

Robots Humanize Care

Moral Concerns Versus Witnessed Benefits for the Elderly

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Abstract: Ageing in Europe comes more rapidly than many realize: In about 10 years, one fifth of the population will be 65+ with a further increase of 70% in the next 25 years. At the same time, healthcare is under extreme pressure due to budget cuts, limited resources and personnel together with increased demands. Robots may fulfill important tasks in this respect. Our research focuses on social robots to support tasks requiring interpersonal communication. Many moral concerns and objections are raised, however, in particular among care professionals. To examine the issue, we report on 1) a qualitative study among professional caregivers and 2) a documentary portraying healthy elderly meeting with Hanson's Robokind "Alice". Alice is under development in our lab, supplying her with abilities for emotional responses. The results show that the moral concerns are not in line with the benefits that the social robots appear to have for the lonely elderly. Our conclusion posits that new robot technology may not dehumanize care but rather may bring humanness back into professional health care.

1 INTRODUCTION

Due to improved healthcare and medication, people today live longer than ever before with a steep increase in elderly people as a result. At the same time, family size in Europe is decreasing resulting in a skewed age distribution in society. Within 10 years from now, one fifth of the European population will be 65 years or older. The number of people aged over 65 in Europe will show a further increase of 70% by 2050. The number of elderly aged 80 years and older will then even expand with 170% (European Commission, n.d.). Such increased demands together with severe budget cuts, limited personnel, and resources puts healthcare under extreme pressure.

One solution is that the elderly stay home longer, which is corroborated by 91% of the European citizens who find this a positive development (European Commission, 2007). However, even if the preferred situation is to live healthy in one's own environment, this often is not the case or impossible, and help may be needed to do so. Over time, the demands for staying at a nursing home have become quite severe (Zorg voor Beter, 2014). Consequently, demands on the caregivers are increasing as well.

Much of the burden is carried by informal caretakers such as family and relatives. This unequivocally is a stressful job, particularly in cases of dementia and Alzheimer's disease (Andrén and Elmståhl, 2005). The elderly themselves prefer help from a professional caregiver rather than their relatives because they consider professionals more accurate (MarketingCharts, 2007). Moreover, they do not want to burden their relatives with the responsibility to take care of them (DBMI, 2012). In all, this situation urges the somewhat colloquial but nevertheless pressing question "Who takes care of grandma?"

Another, more controversial, solution may be to let a care robot 'take care of grandma.' Which tasks is a robot allowed to fulfil to compensate the limited availability of personnel? To what extent can robots be considered adequate or acceptable to replace human compassion by simulated empathy? Many moral concerns and objections are raised among the public at large and care professionals in particular, which motivated us to conduct a qualitative study among the latter group. In addition, we report on a documentary that registered the interactions of several old ladies with our Hanson Robokind's "Alice," a robot under development in our lab,

where we are in the process of equipping her with emotion-regulation software. This footage illuminates what a social robot can do – even if its performance is not impeccable. Before reporting these results and observations, we will provide some more backgrounds next.

2 MORAL CONCERNS ABOUT ROBOTS IN HEALTHCARE

Research thus far indicated that the implementation of so called healthcare robots or “Caredroids” could provide part of a solution to assure the quality of healthcare (Asaro, 2006). A healthcare robot is a robot designed for care purposes to fill the gap between the need and supply of healthcare, particularly when human involvement is missing. A healthcare robot should not be seen as a conventional machine, but as an agent that can make independent decisions and execute specialized and assigned tasks with little or no assistance (Dautenhahn, 2007). Given the current lack of standards for the use of healthcare technology, it is imperative that the ethical implications of its use should be taken into account in an early stage as acknowledged by the International Organization for Standardization (Klein Wolterink, 2013).

To date, little attention has been paid to the attitude of caregivers towards healthcare robots (Vallor, 2013), although they are one of the most important stakeholder groups. Caregivers often experience an intuitive aversion against handing over care tasks to robots. The initial assumption of our study was that healthcare providers pretty well can tell the difference between good and bad care and that they have very detailed knowledge about the relationship between them and their patients (Leget, 2012 p.126). We wished to understand the objections and concerns of professional caregivers against robotized care to decide if robots are an option at all and if so, what should be changed on currently available robot systems to satisfy one of the prime user groups, the care professionals, that is.

