

Ethical issues in robot care for the elderly: Dystopia or optimism?

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Abstract. The increasing proportion of elderly people in society, together with recent advances in robotics, makes the use of robots in elder care increasingly likely. Robots in elder care can be used (i) to assist the elderly and their carers; (ii) to monitor the health and safety of old people, and (iii) to provide them with companionship. Although robots could be usefully employed in each of these areas, there is a need to ensure that they actually benefit the old people themselves, and not just their carers. We discuss a number of ethical concerns and argue that, if introduced with foresight and careful guidelines, robots and robotic technology could improve the lives of the elderly. They could enable more independence, and create more opportunities for social interaction

1 INTRODUCTION

Could robots improve the lives of old people? It is often suggested that one way of coping with the increasing proportion of elderly people in our society would be to use robots and related technology to help in their care. As a result, there is a growing industry in developing robots for elder care. However, some ethical concerns are beginning to be expressed about these developments (e.g. [1,2,3,4]). There is concern for instance that using robots for elder care could result in increased social isolation, and could involve deception and loss of dignity. The three main ways in which robots might be used in elderly care are: (i) to assist the elderly, and/or their carers in daily tasks; (ii) to help monitor their behaviour and health; and (iii) to provide companionship. In an effort to determine the likely effects of robots on the lives of old people, we outline recent developments under each of these headings. We identify and discuss both the benefits that might be obtained from deploying robots in eldercare, and the ethical concerns that have been raised about their use. Finally we consider the relative likelihood that robot use in elder care will lead to a dystopia of neglect, or a more optimistic, empowering scenario; concluding with suggestions about ways to ensure that the latter is the case.

Underlying our consideration of the ethical issues involved in using robots in elder care, is the assumption that the human

rights of the elderly deserve as much protection as those of their carers and family. Amongst the fundamental human rights established in documents such as the Charter of the United Nations, and the Universal Declaration of Human Rights, the rights that are usually thought of as particularly relevant to the elderly include rights to a standard of living adequate for health and well-being; to private and family life; to freedom from torture and inhuman or degrading treatment; and to freedom from discrimination. If the human rights of the elderly are to be respected as much as the rights of other members of society, it is important to ensure robots that introduced into elder care do actually benefit the elderly themselves, and are not just designed to reduce the care burden on the rest of society. Hence our opening question, “could robots improve the lives of old people?” focuses on the effect of robots on the elderly themselves, rather than on the utility and convenience of using robots to help care for an aging population.

2 ASSISTIVE ROBOTS AND ELDER CARE

A number of robots have been developed to assist with some of the daily tasks involved in eldercare. Such robots include the Japanese Secom “My Spoon” automatic feeding robot, and the Sanyo electric bathtub robot that automatically washes and rinses. Riken have developed the Riba robot (Robot for Interactive Body Assistance) that has the face of a teddybear; it can pick up and carry humans from a bed to a wheelchair. It can recognise faces and voices and respond to spoken commands. In the US, Charlie Kemp at Georgia Tech, has developed an assistive robot, EI-E that can respond to many of the commands, and perform the same tasks in a house that a guide dog is capable of. When coloured towels are tied to doors, and drawers, the robot can be instructed to open them, using a combination of verbal commands, and a laser pointer to indicate the target location. It can pick up quite a wider variety of objects from flat surfaces [5].

There are some interesting new developments arising from robotic technology that could improve the lives of the elderly. Cyberdene has developed the Hybrid Assistive Limb suit (HAL) that is currently available to rent in Japan. It detects nerve signals sent by a person attempting to move, and then is said to automatically move the muscle as the person expects. It can apparently multiply original strength by a factor of 2 to 10. There are also walking machines from Honda: ‘Stride Management Assist’, and their ‘Walking Assist’ device with body weight support system (New Scientist online, November 2008), although these are some way away from mass

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production. Wheelchairs for the elderly and the disabled are becoming increasingly sophisticated. For example, at MIT, Nicolas Roy and colleagues are working on an interface to a wheelchair that will enable it to take the user to a designated known location in an indoor environment, on vocal command [6].

