Human-Computer Interaction

A Journal of Theoretical, Empirical, and Methodological Issues of Interaction Science and System Design

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Call for Papers for a Special Issue on

Intelligent Systems for People with Diverse Cognitive Abilities

Special Issue Editors

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This special issue highlights state-of-the-art research in intelligent systems and technology for people with diverse abilities. To control scope, we focus on cognitive diversity, including but not limited to, neurodevelopmental disorders and autism, cognitive and learning disabilities, and dementia. This special issue targets the challenges and requirements inherent to the development and assessment of such systems.

The inclusion of people with disabilities is extremely important since about 26% (1 out of 4) in the US have some form of disability. This statistic is reflected worldwide, with 15% of the population experiencing a form of disability. Prior research has developed numerous technologies that support people with physical (e.g. mobility impairments), and sensory disabilities (e.g., blindness and deafness), but less so when it comes to cognitive disabilities. However, according to the Center for Disease, Control and Prevention, the second most widespread form of disability regards cognition (11%). Cognitive disabilities pose challenges from the perspectives of: (1) intelligent systems (e.g., which user data to consider, how to design novel efficient algorithms, which information to present, etc.), (2) interaction design (e.g., how to present information, in which format, etc.) and (3) technology (e.g., development and sound assessment of new algorithms and technologies). The lack of work in this area can be explained by the difficulty in managing the subjectivity of this condition, contrasting with physical problems.

As a result, prior research efforts in developing intelligent systems to support people with cognitive disabilities are limited. Among the HCI community, technology has been widely used to support people with cognitive disabilities for managing specific problems in specific

categories of users, such as social interaction for people with autism (Putnam et al, 2019; Martín et al., 2019, Boyd et al, 2016, Simm et al. 2016, Grynszpan et al, 2014), understanding issues for people with learning disabilities (Bryant et al, 2014) and communication and job training for people with cognitive impairments (Roldán et al., 2021, Samuelsson and Ekström, 2019, Smith et al, 2011).

With recent advances in artificial intelligence (AI) techniques, the study of intelligent systems to support people with cognitive disabilities has become more relevant, since AI potentially increases the accessibility of services (Mauro et al, 2020, Ng and Pera, 2018, Costa et al 2017, Hong et al 2012). There is a growing number of examples showing how AI is being used by people with different disabilities. For instance, new applications offer image and facial recognition for people with visual impairments (e.g., Kianpisheh et al., 2019), lip-reading for people with hearing impairments (e.g., Mattos et al, 2018), conversational interaction for people with cognitive impairments (e.g., Yaghoubzadeh and Kopp, 2015) and real-time captioning and translations for people with hearing impairments and second language learners (e.g., Martinez, 2021).

Ethical issues are also a concern (Lillywhite and Wolbring, 2019. Such considerations are compounded by the challenge of making AI itself more inclusive, focusing on AI fairness for people with disabilities (Trewin et al, 2019; Guo et al. 2020), as well as explicitly considering the implications of designing intelligent systems to and for people with cognitive disabilities (Lewis, 2020). Moreover, it is necessary to consider the risks of AI for this target population, for example, discrimination against people with disabilities, lack of awareness of AI, and misfounded trust AI (Smith and Smith, 2021).

In this special issue, we solicit papers to improve awareness of the state-of-the-art. We also hope to identify open issues and new opportunities for research. We also want to build community, as research in this area is disseminated across many different venues. This special issue offers direct opportunities to spotlight research efforts that take multiple perspectives and different application focus (HCI, IR, RecSys, ML, AI, User Modeling, User Behavior, Interaction, development of new algorithms, etc.).

Topics of Interest

With this special issue, we target open challenges and opportunities related to how to best model users and items in this space; how to deal with the disproportionate amount of data for diverse populations and how that impacts design and development; how to make new and existing strategies supporting this population address trade-offs between privacy and personalization and finally to understand current limitations of sharing datasets and evaluating intelligent systems serving users with diverse cognitive abilities.

Specifically, the topics of interest for the special issue include (but are not limited to):

- Conceptual models and framework for intelligent applications for people with cognitive disabilities;
- How to model cognitive disabilities: which data to collect, how to collect them, formalisms to represent user data;
- Interaction models for people with cognitive disabilities and user-centered design for

intelligent applications for people with cognitive disabilities, also considering universal design approach;
- Search systems for people with cognitive disabilities, such as conversational and traditional modes of interaction with search systems;
- Job training systems for people with cognitive disabilities;
- Personalized support for people with cognitive disabilities;
- Recommender systems for people with cognitive disabilities;
- Recommendation and search based on expert/human in the loop paradigm;
- Ethical and privacy issues in dealing with intelligent applications for people with cognitive disabilities;
- Evaluation and associated concerns (restrictions inherent to the population under study, lack of shared datasets or benchmarks to enable comparisons, metrics);
- Usability and accessibility studies where the participants are people with cognitive disabilities.

