Techno-fixes for an Ageing Society

Paul Higgs and Chris Gilleard

Division of Psychiatry

UCL Faculty of Brain Sciences

6th floor, Maple House

149 Tottenham Court Road

London W1T 7NF

UK

Abstract

For some time, there has been a keen interest in developing Artificial Intelligence (AI) and robotics as solutions to the ageing of society and the growing crisis of social care. Futuristic scenarios have been constructed of robotic care and AI home monitoring systems complementing and supplementing the perceived shortfall in the human care work force. In this editorial we draw attention to some of the more negative consequences that may follow from the successful roboticization of what has been described as 'a labour of love'.

Techno-fixes for an ageing society

Technological innovation has been identified as the solution for a range of contemporary concerns, from human caused climate change to the global pandemic of COVID-19. To this can be added the ageing of the population. Supporting a growing aged population is seen as an increasing burden. The United Nations population projections point to a future when the returns from the so-called demographic dividend dry up and the working age population is slowly outnumbered by people of and over retirement age.

Drawing on the fear of a 'grey planet', apocalyptic demography has prompted considerable public investment and private interest in 'techno fixing' the challenges brought about by ageing. One of the most significant areas where this has become apparent is the promise of a 'networked' society, where artificial intelligence and robotics lay the foundations for a 'fourth age' of change, imagined by some as being on a par with the invention of the wheel and the written word (Reese, 2018).

This techno-future is projected as all pervasive. This can be seen in the then Prime Minister of Japan, Shinjo Abe's vision for realising Society 5.0 (Deguchi et al., 2020). He promoted the idea of a fully integrated, knowledge intensive society, where computerised automated controls could ensure 'comfort in all aspects of life" (op. cit, 2). While other countries have not been so explicit in outlining the technological dimensions of a future society, most of the advanced economies are investing heavily in AI and robotics (Wright 2021).

Although such technologies are being applied to many aspects of life, certain aspects of later life appear particularly ripe to become arenas for digitalisation and robotic support. These tend to focus on frailty and 'anomalous behaviours' in later life emphasising assistance and monitoring as distinct from technologies that are designed to enhance the agency and experience of people with disabilities, irrespective of their age. Technologies that target old

age reflect this asymmetrical bifurcation, directed as they often are towards those least able to exercise control but who are most susceptible to being controlled by others. This is a continuing theme in the literature on users' views of assistive and monitoring technologies.

Papers describing social robots for use in later life have proliferated over the last decade. Reviews of this area have become so common that they seem to be advancing at a faster rate than the actual robotics themselves. First described in the late 1990s, 'robotic eldercare' has advanced from the development of the 'Care-O-bot' (Schraft, Schaeffer and May 1998) to plans for assisted living in robot-integrated smart homes (Do et al., 2018). Considerable public funding, particularly in the European Union and Japan (Wright, 2021) has fostered the development of social robotics. They come in three forms: those designed to perform services for human beings (service robots); those designed to perform anthropomorphic services as 'fellow' human beings (companion robots); and those designed to assist everyday living (assistive robots). Companion robots such as Paro, the 'pet' robot seal, have progressed furthest, offering conversation and encouragement to frail older people in nursing home settings. Service robots are now marketed to adults of all ages offering relief from the daily chores of household maintenance. However, arguably the most desirable – and least realised - are robotic systems designed to assist frail older people perform the basic activities of daily living.

Examples of such assistive robo-care are much less advanced. Despite the 'unskilled' status of the care workers performing these 'labours of love' (Rodriquez, 2014), designing robots to carry out such daily care is proving more complex than getting machines to play chess, drive cars or assemble other machines. Nor is it clear that older people with disabilities want such robo-care. Studies suggest that there is a preference for receiving care from other human beings. As far as robots are concerned, there is a clear preference for robots

offering instrumental assistance in living (help with cleaning, help with laundry, help taking out the trash, etc.) rather than help with the more intimate, everyday activities of daily living, like bathing, dressing, eating, hair dressing, shaving, and so forth (Smarr et al., 2012; 2014).

This instrumental value of robots rates higher than any pleasure or entertainment value that they may offer the older consumer. Even this utilitarian value is constrained by its potential to mark the consumer not as rich, resourceful and 'successfully ageing' but as in some way incapable, impaired or lacking – in short as a 'frailed' older person (Higgs and Gilleard, 2016). Unless, and until, some obvious symbolic capital can be attached to having a robot, akin to having a butler or a maid or a smart vacuum cleaner, the likelihood is that such robo-carers will remain both 'other' and 'othering' (Bischof and Jarke, 2021: 201).

