

Diversity-Aware Hybrid Human-Artificial Intelligence

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Abstract

We summarize the purpose and outcomes of the first Workshop on Diversity-Aware Hybrid Human-Artificial Intelligence (DHHAI 2023), which was organized as part of the second International Conference on Hybrid Human-Artificial Intelligence (HHAI 2023), and was held on June 26, 2023 in Munich, Germany.

1. Introduction

The increase in social media and Internet users' exposure to diversity has not come with new instruments and skills to deal with it, despite the invariable impact that diversity has had on human lives. The DHHAI 2023 workshop sought to promote richer and deeper social interactions by enabling "The Internet of Us", a diversity-aware Hybrid Human-Artificial Intelligence online platform that improves upon the limitations of existing systems by being robust to the many forms of diversity and to the fact that most of them will be unexpected and unknown. The focus of the workshop on "The Internet of Us" moves away from the traditional view of a network of computers that, in turn, may be connected to people, and towards a hybrid network of people and AI systems, where the interactions are mediated and facilitated by AI systems. In the same way that the Internet connects computers by abstracting over their diversity via the creation of a common communication layer, the goal of the envisioned online platform is to connect people, and augment their social interactions, by creating a common human-level communication layer above their diversity and differences, towards a better and more inclusive society.

Towards this goal, the workshop solicited contributions on any topic relating to the general theme of the workshop, with the word-cloud in Figure 1 providing an indicative list of relevant keywords. Contributions were expected to be highly interdisciplinary, with a focus on human involvement and on how to develop meaningful paradigms of AI-enabled human-human interactions, human-AI interactions, and human-centered AI-AI interactions. A non-exhaustive list of relevant disciplines and subdisciplines that could contribute to the workshop's goal is: Agents and Multi-Agent Systems, Ethics, HCI, Knowledge Representation, Machine Learning, Ontologies, Privacy, Psychology, Social Computing, Social Psychology, Social Sciences.

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Figure 1: Indicative and non-exhaustive list of keywords relevant to the general theme of the workshop.

In addition to the aforementioned topics, the workshop also solicited contributions on “Empirical Studies on Hybrid Human-Artificial Intelligence” that describe the results of the empirical analysis of data about human behavior that were provided by the workshop organizers.

2. Organization

2.1. Organizing Committee

- Loizos Michael, Open University of Cyprus & CYENS Center of Excellence, Cyprus
- Fausto Giunchiglia, University of Trento, Italy
- Jessica Heesen, University of Tübingen, Germany

Shared data-analysis task:

- Matteo Busso, University of Trento, Italy

2.2. Programme Committee

- Ivano Bison, University of Trento, Italy
- Ronald Chenu-Abente, Aalborg University, Denmark
- Luca Cernuzzi, Universidad Catolica De Asuncion, Paraguay

- Amalia De Götzen, Aalborg University, Denmark
- Shyam Diwakar, Amrita University, India
- Kobi Gal, Ben Gurion University, Israel
- Amarsanaa Ganbold, National University of Mongolia
- George Gaskell, London School of Economics, UK
- Daniel Gatica-Perez, Idiap and EPFL, Switzerland
- Alethia Hume, Universidad Catolica De Asuncion, Paraguay
- Styliani Kleanthous, Open University of Cyprus, Cyprus
- Vasileios Markos, Open University of Cyprus
- Lakmal Meegahapola, Idiap and EPFL, Switzerland
- Daniele Miorandi, UHopper, Italy
- Jahna Otterbacher, Open University of Cyprus, Cyprus
- Nardine Osman, CSIC-III A, Spain
- Salvador Ruiz Correa, Instituto Potosino de Investigación Científica y Tecnológica, Mexico
- Laura Schelenz, University of Tübingen, Germany
- Avi Segal, Ben Gurion University, Israel
- Carles Sierra, CSIC-III, Spain
- Donglei Song, Jilin University, China
- Andrea Aler Tubella, Umeå University
- Hao Xu, Jilin University, China

3. Programme

The workshop programme comprised presentations of 11 peer-reviewed short papers, which were contributed following a call for papers. The papers were grouped into three sessions:

Diversity in Social Interactions

- Nardine Osman, Bruno Roselli Gui and Carles Sierra. “Leveraging Diversity in Online Interactions”.
- Isidoros Perikos and Loizos Michael. “Sensitive Content Recognition in Social Interaction Messages”.
- Andrea Mercado Kroll, Alethia Hume, Ivano Bison, Fausto Giunchiglia, Amarsanaa Ganbold and Luca Cernuzzi. “Social Interactions Mediated by the Internet and the Big-Five: A Cross-Country Analysis”.
- Savvas Charalambides and Loizos Michael. “Intra Organizational Communication 2.0”.

The Implications of Diversity

- Vasileios Theodoros Markos and Loizos Michael. “An Empirical Exploration of Diversity Perception”.

- Colton Botta, Avi Segal and Kobi Gal. “Personalizing Interventions with Diversity Aware Bandits”.
- Amit Sultan, Avi Segal, Guy Shani and Kobi Gal. “Addressing Popularity Bias in Citizen Science”.
- Laura Achón, Ana Cristina De Souza, Alethia Hume, Ronald Chenu-Abente, Amalia De Götzen and Luca Cernuzzi. “‘SOS TUTOR ÍA UC’: A Diversity-Aware Application for Tutor Recommendation Based on Competence and Personality”.

Diversity and Context-Awareness

- Matteo Busso and Xiaoyue Li. “A Context Model for Collecting Diversity-Aware Data”.
- Matteo Busso, Amalia De Götzen and Ronald Chenu Abente Acosta. “A Research Infrastructure for Generating and Sharing Diversity-Aware Data”.
- Ivano Bison and Haonan Zhao. “Factors Impacting the Quality of User Answers on Smartphones”.

4. Conclusions

The presentations raised a fair amount of interactions and lively discussions between the participants. In particular, the workshop highlighted the relevance of a certain key points:

- The need for machines to become deeply aware of humans and of how to interact with them given their diverse characteristics. The current work in, e.g., HCI, Machine Learning, and AI in general, is a very good starting point, but much deeper forms of interaction are required. See, for instance, the papers by Osman et al., Perikos et al., and Bison et al.
- Following from above, the need for highly interdisciplinary research spanning Ethics, Privacy, Psychology, the Social Sciences, etc., for the development of meaningful paradigms of human-centered and AI-enabled interactions in hybrid human-AI societies. See, for instance, the papers by Kroll et al., Charalambides et al., Markos et al., and Bison et al.
- The strong implications that diversity awareness has on the development of AI algorithms, this being a topic dealt with essentially by all the papers presented at the workshop.
- The need for research which is highly experiment-driven and the consequent need for supporting this type of research by ensuring, for example, the availability of high-quality data about human behavior. See, for instance, the paper by Busso, De Götzen et al.

Following the interest expressed before and during the workshop, the organizers announced their plans to edit a Special Issue of “AI Communications: The European Journal on AI” on the general theme of the workshop, and invited participants to contribute their relevant work.

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