



Special Issue: Advanced human–computer interfaces for promoting inclusive communication and social interaction

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Accepted: 17 October 2023 / Published online: 4 November 2023

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Humans communicate for various reasons, such as exchanging information, expressing needs and desires or developing social relationships. Talking, gesturing, or reading are just some mediums we use to communicate. However, disability can influence how an individual acquires and understands information, limiting communication. To ensure that the exchange of information meets everyone's communication needs, the message needs to be perceivable, understandable and communicated via an accessible medium.

Information and Communication Technologies (ICTs) have a key role in promoting inclusive communication by facilitating, transforming or augmenting messages, or enhancing interaction and communication. New approaches in Human–Computer Interaction (HCI) using multimodal interfaces, Artificial Intelligence (AI) or Extended Reality (XR) offer the possibility to remove accessibility barriers, which will foster individuals with disabilities to participate more actively in public life, express themselves and build and maintain social relationships.

This special issue looks at research on the design, development, evaluation, and use of ICT applications, tools, and systems that promote communication and social interaction.

The articles in this issue address the pressing need for innovative solutions to promote soft skills in children with ADHD, improve accessibility for individuals with hearing and cognitive impairments, and empower users in various contexts. From leveraging virtual reality for public speaking practice to crafting accessible tools for video calls and creating user-friendly interfaces for cognitive accessibility, these studies collectively underscore the potential of cutting-edge technology to bridge gaps, enhance accessibility, and enrich the lives of diverse populations. Through collaborative efforts and thoughtful design, these articles offer valuable insights and practical strategies for building more inclusive and interconnected digital landscapes.

In *Empowering soft skills in ADHD children through the co-creation of tangible tabletop games*, E. Cerezo, C. S. González-González and C. Bonillo present their investigation into effective strategies for promoting soft skills in children with ADHD through technology. They explore methods and frameworks suitable for enhancing this group's creativity and social skills. The study includes a pilot experience where children with ADHD collaboratively create a game using tangible tabletops. Results indicate that these strategies effectively encouraged positive behaviors, including improved communication, collaboration, and creativity during the sessions. This research offers valuable insights into practical approaches for nurturing soft skills in children with ADHD.

In *Effects of Audience Familiarity on Anxiety in a Virtual Reality Public Speaking Training Tool*, D. Monteiro, A. Wang, L. Wang, H. Li, A. Barrett, A. Pack and H.N. Liang introduce a solution to the challenge of public speaking practice, a critical skill in both professional and academic realms. They address the limitations in finding a suitable environment and a willing audience for rehearsals. To overcome these hurdles, the authors developed a virtual reality environment featuring 3D scans of real people, creating a realistic and familiar audience. Their study explores the impact

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of presenting to a familiar virtual audience versus an unfamiliar one, and whether exposure to customized virtual faces influences subsequent anxiety levels when presenting to a real-life audience. Notably, individuals with a moderate fear of public speaking derived the greatest benefit from presenting to a virtual audience with familiar faces. Furthermore, the study investigates non-traditional metrics for detecting anxiety. Lastly, the findings emphasize the importance of users' perception of virtual audience feedback, particularly their focus on facial expressions rather than body language.

In *Exploring automatic text-to-sign translation in a healthcare setting*, L. Esselink, F. Roelofsen, J. Dotlacil, S. Mende-Gillings, M. de Meulder, N. Sijm and A. Smeijers address the challenge of communication between healthcare professionals and deaf patients, which the COVID-19 pandemic has amplified. They develop a prototype system to automatically translate common medical phrases, particularly related to COVID-19, from Dutch or English to Dutch Sign Language (NGT). The system employs both pre-recorded videos featuring a human signer for some sentences and computer-generated signing avatars for others. Their evaluation reveals that while individual signs are accurately reproduced by the avatar, sentence comprehension, and clarity suffer compared to human signers. The study identifies limitations in the underlying JASigning avatar engine, which require resolution for practical use in the future.

In *Inclusive AR/VR: Accessibility Barriers for Immersive Technologies*, C. Creed, M. Al Kalbani, A. Theil, S. Sarcar and I. Williams tackle the problem of accessibility barriers in the context of augmented and virtual reality (AR/VR) for individuals with disabilities. They led multidisciplinary sandpits involving academic researchers, AR/VR industry experts, people with disabilities, assistive technologists, and representatives from disability-focused organizations. Together, they collaboratively explored challenges within AR and VR experiences. The study highlights key themes that emerged from these activities, pinpointing interaction barriers across various impairments, including physical, cognitive, visual, and auditory disabilities. The authors conclude with recommendations for future work to address these challenges and stimulate the development of more inclusive AR and VR experiences.

In *Automatic captions on video calls, a must for the older adults*, E. Nacimiento-García, C.S. González-González and F.L. Gutiérrez-Vela address the increasing use of video call and conferencing tools, particularly due to the surge in demand during the COVID-19 pandemic. They focus on the challenges faced by older individuals with hearing difficulties who may struggle to fully benefit from video calls. To mitigate this issue, the authors have developed an automatic conversation subtitling tool utilizing Automatic Speech Recognition and Speech to Text technology, supported by the open-source tool Coqui STT. This platform-independent tool enables older adults and individuals with hearing diversity to enjoy video calls with ease. The study includes feedback from older adults to assess the benefits of the interface, and configuration preferences, and proposes enhancements to text display.

Finally, in *Designing user interfaces for content simplification aimed at people with cognitive impairments*, L. Moreno, H. Petrie, P. Martínez, and R. Alarcon introduce cognitive accessibility design patterns and their application in designing the user interface for the Easier web system. This system aims to improve text content comprehension and readability for people with intellectual disabilities by detecting complex words and providing simplified alternatives, along with definitions of complex terms. Their results demonstrate that individuals with cognitive impairments can effectively use the Easier web system interfaces and have a satisfactory user experience. The article also presents a design proposal for a glossary mechanism to be integrated into web interfaces featuring simplified texts, which has been validated for its effectiveness.

The guest editors would like to thank all the reviewers for their valuable input in selecting and improving the papers collected for this special issue. We sincerely hope that readers will find this collection a valuable reference on digital accessibility in the field of Human–Computer Interfaces.

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