3 ROBOTS THAT MONITOR AND SUPERVISE THE ELDERLY

A number of robots have been developed for monitoring the health and safety of old people. Pearl, developed at CMU [7], is a “nursebot” that reminds seniors about routine activities (e.g. eating, drinking, taking medicine and using the bathroom/toilet), and that can guide them through their environment. RP-7 is a tele-operated robot that is used to facilitate doctor-patient interactions without the doctor leaving her office. It has been used at the Silverado Senior Living Apsen Park [8]. The uBot5 robot, developed by University of Massachusetts, Amherst [9] has manipulators that enable it to perform a number of tasks such as picking up and moving objects around. It has been proposed as a means of doing house calls to check for signs of a stroke and could be used to monitor an old person for signs of a fall. It can also be used for social telepresence, since it can be remotely controlled by authorised users over the internet, allowing a virtual visit and two way conversation, with the visitor’s face appearing on a video screen. The robot can also be remote controlled to perform tasks in the home. Mitsubishi Heavy Industries developed the Wakamura robot mainly as a companion (see next section), but it can also be used for monitoring the elderly, delivering messages and reminding about medicine.

Gecko Systems International Corp has predicted that its sales of eldercare personal robots will reach 8.3 Billion dollars by 2014. They are developing the CareBot™, a personal robot equipped with multiple vital sign sensors, that can follow an elderly person in their home: home evaluation trials with the elderly began in November 2009. The CareBot is capable of verbal interaction, the delivery of medicine, video monitoring and two way interaction, and can provide verbal reminders, at predetermined dates and times, of the need for medical checks, or of other appointments. In Osaka, Japan, Matsushita Electric runs “Sincere Kourien”, an elderly retirement home with 106 beds, and used it as a test bed for robot teddy bears that monitor patients’ response times to spoken questions (Guardian online, 21st February 2002 <http://news.bbc.co.uk/1/hi/sci/tech/1829021.stm>). The bears record how long the residents spend performing various tasks, and can relay conclusions to staff, or alert them to unexpected changes. They form part of the monitoring network that exists throughout the building, and for instance alerts staff when residents leave their beds. Their use in the Sincere Kourien home illustrates a likely direction for monitoring robots, as a robotic component is integrated into a network of fixed sensors more typical of “smart” homes.

4 ROBOTS AS COMPANIONS FOR THE ELDERLY

It is sometimes suggested that robots could provide companionship for the elderly. Indeed, an old person might be more likely to tolerate, or even enjoy, the presence of a monitoring robot if it also had some ability to be a companion. For instance, the Gecko CareBot referred to in the previous section is described as “a new kind of companion that always stays close to them enabling friends and family to care from afar”. There is also a growing number of robot toys, some of which have been mooted as possible companions for the elderly. Such toys have the advantage of being relatively more affordable than some of the more elaborate robots we have considered so far.

Potential robot companions include Paro, a fur covered robotic seal, which was specifically designed for therapeutic uses with the elderly. Developed by AIST, it responds to petting by moving its tail and opening and closing its eyes. It reacts to sounds and can learn to respond to its name. It makes seal-like sounds, and is active in the day, preferring to “sleep” at night. It can detect light and dark by means of a light sensor, and recognise when it is being held, stroked, or hit, by means of posture and tactile sensors. Sony’s AIBO robotic dog, developed as an “entertainment robot”, has also been used in robot companions research. It has a metallic dog-like form, and can walk, or chase a ball. It has sensors that can detect distance, acceleration, sound, vibration and pressure. It can express six “emotions” (happiness, anger, fear, sadness, surprise and dislike), by means of its tail, body movements, and the colour and shape of its eyes. More recent versions can recognise voice commands, and the robot exhibits slightly different behaviour depending on the interactions it has experienced.

NeCoRo (OMRON) is a robotic cat covered in synthetic fur. Its behaviour depends on the history of its interactions and it can ‘learn’ to recognise its name. Stroking and hugging it elicits positive responses while treating it roughly elicits angry behaviour. Like Paro, it has internal rhythms that lead it to sleep, or seek to be cuddled. And My Real Baby (iRobot) is described as an “interactive emotionally responsive doll”. It can make different expressions, blink, and suck its thumb or bottle. It changes its expressed emotion depending on how it is treated – so that when fed and rocked for instance, it behaves as though it were sleepy. When unfed, it gets hungry and cries. It also makes a number of random sounds and words, which become more like sentences the longer it is played with.

