

ORAL SESSION 7: TECHNOLOGICAL NEEDS AND BARRIERS

Adopting an ethical mindset while developing and using 'smart' gerontechnology in long-term care

D.R.M. Lukkien, S. Suijkerbuijk, H.H. Nap

Lukkien et al. (2020). *Gerontechnology* 19(suppl); <https://doi.org/10.4017/gt.2020.19.s.69950>

Purpose In ageing societies, there is an increase in the use of technologies driven by data and artificial intelligence (AI), or more specifically rule-based and self-learning algorithms. A variety of AI-based assistive technologies, such as sensor- and camera-based surveillance systems, decision-support tools in electronic health records, social care robots and virtual nurses and companions, are being tested and deployed in both institutional and community-based aged-care settings (Ambagtsheer et al., 2020; Dermody & Fritz, 2019; Hindriks & Meyer, 2019). We firstly present some examples of (early) AI-based technologies that emerge in the Dutch context of health and ageing. Secondly, we discuss some of the ethical challenges posed by AI and advocate for developers, users and other stakeholders to adopt an ethical mindset in the development and use of AI-based technologies. While responsible innovation always requires explicit attention to potential risks and downsides and the alignment of innovation with societal values, needs and expectations, new challenges arise in the case of AI. The developing autonomy and learning capabilities of AI are namely enabling these systems to decide and act without direct human control, and can lead to situations in which the consequences of AI-based decisions and actions are not always possible to direct or predict (Dignum, 2017). From a policy perspective, a variety of guidelines are being developed and piloted, for instance by the European Commission, that can help to cope with the ethical challenges surrounding AI, including ethical requirements such as human control, safety, privacy, transparency and fairness (European Commission 2019; Jobin et al., 2019). However, state-of-the-art frameworks for responsible AI innovation still leave much room for interpretation as to how they can be applied in specific contexts, such as health and ageing, and little to nothing has thus far been written about their tangible implementation (Jobin et al., 2019; Hagendorff, 2020). In this line, multiple scholars advocate for responsible AI innovation practices that behave sensitively towards individual situations and specific technical assemblages (Hagendorff, 2020; Floridi, 2019). **Method** Based on a review of the existing literature and our experience in multiple projects, we share some preliminary findings of how this challenge is being addressed in gerontechnology. **Results and Discussion** We found that it is often stated that supportive technologies in the area of health and ageing are 'smart', 'intelligent' or 'adaptive' without explication why such properties can be attributed to the technology and how rule-based and/or machine learning algorithms play a role in their operation. Also, we found that the importance of various state-of-the-art principles for responsible AI innovation is reflected in a wide set of studies on the design and/or deployment of AI-based systems in this context, but that the majority of studies lacks substantiation of their implementation. Lastly, we perceive a growing ethical awareness among AI developers and users, but also recognize some of the practical challenges for responsible AI innovation (Blok & Lemmens, 2015).

References

- Ambagtsheer, R.C., Shafiabady, N., Dent, E., Seiboth, C. & Beilby, J. (2020). The application of artificial intelligence (AI) techniques to identify frailty within a residential aged care administrative data set. *International Journal of Medical Informatics*, 136, 104094. <https://doi.org/10.1016/j.ijmedinf.2020.104094>
- Blok, V. & Lemmens, P. (2015). The Emerging Concept of Responsible Innovation. Three Reasons Why It Is Questionable and Calls for a Radical Transformation of the Concept of Innovation. In B.J. Koops, I. Oosterlaken, H. Romijn, T. Swierstra & J. Hoven (Eds.), *Responsible Innovation 2* (p. 19–35). Cham: Springer.
- Dermody, G. & Fritz, R. (2019). A conceptual framework for clinicians working with artificial intelligence and health-assistive Smart Homes. *Nursing Inquiry*, 26(1), e12267. <https://doi.org/10.1111/nin.12267>
- Dignum, V. (2017). Responsible Artificial Intelligence: Designing AI for Human Values. *ICT Discoveries*, 1, 1–8.
- European Commission. (2019). Ethics Guidelines for Trustworthy AI. High-Level Expert Group on Artificial Intelligence. Retrieved from <https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>
- Floridi, L. (2019). Establishing the rules for building trustworthy AI. *Nature Machine Intelligence*, 1(6), 261–262. <https://doi.org/10.1038/s42256-019-0055-y>
- Hagendorff, T. (2020). The Ethics of AI Ethics: An Evaluation of Guidelines. *Minds and Machines*, 30(1), 99–120. <https://doi.org/10.1007/s11023-020-09517-8>
- Hindriks, K.V. & Meyer, J.-J.C. (2019). Artificial Intelligence in Health Care and Medicine: A Personalized Approach. *Acta Scientific Medical Sciences*, 3(10), 71–7. <https://actascientific.com/ASMS/pdf/ASMS-03-0410.pdf>
- Jobin, A., Ienca, M. & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature Machine Intelligence*, 1(9), 389–399.

Keywords: artificial intelligence, health and ageing, responsible innovation, ethics, context, stakeholder involvement

Address: Vilans (Netherlands)

Email: d.lukkien@vilans.nl