Workshop on Assistive Augmentation

Abstract

Our senses are the dominant channel for perceiving the world around us, some more central than the others, such as the sense of vision. Whether they have impairments or not, people often find themselves at the edge of sensorial capability and seek assistive or enhancing devices. We wish to put sensorial ability and disability on a continuum of usability for certain technology, rather than treat one or the other extreme as the focus.

The overarching topic of the workshop proposed here the design and development of assistive technology, user interfaces and interactions that seamlessly integrate with a user’s mind, body and behavior, providing an enhanced perception. We call this "Assistive Augmentation".

The workshop aims to establish conversation and idea exchange with researchers and practitioners at the junction of human-computer interfaces, assistive technology and human augmentation. The workshop will serve as a hub for the emerging community of assistive augmentation researchers.

Author Keywords
Assistive Technology, Augmented Human, Design Science, Wearable Computing, Perception, Sensing

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Motivation
Our senses are the dominant channel for perceiving the world around us, some more central than the others, such as the sense of vision [7]. With impairments and lack thereof, people find themselves at the edge of sensorial capability and seek assistive or enhancing devices. The overarching topic of the workshop proposed here is centered on the design and development of assistive technology, user interfaces and interactions that seamlessly integrate with a user’s mind, body and behavior, providing an enhanced perception. We call this "Assistive Augmentation".

Assistive augmentation finds its application in a variety of contexts, for example in providing a scaffold for people when they feel their innate senses are inadequate or to support development of desired skillsets (cf. Figure 1). We wish to put sensorial ability and disability on a continuum of usability for certain technology, rather than treat one or the other extreme as the focus. We therefore follow the design rationale of [13] stating technology should be socially acceptable, work coherently for disabled and non-disabled alike, and support independent and portable interaction. The latter requirement challenges both user interface and interaction design in particular, as Jones and Marsden point out: “the test comes when it [the device] is deployed in the complex, messy world of real situations […] when it has to be used in the wild, as it were, in tandem with the world around it, the usability can break down quickly” (cf. [4], p. 51).

Challenges for Assistive Augmentation
The creation of assistive augmentation faces a variety of challenges due to its cross-disciplinary nature. The following challenges are envisioned as the point of departure for the conversation at the workshop.

Synthesis of Assistive and Augmenting Technologies
Emerging technologies for human augmentation continuously change how we perceive and interact with our surroundings, as well as ourselves. They strive to augment our sensory abilities for increased well-being, e.g. by stimulating our motor system [6] or even the gustatory perception [9]. At the same time, assistive technologies emerge that promise e.g. to scaffold sensory disabilities, e.g. to improve reading capabilities of the blind through technologies such as BrailleTouch [14] or UbiBraille [12]. The workshop intends to...
Novel sensory modalities; e.g. sensory substitution, sensory fusion, synesthesia
Alternative, novel feedback modalities
Novel technology and interaction support targeting sensory enhancement, e.g.
- Mobile and personal technologies
- Wearable interfaces
- Eyes-free, hands-free, interactions
- Imaginary interfaces
- Brain-computer interfaces
- Unobtrusive interaction
- Cross-domain transfer of interfaces and technologies
Ethnographic studies on assistive augmentations
Comparative studies showing the effect of using novel interaction technology
Approaches that leverage on assistive augmentations for inclusive design
Design methods for assistive augmentations
Ethical issues, e.g. focusing on
- Quality of assistive augmentations
- Appropriation of human augmentations
- Critical perspectives
- Fictional or futuristic ideographs, utopian or dystopian

Figure 2. Exemplary workshop topics

provide a cross-disciplinary forum to think and brainstorm about novel technologies that draw upon both research thrusts along the ability continuum—between sensorial ability and disability. Furthermore, the workshop will explore how research in these both thrusts can trigger cross-fertilization and spur innovation towards assistive augmentation technologies.

Design Science of Assistive Augmentations
Assistive augmentations require a holistic design perspective to increase efficiency, work coherently for disabled and non-disabled alike, and also support independent and portable interaction [15]. Discussions in this workshop will also revolve around questions such as: what is a good assistive augmentation, what is its quality and when can it be considered successful? Also, can we build on well-established research and evaluation methods that are effective in the assistive technologies accessibility communities? The workshop will focus on how the community can converge towards a design science of assistive augmentation as a common ground through e.g. design ethnography.

Ethical Issues: Existing ethnographic research sheds light on stigma and misperceptions people face when using assistive technology in social situations [16], such as being publicly marked as a disabled person, or that technology can effectively eliminate disability. Augmenting technology also harbors ethical implications, as it breaks the conception of an even playing field for all once certain people start augmenting their natural-born senses with technology [5]. The workshop will explore ethical questions such as: how can technology be designed to discourage stigma, self-consciousness or social asymmetry in its users?

Workshop Topics
The organizing committee is comprised of researchers working at the intersection of HCI, assistive technology and human augmentation. They draw on extensive experience from studying sensorial capabilities and impairments [18], as well as developing and novel technology and interfaces that e.g. strengthen impaired senses [10,11], enhance healthy ones [8] and augment [2,17], as well as leverage on their unique capabilities [1]. Given the advent of communities such as Augmented Human, as well as the pioneering research in the areas of assistive technology and accessibility, the workshop will address topics that are located at the junction of both (cf. Figure 2 for an exemplary list).

Workshop Goals and Outcomes
One of the main goals of this workshop is to establish conversation and idea exchange with researchers and practitioners at the junction of assistive technology and human augmentation. The workshop will serve as a hub for the emerging community around assistive augmentation. Along these lines, the cross-disciplinary discussion of human-computer interfaces and common design thinking is key; for which CHI provides the ideal platform. Further workshop goals and envisioned outcomes comprise:

- Exploration and identification of key challenges for assistive augmentation to direct future research within the community
- Critical discussion of fundamental issues with assistive augmentations, such as both their quality and their success, as well as ethical discussions
- Stimulate and spice the discussion through interactive demonstrations of research prototypes by attendees at the workshop
• Fostering of cooperation through common brainstorming and low fidelity prototyping
• Establishment of a cross-disciplinary core interest group that will steer future endeavors
• Production of tangible outcomes, in particular the solicitation of contributions in the form of chapters for a book edited by the workshop organizers. The book is to be published in coordination with Springer, Singapore.

References