There are other robots that have also been touted as possible companions for the elderly (see [10] for interesting discussions of digital companions in general). Toy robots that could entertain the elderly include: Pleo, Ifbot, and Primo Puel. Pleo is a robotic dinosaur with many sensors that responds with different behaviours depending on its treatment. The IfBot was developed by Business Design Laboratory Co. for elderly people and can converse with them by means of a large number of stored interaction patterns. Primo Puel is an interactive doll that talks, giggles, and asks

for cuddles. It was originally designed to stand in for a boyfriend for young single women, but proved unexpectedly popular with elderly women in Japan.

5 POTENTIAL BENEFITS

Assistive robots such as the Riba that can lift patients from bed to wheelchair, and back, could relieve those who look after the elderly from a physically demanding task. Robots that provide ways of remotely monitoring old people could potentially increase the likelihood that they could remain in their own home for longer. Studies that have looked at the effect on the elderly of interacting with robot companions have found evidence that old people can benefit from them. The positive effects are often said to be similar to those obtained from animal assisted therapy in which visits from a pet animal to residents of long term care facilities are found to reduce loneliness [11][12]. For instance, Kanamori *et al* [13] showed various improvements in elderly persons who interacted regularly with a Sony AIBO robotic dog – their loneliness scores were reduced, and their Quality of Life assessment scores improved. Banks *et al* [14], even found that old people in long term care facilities benefited as much from interacting with an AIBO robotic dog as from interacting with a real dog; both resulting in reductions in their reported levels of loneliness. Elderly dementia patients have also shown positive outcomes, including increased communication, as a result of sessions with an AIBO [15]. An interesting possibility that could be explored in future research is that some of the benefits that result from playing with, or “nurturing” robot pets are a consequence of increased levels of oxytocin.

Quite often the suggested benefits of robot eldercare are framed more from the perspective of the carer, than from that of the old person in receipt of such care. For example, GeckoSystems suggest that their robot will help the caregiver for an elderly person by giving them some time off, and that it will “decrease[s] the difficulty and stress for the caregiver that needs to watch over Grandma, Mom, or other family members most, if not much, of the time day in and day out due to concerns about their well being, safety, and security.” (from an article on GeckoSystems website, December 2009). To be fair, GeckoSystems do also consider the benefits of robot care for the care receiver, suggesting that such robots will make it possible for the elderly to stay in their own, or their family’s home for longer and avoid long term nursing care; but more emphasis is placed on the advantages for the caregiver.

6 ETHICAL CONCERNS

The concerns that have been raised with respect to the use of robots in eldercare have mostly focused on two issues: loss of human contact, and deceit. A decrease in social contact for the elderly could result if robots were used for tasks such as feeding them. The use of robots to monitor the health of the elderly could remove an opportunity for social interaction with a nurse, or doctor. Even the use of robots to clean floors

could remove the informal opportunity to chat to a human cleaner, as Sparrow and Sparrow [1] point out. Robot visitors, and robot companions could also be used as an excuse by society and the family of old people to avoid the need of actually calling in and checking on their well being – “don’t worry about Granny, she’s with the robot” could become a familiar response.

The argument has also been made that the introduction of robot companions involves deceit of the old person, who may be encouraged to think that a robot is something with which they could have a relationship. Sparrow [16] and Sparrow and Sparrow [1] argue that any beneficial effects of robot pets or companions are a consequence of deceiving the old person into thinking that the robot pet is something with which they could have a relationship, and are adamant that this should not be encouraged. Turkle *et al* [17] expressed similar disquiet: “the fact that our parents, grandparents and our children might say ‘I love you’ to a robot who will say ‘I love you’ in return, does not feel completely comfortable; it raises questions about the kind of authenticity we require of our technology” [17]. Wallach and Allen [4], in a discussion of the ability of robots to detect basic human social gestures, and respond with human-like social cues, suggest that, “From a puritanical perspective, all such techniques are arguably forms of deception” [4].