Timing:

- Call for Proposals: 15th May 2022
- Proposals due: 1st July 2022
- Response to authors: 15th July 2022
- Full papers due: 15th October 2022
- Reviews to authors: 15th January 2023
- Revised papers due: 15th March 2023
- Reviews to authors: 1st June 2023
- Final papers due: 1st July 2023

Submission of Proposals

To help authors find a good fit, we encourage proposals. Proposals should be about 1000 words and provide a clear indication of what the paper is about. Proposals will be evaluated for relevance to the special issue theme, and guidance will be given. Both proposal and full paper submissions should be submitted to the HCI Editorial site (https://rp.tandfonline.com/submission/create?journalCode=HHCI). Follow the guidelines and instructions for submissions on the site. There is a place on the submission site to note that your submission is for the special issue. Special Issue submissions will be peer-reviewed to the usual standards of the HCI journal.

For questions and queries about the special issue, please email one of the special issue editors.

Special Issue Editors

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Noemi Mauro is an Assistant Professor at the Computer Science Department of the University

of Torino where she obtained a PhD in Computer Science with Honors. Her research interests concern user modeling, recommender systems, human-computer interaction, information filtering and information visualization. She recently won the best paper award at UMAP 2020 with the paper "Personalized Recommendation of PoIs to People with Autism" and the outstanding program committee member award at HT 2020. She is a program committee member of the top conferences in her research areas and reviewer for several related journals. She has been co-chair of four editions of the Workshop on Personalized Access to Cultural Heritage (PATCH) and she is a co-guest editor of the special issue "AI and HCI Methods and Techniques for Cultural Heritage Curation, Exploration and Fruition" in the Applied Sciences journal.

Federica Cena, University of Torino (federica.cena@unito.it)

Federica Cena is an Associate Professor at the Computer Science Department of the University of Turin (http://www.di.unito.it/~cena.). She works on the intersection of Artificial Intelligence and Human-Computer Interaction. In the last years, she is mainly devoted to studying the implications of Internet of Things for user modeling and personalisation, with a special focus on assistive applications for cognitive disabilities and frailty. She is the author of more than 100 scientific publications at conferences and in international journals. She leads as guest editor several special issues on different journals, among others Journal of Human Computer Studies, ACM Transactions on Intelligent Interactive Systems, ACM Transactions on Intelligent Systems and Technology, Computer, Behaviour and Information technology, New Review of Hypermedia and Multimedia.

Cynthia Putnam, DePaul University (cputnam@depaul.edu)

Cynthia Putnam is an Associate Professor in the College of Computing and Digital Media at DePaul University located in Chicago, Illinois. Currently, her research is focused on user experience (UX) practice to inform pedagogy. Recent work has focused on several areas concerned with diverse users, including: (1) helping therapist make decisions on game-based therapy for their patients with brain injuries, (2) exploring uses and desires of caretakers for software aimed at children with autism in their care, and (3) models for teaching accessibility in university classrooms. She has served on the Program Committee for the ACM Conference on Computers and Accessibility since 2016.

Maria Soledad Pera, Boise State University (SolePera@boisestate.edu)

Maria Soledad Pera is a Computer Science Associate Professor at Boise State University. Her expertise is in Information Retrieval, focused on how technology can facilitate information access to specific user groups. Along with interdisciplinary academics and practitioners, she takes a human-driven approach to advance knowledge on the design, development, evaluation, and deployment of information retrieval systems (search and recommendation) for often underserved populations, including children, teachers, as well as individuals who speak English as a second language, are affected by autism, or experience mental disorders. She has authored more than 100 scientific publications, reviews for journals like ACM TOIS,

and serves as Senior PC for ACM RecSys, SIGIR, in addition to being part of PC committees for conferences like ACM CHIIR and ACM UMAP.

David Roldán Álvarez, University of Universidad Rey Juan Carlos (david.roldan@urjc.es)

He obtained his PhD from the Universidad Rey Juan Carlos in July 2017. His interests are teaching innovation through technology to improve both the performance of teachers and the performance of students. From September 2015 to August 2018 he was research staff within the department of Computer Engineering of the Universidad Autónoma de Madrid, financed by the competitive call "aid for predoctoral contracts for the training of doctors 2014" of the Ministry of Industry, Economy and Competitiveness. He is currently working as a doctoral assistant professor at the Escuela Técnica Superior de Ingeniería de Telecomunicación de la Universidad Rey Juan Carlos, combining his teaching work with participation in research projects.

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