In contrast to the limited potential for assistive robotic technology, AI systems are being actively developed as forms of surveillance technology or what is sometimes called well-being monitoring (Sapci and Sapci, 2019). Much more sophisticated than the use of closed-circuit television in psychiatric services, ambient assisted living monitoring is anticipated to become 'ubiquitous' across age care settings. Concerns regarding the challenges of 'wandering' behaviour among older people with dementia have seen the development of a market for relatively low-cost wearable tracking technologies used by carers to locate the person that they care for (Vermeer, Higgs and Charlesworth 2019).

The monitoring of risk and 'anomaly detection' among older people has moved beyond simply the tasks of the surveillance of their movements to include activity monitoring and the detection of 'risky' or 'unusual' patterns of behaviour (Ghayvat et al., 2019). Such 'passive' monitoring systems, however, are often resisted by older vulnerable persons (Niemeijer, et al., 2010; Niemeijer et al., 2015). Even when they accept trialling of such systems, older people report finding them anything other than 'empowering' (Berridge,

2017). This raises the question of who exercises power in the choice and implementation of such 'techno-fixes' (Sparrow 2016).

Nor is this simply an issue of the different perspectives between carers and cared for persons. It extends to the increasing use of semi-autonomous programmes, developed, managed, and monitored by care-provider commissioned artificial intelligence systems. One can imagine that, in some more dystopian future, decision-making and control might no longer be the domain of individual carers and health and social care professionals but might be 'locked in' to what works best at the technological interface. There is a gap already between the actual present nature of assistive technology and its imagined future realisations. In one survey of what providers of existing assistive technologies in the USA thought would be the most important future developments in 'assisted mobility', the majority (52%) replied that they would like to see devices that made transfers to and from a wheelchair simpler, safer, and more pain free (Dicianno et al., 2018: 4). When asked about critical future developments, the majority voted for better, longer lasting sources of power to increase the range of electric wheelchairs (op.cit. 4). In short, the need for better versions of existing technology was prioritised over new robotic developments.

In making these points we seek to draw attention to the contradictions inherent when proposing technology as the solution to the challenges of an ageing society. Artificial intelligence, digitalisation and robotics might seem to offer solutions by effectively automating health and social care sufficiently to overcome the restrictions imposed by limited supplies of (largely younger) labour. Introducing a range of technological fixes, it is claimed, can help the human species evolve beyond the limits imposed by its biological evolution into a putative 'Humanity 2.0' (Fuller, 2011). Technologically enhanced communities could ensure that much of the daily labour of production, social reproduction and self-maintenance could be performed through smart machines coordinated through an

Internet of Things within the wider community. Such communities are however speculative rather than based on specific achievements and derive more from concerns over mounting costs and limited labour supply than enriching the experience of later life.

What of improving society? Many public health researchers argue that social change can help resolve the problems of inequity in ageing societies. The observed differences in health and longevity associated with inequalities in education, income and wealth provide evidence that some, already existing influences can and do influence the desired rectangularisation of the lifespan. For some, the scope to extend educational opportunities, grow greater wealth and increase the sources and scope of income across society and across the life course promises a future of 'fully automated luxury communism' (Bastani, 2020). For others, to achieve a step change in the future of long-lived human society is seen to require more than mere social betterment or improved social mobility: it requires rewiring human nature and human society. The Japanese Government's vision of such a fully integrated Society 5.0 where everyone's everyday comfort is ensured might seem to be the ideal 'dementia-friendly' community, where the Internet of Things supplies most basic needs – and cleans up afterwards. In the meantime, the last two decades have seen a ten-fold increase in the sale of 'welfare vehicles' in Japan, a nine-fold increase in the sale of canes and walking frames and a seven-fold increase in the sale of adult diapers (Yamada, 2019: 2). Alongside rising sales of anti-ageing creams and hair dyes, there is a concomitant increase in incontinence pads, blood pressure monitors and self-tracking devices but no sign of any robot-run care homes.

In short, the prospect of an AI techno-fix for our ageing societies remains a 'science fiction', and some way off from becoming a 'Fourth Age' fact. Whether or not such interventions realise a 'dystopian' future predicted by some (Leslie 2019) and which have been reflected in films such as *Ex Machina* is still very much an unwritten page. Robot care

remains as much an unfilled promise as are effective anti-dementia drugs or age reprogramming. They equally inhabit this imagined future. The automation and roboticization of production, we would argue, cannot in the end substitute for the human qualities of care; and may indeed reduce their value. However, delivered, a better goal for care should be to assist human beings to be more, not less fully human. The roboticisation of care might better be directed not at replacing but at helping human carers achieve their aspirations to deliver a kinder and more compassionate care. As with many 'techno-fixes', the problem lies less in the technology itself than in the worldview it embodies.

References

Bastani, A. (2019). *Fully Automated Luxury Communism*. Verso Books, London.

Berridge, C. (2017). Active subjects of passive monitoring: responses to a passive monitoring system in low-income independent living. *Ageing & Society*, 37(3), 537-560.