Sparrow argued that the relationships of seniors with robot pets, “are predicated on mistaking, at a conscious or unconscious level, the robot for a real animal. For an individual to benefit significantly from ownership of a robot pet they must systematically delude themselves regarding the real nature of their relation with the animal. It requires sentimentality of a morally deplorable sort. Indulging in such sentimentality violates a (weak) duty that we have to ourselves to apprehend the world accurately. The design and manufacture of these robots is unethical in so far as it presupposes or encourages this”, [16].

The issue of deceit however is complex. Although Sparrow and Sparrow [1] argued that robot companionship necessarily involves deceit, we suggest that this is not as simple an issue as they suggest. It is not straightforward because people in general are all too ready to anthropomorphise about machines, as discussed by Sharkey and Sharkey [18]. Zizek [19] the psychoanalyst, describes the way in which people can chose to act as though something were not real, “I know very well that this is just an inanimate object, but none the less I act as if I believe that this is a living being”. There may well be elements of a “willing suspension of disbelief” [20] when old people interact with robot pets. Indeed, there are likely to be considerable individual differences here in terms of old people’s beliefs about, and understanding of robotic technology. There is as yet little knowledge about the interactions between old people’s knowledge of, and attitudes to robots, and the possible benefits they might obtain from interacting with them. It is quite possible that old people might enjoy, and benefit, from interacting with a robot pet without thinking that it is actually sentient.

As well as concerns about the (possible) deception of old people, we can identify other potential downsides to robots in elder care. It is quite possible that, if used insensitively, they

could increase the feeling of powerlessness and objectification that can result from the “malignant care” that old people sometimes receive [21]. Being lifted and carried by a robot that is under the control of another person seems likely to make an old person feel more of a burden, and less in control of their life. Further ethical concerns are discussed by Sharkey and Sharkey [2]; the use of robots to monitor old people could infringe their privacy, especially if it was done without the consent, or even without the knowledge of a confused old person. Robots left to supervise an old person might well be required to prevent or restrict some of their activities; discouraging them from leaving the building, or from potentially dangerous activities. The issues involved in using robots in an authoritarian capacity to restrain human activities are complicated and multifarious, and would depend amongst other things on a belief that the robot was able to consistently recognise the intended action of the old person, and its likely consequences.

7 DYSTOPIA OR OPTIMISM?

It seems there is a real risk that robots in elder care could lead to a dystopian future in which old people were removed from society and left in the care of robots. There is also a need for caution in accepting the results of studies that seem to show that old people benefit from interacting with robot companions, since such benefits depend on what the alternative is. The results reported by Kanamori et al [13] showed improvements in well being over time between initial, and later sessions. Banks et al [14] showed that beneficial effects were obtained for those interacting with either the real or the robotic dog, as compared to their control group who received no such opportunities for interaction. However, such improvements could have been found because the alternative was so dire and lacking in stimulation. Someone in solitary confinement might benefit from being given a robot companion, but they would benefit far more if they were released into a friendly social environment. It is possible that the similar improvements might be found if the comparison were to a control group that received some other form of intervention. If the comparison group received some other individual attention, such as a visit by someone who massaged their neck and shoulders, or who sat holding their hand and chatting, the benefits of the robot dog might not be so apparent. It is also important to see that any benefits are maintained over time, because a robot that was interesting to interact with initially may rapidly lose its appeal. A Reuters article (21st September 2007) reported that the old people in a care home had liked the IfBot robot for about a month before losing interest. The director of the facility in Japan commented, “stuffed animals are more popular”.

Nonetheless, we suggest that it is possible that robots could be introduced into elder care in such a way as to improve the lives of the elderly themselves, and not just the lives of their carers. There is a need for further, carefully controlled research on their impact on the elderly themselves and their quality of life. There is a need to provide protection against the overuse of robots in the care of the elderly, and for some

guidelines, or preferably legislation, to ensure that robots do not result in a reduction in opportunities for human contact for the elderly. The problem is that, apart from fundamental human rights legislation, there is little protection for old people against the potential downsides of robot care. In particular, there are no obvious explicit restrictions on the amount of time that old people could be left in the care of robots, nor on the amount of human contact that they should experience. Like children, the very old and infirm can be seen as being in need of special protection. As discussed elsewhere [20], children could possibly be afforded some protection from extensive robot care by the legislation pertaining to neglect, but there is no such legislation for the elderly.

