

Day: Tuesday
Session: Interaction
Time slot: 10:45 – 11:09
Talk no.: 1

TOWARDS AN ETHICAL DEFINITORY FRAMEWORK FOR BOTH TRADITIONAL AND NOVEL HUMAN-COMPUTER INTERACTION PARADIGMS

Laurens Ruben Krol^{1,*}, Thorsten Oliver Zander²

¹Team PhyPA, Biological Psychology and Neuroergonomics, Technische Universität Berlin, Berlin, Germany

²Zander Laboratories B.V., Amsterdam, The Netherlands

*lrkrol@gmail.com

ABSTRACT

A prevailing definition of human-computer interaction (HCI) concerns the *field* of HCI and not the subject matter, i.e., the interaction itself [1]. It is common to rely on a broad understanding of interaction, as even technical committees tend to define only top-level terms such as “user” and “system” [2]. As a result, HCI does not have a standard framework of terms that allow specific HCI instances or paradigms to be modelled in detail with shared understanding and consistency. This, however, is increasingly necessary given the expansion of HCI into novel areas. We ourselves have referred to implicit control [3] and neuroadaptive technology [4] as being distinct from traditional HCI paradigms in specific ways, while simultaneously firmly anchoring them in the context of HCI developments. Such novel areas of HCI require additional aspects not covered by traditional definitions to be taken into account, as brain-actuated devices make aspects such as volition, intention, emotion, and even consciousness crucial to the type of interaction that can take place.

On the one hand, these increasingly relevant aspects of HCI call for a clear framework of shared understanding about what is and is not “interaction.” On the other hand, these uniquely human aspects likely prohibit any definition from being fully technical, formal, or unambivalent. With that in mind, we suggest an updated framework of terminology related to HCI. This framework aims to consistently cover both traditional and novel HCI paradigms, to allow HCI to be modelled at different levels of abstraction, and to convey ethical considerations which exclude abusive paradigms from using the same terms. We thus also suggest that the field of HCI, and neuroadaptive technology in particular, explicitly *not* be a value-free science [5].

Relevant to this conference, we define neuroadaptivity as a property of a computer, which *is neuroadaptive when it acquires implicit input through a brain-computer interface, and uses this input for control.*

The terms *computer*, *implicit input*, *brain-computer interface*, and *control* are defined separately, along with smaller constituent terms such as *data*, *information*, *communication*, et cetera. For this

abstract, we highlight two more terms.

Implicit input is defined as *any information acquired by the receiving unit that the source did not intend to be acquired by the receiving unit*. This illustrates the above-mentioned issue of including such words as *intent* in formal definitions. At what point can it be said that a human—or a computer—*intended* for something to be received? Nonetheless, this is a key issue for the implicit/explicit distinction. The definition thus makes the distinction in the general case, but cannot provide a complete guideline for judging individual instances.

We define *user* as *a human who is communicating or interacting with a computer, and who has given and not revoked consent for this communication or interaction to take place*. This illustrates our proposal to put ethical considerations into the core of what is or is not HCI, which we deem prudent given the advances of e.g. cognitive probing [4].

At NAT'19, we are open to revisions before complete publication of the framework.

REFERENCES

- [1] Hewett, T. T., Baecker, R., Card, S., Carey, T., Gasen, J., Mantei, M., ... Verplank, W. (1992). ACM SIGCHI Curricula for Human-Computer Interaction (Tech. Rep.). New York, NY, USA: ACM.
- [2] DIN EN ISO 9241-210:2010. Ergonomics of human-system interaction—Part 210: Human-centred design for interactive systems.
- [3] Krol, L. R., Andreessen, L. M., & Zander, T. O. (2018). Passive Brain-Computer Interfaces: A Perspective on Increased Interactivity. In C. S. Nam, A. Nijholt, & F. Lotte (Eds.), *Brain-Computer Interfaces Handbook: Technological and Theoretical Advances* (pp. 69-86). Boca Raton, FL, USA: CRC Press.
- [4] Krol, L. R., Zander, T. O., Birbaumer, N. P., & Gramann, K. (2016). Neuroadaptive technology enables implicit cursor control based on medial prefrontal cortex activity. *Proceedings of the National Academy of Sciences*, 113(52), 14898–14903.
- [5] Douglas, H. E. (2009). *Science, policy, and the value-free ideal*. Pittsburgh, PA, USA: University of Pittsburgh Press.

The Second Neuroadaptive Technology Conference

Conference Programme

© 2019 Society for Neuroadaptive Technology



This work is licensed under the
Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.
To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>
or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.