad view of "Human Centered Artificial Intelligence". The articles are a starting point to offer different perspectives on interactive intelligent systems and the role of human-computer interaction in their development. We have included basic definitions for the topics, considerations how this can change design, and how we develop new interaction paradigms. Further, we highlight issues related to trust and explanations, as well as societal aspects of the impact on people's lives. We also included several concrete examples.

- Human-centered Artificial Intelligence: Three fresh ideas. [13]
- Interactive Human Centered AI: A Definition and Research Challenges [10]
- Human-Centred Machine Learning [3]
- Design Lessons From AI's Two Grand Goals: Human Emulation and Useful Applications [14].
- How Might Design Practice Change in the AI Era? [6]
- Intervention UIs: a New Interaction Paradigm for Automated Systems [12]
- How do People Train a Machine? Strategies and (Mis)Understandings [9]
- Human-Centered Artificial Intelligence: Reliable, Safe Trustworthy [15]
- Opening the black box: a primer for anti-discrimination [8]
- Meaningful explanations of Black Box AI decision systems [7]
- ImageSense: An Intelligent Collaborative Ideation Tool to Support Diverse Human-Computer Partnerships [4]
- Expressive Keyboards: Enriching Gesture-Typing on Mobile Devices [1]
- Fieldward and Pathward: Dynamic Guides for Defining Own Gestures [5]
- The End of Serendipity: Will Artificial Intelligence Remove Chance and Choice in Everyday Life? [11]
- GreenLife: A Persuasive Social Robot to Enhance the Sustainable Behavior in Shared Living Spaces. [2]
- CivicBots: Chatbots for Supporting Youth in Societal Participation [16]

4 Conclusions

Advancing AI technologies and improving ML algorithms will not lead to an AI revolution. We argue that human-computer interaction is the key discipline for creating meaningful tools, systems, applications, and devices that incorporate AI. HCI offers the skills and tools to make use of AI and ML to create meaningful and valuable experiences for individuals and society.

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