If such protection were in place, it is quite possible that robots and robotic technology could be used in such a way as to increase the degree of social interaction that old people experience. For example, the wearable suits discussed earlier could make it possible for the elderly to get out of their houses, or chairs, and to reach social meeting places. An intelligent wheelchair that responded to the commands of the user could have a similar effect. Assistive aids based on robotic technology could function more as tools, or even as extensions of the old person's body, as discussed by Clark and Chalmers [22].

As well as helping old people to get to social meeting places, such aids could also increase the feeling of autonomy of old people, and reduce their dependence on human carers. Unfortunately, human carers do not always have the time and inclination to respond to the needs of old people, as the following example from the Joint Committee report on ‘Human rights and elder care’[23] shows: the account is that of an elderly wife visiting her husband in hospital: *“I went to visit my husband on the first day and he is a very private person, he doesn’t like anything to embarrass him and when I went in he was almost in tears which is not my husband. He said ‘please, please go and get a bottle I am nearly wetting myself’. I rushed out I got a bottle and I said to him ‘Well why didn’t you just ring the nurse’, in my innocence. ‘I have, for an hour and a half I’ve been asking for a bottle’. Well when I went out [and] told the nurse she said ‘Oh don’t worry we would have changed the sheets’. Now his dignity at that stage would have gone out of the window. There was no dignity.”* (Pg 15). A robotic device such as a wheelchair that acted under the control of the old person themselves could substantially reduce such dependence.

As indicated above, a possible downside of robot companions is that they could be used as an excuse for leaving an old person on their own for longer. Yet it is also possible that a robot companion could create or promote social interaction with fellow humans. Robot companions can act as social facilitators, giving the people around them something to talk to an old person about, and giving the old person themselves something to show, and to talk about. A robot that facilitates conversation can be an attractor for visitors. Children may want to play with the robot and have fun with granddad's big toy. For instance, Kanamori et al [13] report the case of an 84-year-old man with cerebral apoplexy sequelae. He talked much more to his children after

the introduction of an AIBO robot dog. It gave both him and them a focussed object to talk about. Similarly, when Wada and Shibata [24] videoed interactions between a Paro robot seal and a group of elderly care home residents, they found evidence that the social interactions between the residents themselves increased, at the same time that physiological indicators showed reduced stress levels. It seems that Paro even encouraged positive communication, and resulted in a reduction of the “backbiting” that had previously characterised some of their interactions. One 75 year old female resident greatly increased her interaction with fellow residents. A friend of hers commented that she had been taciturn before Paro’s arrival, but that now she was more cheerful and talkative. Thus benefits could be obtained from robot pets that are due to the robots stimulating increased interaction with other people; benefits that have nothing to do with deceiving the old person.

8 CONCLUSIONS

We have reviewed the main uses of robots in eldercare, and considered both the claimed benefits, and the ethical issues that are involved. There are concerns that robots could be used to create a dystopian future, in which neglected old people are insensitively manipulated and controlled by machines. At the same time, it is possible that robots could be introduced in such a way that they resulted in increased social interaction between the elderly and their society, and that offered the elderly more control over their lives and the environment.

How can we ensure that the optimistic, rather than the dystopian future, is achieved? Some of the solutions proposed above depend on sufficient monies being provided - However, the argument is beginning to be made that the cost of providing residential nursing care is so high, that the provision of robotic technology that enables old people to continue to live in their own homes begins to seem more cost effective. Research that focuses on the views and experiences of the elderly who interact with robots will help, although as discussed there is a need to guard against the possibility that any benefits shown are not just because interacting with a robot is better than being left in complete, or near, isolation. In particular, we are more likely to achieve the optimistic rather than the dystopian future if guidelines and legislation are introduced to give the elderly rights to certain levels of human social contact, and to protect them from being left in the control of robots. It is not the robots themselves that are intrinsically good or bad for the elderly, but the way in which they are used.

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