Bischof, A. and Jarke, J. (2021). Configuring the older adult: how age and ageing are re-configured in gerontechnology design, in [eds.] A. Peine, B.L. Marshall, W. Martin and L Neven, *Socio-gerontechnology: Interdisciplinary critical studies of ageing and technology*, Routledge, London (pp.197-212)

Deguchi, A., Hirai, C., Matsuoka, H., Nakano, T., Oshima, K., Tai, M. and Taniin, S. (2017). What Is Society 5.0? In, *Society 5.0: A People-centric Super-smart Society*. Hitachi-UTokyo Laboratory, University of Tokyo, Springer Open.
(Accessed via: https://link.springer.com/content/pdf/10.1007%2F978-981-15-2989-4.pdf)

Dicianno, B. E., Joseph, J., Eckstein, S., Zigler, C. K., Quinby, E. J., Schmeler, M. R., Schein, RM., Pearlman, J. & Cooper, R. A. (2019). The future of the provision process for mobility assistive technology: a survey of providers. *Disability and Rehabilitation: Assistive Technology*, 14(4), 338-345.

Do, H. M., Pham, M., Sheng, W., Yang, D., & Liu, M. (2018). RiSH: A robot-integrated smart home for elderly care. *Robotics and Autonomous Systems*, *101*, 74-92.

Fuller, S. (2011). *Humanity 2.0: What it means to be human past, present and future*. Palgrave Macmillan, Houndmill, Basingstoke, UK.

Ghayvat, H., Awais, M., Pandya, S., Ren, H., Akbarzadeh, S., Chandra Mukhopadhyay, S., Chen, C., Gope, P., Chouhan, A. and Chen, W. (2019). Smart aging system: uncovering the hidden wellness parameter for well-being monitoring and anomaly detection. *Sensors*, 19(4), 766.

Higgs, P. and Gilleard, C. (2016). *Personhood, Identity and Care in Advanced Old Age*. Policy Press, Bristol, UK.

Leslie, D. (2019). Raging robots, hapless humans: the AI dystopia. *Nature*, *574*(7776), 32-34.

Niemeijer, A. R., Frederiks, B. J., Riphagen, I. I., Legemaate, J., Eefsting, J. A. and Hertogh, C. M. (2010). Ethical and practical concerns of surveillance technologies in residential care for people with dementia or intellectual disabilities: an overview of the literature. *International Psychogeriatrics*, 22 (7), 1129-1142.

Niemeijer, A. R., Depla, M. F., Frederiks, B. J. and Hertogh, C. M. (2015). The experiences of people with dementia and intellectual disabilities with surveillance technologies in residential care. *Nursing Ethics*, 22 (3), 307-320.

Reese, B. (2018). *The Fourth Age: Smart robots, conscious computers and the future of humanity*. Atria Books, London.

Rodriquez, J. (2014). *Labors of Love: Nursing homes and the structures of care work*. NYU Press, New York.

Sapci, A.H. and Sapci. H.A. (2019). Innovative assisted living tools, remote monitoring technologies, artificial intelligence-driven solutions and robotic systems for aging societies: Systematic review. *JMIR Aging*, 2, 2: e15429

(Accessed via: http://aging.jmir.org/2019/2/e15429/)

Schraft, R. D., Schaeffer, C., & May, T. (1998). Care-O-bot/sup TM: the concept of a system for assisting elderly or disabled persons in home environments. In *IECON'98. Proceedings of the 24th Annual Conference of the IEEE Industrial Electronics Society (Cat. No. 98CH36200)* (Vol. 4, pp. 2476-2481). IEEE.

Smarr, C. A., Prakash, A., Beer, J. M., Mitzner, T. L., Kemp, C. C., & Rogers, W. A. (2012)). Older adults' preferences for and acceptance of robot assistance for everyday living tasks.

In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* vol. 56,(1), pp. 153-157. SAGE Publications, Los Angeles, CA.

Smarr, C. A., Mitzner, T. L., Beer, J. M., Prakash, A., Chen, T. L., Kemp, C. C., & Rogers, W. A. (2014). Domestic robots for older adults: attitudes, preferences, and potential. *International Journal of Social Robotics*, 6 (2), 229-247.

Sparrow, R. (2016). Robots in aged care: a dystopian future? *AI & society*, *31*(4), 445-454.

Vermeer, Y., Higgs, P. and Charlesworth, G. (2019), "Marketing of surveillance technology in three ageing countries", *Quality in Ageing and Older Adults*, 20 (1), 20-33

Wright, J. (2021). Comparing public funding approaches to the development and commercialization of care robots in the European Union and Japan. *Innovation: The European Journal of Social Science Research*, doi:10.1080/13511610.2021.1909460.

Yamada, K. (2019). An acquaintance with an ageing society. *Social Sciences*, 8, 110 (Doi: 10.3390/socsci8040110).