

Humboldt Kolleg

Hilton Garden Inn Hotel, Doamnei St. 12, Bucharest
18-22 November 2020

Global Challenges of the 21st Century

- 1) Technological development and human health/ quality of life*
- 2) Climate change and environmental sustainability*
- 3) Democracy and cohesion in Europe*

Artificial Intelligence for the Ageing World: Promises and Challenges

Intelligent computing is rapidly reshaping healthcare. In light of the global burden of population aging and neurological disorders, elderly and dementia care are among the healthcare sectors that are most likely to benefit from this technological revolution. Trends in artificial intelligence (AI), robotics and ubiquitous computing hold the promise of mitigating the global burden of age-related cognitive impairment. In particular, Intelligent Assistive Technologies (IATs) such as AI-based assistants, care robots and cognitive monitoring tools open the prospect of enabling earlier and more continuous cognitive screening, supporting older adults with neurocognitive disabilities, maintain their independence, reduce the burden on caregivers and delay the need for long-term care(1). While technology develops fast, yet little knowledge is available to patients and health professionals about the current availability, applicability, and capability of existing IATs. Furthermore, this increasing reliance on algorithms and automated systems and the associated ubiquitous collection of large volumes of personal data raise ethical challenges (2-4).

This contribution provides both a descriptive overview and a proactive ethical assessment of the promises and challenges associated with using AI in elderly and dementia care. At the descriptive level, we will present the preliminary results of a qualitative interview study exploring the views and attitudes of health professionals, gerontechnology developers and elderly patients with physical or cognitive disability (aged 65-90) regarding the use of AI solutions in elderly and dementia care. Our findings indicate that advances in intelligent technology are resulting in a rapidly expanding variety of assistive solutions for older adults and people with physical or cognitive disabilities. However, our analysis identifies a number of challenges that negatively affect the optimal deployment and uptake of IATs among target users and care institutions. These include design issues, sub-optimal approaches to product development, translational barriers between the lab and the clinics, lack of adequate validation and implementation, as well as data security and cyber-risk weaknesses.

At the normative ethical level, we present the results of an ethical Technology Assessment (eTA) of intelligent solutions for elderly and dementia care. This assessment is primarily focused on intelligent technologies at the human-machine interface such as wearables, cognitive training tools and personal care robots, as these applications enable a greater exposure of the intimate dimension of individuals to the digital infosphere. Issues of privacy (especially in conjunction with big data analytics), physical and mental integrity, equality, and cognitive enhancement will be discussed. Based on this empirical and normative evaluation, some evidence-based recommendations will be outlined with the aim of facilitating participatory and responsible development in intelligent technology, and informing the creation of governance frameworks that maximize the clinical benefits of AI for the aging world, while minimizing unintended risks.

References:

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Marcello Ienca is a Senior Research Fellow at the Department of Health Sciences and Technology at ETH Zurich, Switzerland. His research focuses on the ethical, legal and social implications of neurotechnology and artificial intelligence, with particular focus on big data trends in neuroscience and biomedicine, human-machine interaction, social robotics, digital health and cognitive assistance for people with intellectual disabilities. He is interested in comparative approaches to the study of human and artificial cognition. Ienca is the Principal Investigator of multi-disciplinary federal research projects and has received several awards for social responsibility in science and technology such as the *Prize Pato de Carvalho* (Portugal), the *Vontobel Award for Ageing Research* (Switzerland), and the *Paul Schotsmans Prize* from the *European Association of Centres of Medical Ethics* (EACME). Ienca is serving as appointed member or expert advisor in a number of national and

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