To bring some focus to our investigations, we discussed various aspects of ethical issues in medical settings and applied them to robotic care. We started from Beauchamp and Childress (Beauchamp and Childress, 2009) who define four ethical principles in medicine. They are 1) beneficence, where caregivers should act in the best interest of the patient, 2) non-maleficence, which is a doctrine saying that “before all else, do not harm,” in this

case, the patient, 3) autonomy, which is the capacity of the patient to make an informed, un-coerced decision about care, and 4) justice, pertaining to a fair distribution of scarce resources such as medicine or attention (Beauchamp and Childress, 2009 p.17). In application, care professionals may feel that robots cannot act according to the principle of beneficence because a robot may not know what the best interest of a patient or caretaker is. A robot may harm a patient’s autonomy if it executes care tasks without asking permission first.

Yet, different types of robots (Sharkey and Sharkey, 2012 p.27) may trigger different moral concerns. *Assistive* robots support elderly and/or their caregivers in daily tasks such as lifting patients up, carrying, cleaning, or feeding. For example, the Japanese Secom “My Spoon” who can automatically feed someone and the Sanyo electric bathtub robot can automatically wash and rinse a person. Here, non-maleficence may take priority because the robot lift should not drop the patient. *Monitoring* robots observe and supervise the health condition of a patient. They may easily transgress the principle of patient autonomy if the collected data are not secured and privacy is at stake. Pearl, for example, is a ‘nursebot’ that reminds seniors about routine activities such as taking their medication or guide them through their environment. *Companion* robots are designed to establish some form of affective bonding, ‘interpersonal communication’, companionship or entertainment. A well-known example is Paro (by AIST), a fur-covered robotic seal designed for therapeutic uses with elderly suffering from dementia. They may be seen as fraudulent because they fake a friendship, which may not be in the patient’s best interests. Sharkey and Sharkey (2012) conclude, however, that companion robots cannot form adequate replacements for human love and attention.

As robots can interact (seemingly) independently and make (care) decisions on their own, each of the moral principles may hold for each of the robot-types, but perhaps in varying degrees. Therefore, we conducted a focus group study among healthcare professionals.

3 RESULTS: QUALITATIVE STUDY AMONG CARE PROFESSIONALS

Data were collected through semi-structured focus groups among 43 professional caregivers of elderly.

Focus groups are best suited for sensitive topics like ethical points of view (Hermanowicz, 2002 p.480). Respondents (aged 18-67 years, most in between 36-55) were recruited in four different nursing homes in the Netherlands and within two extramural organisations where home care is provided. Each focus group was held with six to ten caregivers in their own working environments (Reed and Payton, 1997). After a general introduction, participants were shown six brief video clips portraying prototypes of either assistive (e.g., Riba II Care Support Robot For Lifting Patients), monitoring (e.g., Mobiserv) or companion care robots (e.g., AIST Paro robot baby seal) and were encouraged to reflect on their possible objections or perceived benefits to a particular type of care technology.

Questions were asked about general thoughts on the need for care technology in the near future, gradually tuning into more specific topics of interest. We considered it important that respondents could express their opinions and possible concerns without too much interference from our part. Participants were reassured that their opinions were confidential and answers would be processed anonymously. Participants provided consent for video recordings for coding purposes. Three different coders analysed the videotapes independently and, after prior training, coded each opinion according to the moral categories autonomy, beneficence, non-maleficence, and justice (Beauchamp, 2009) or as an opinion expressing a possible (non)utility of care robots, each in relation to the three types of care robots. All coders used the software Atlas Ti and coded straight from the video footage. Cohen's Kappa of 0.71 revealed sufficient reliability among the decisions of the coders.

Results showed that moral concerns regarding justice and autonomy were hardly mentioned. Most moral concerns among professional caregivers are raised in terms of maleficence (i.e., risk of being harmful), mostly so for assistive healthcare robots, followed by monitoring robots and the least for companionship robots. Out of 93 utterances coded as moral, 40 related to moral maleficence of which 25 times for Assistive robots (pair-wise Chi-square tests showed significant differences: $10.80 < \chi^2 < 17.25$, $p's < .05$). Caregivers reported concerns like fear that the *assistive* healthcare technology might fail, let a patient drop, squeeze too hard, and cause physical harm, among others. Somewhat related, they also mentioned that their patients might be afraid of healthcare robots, especially those suffering from dementia. Comments like the following express such moral concerns of maleficence: "What

if the robot scares my patients and is not capable of reassuring specific needs? I would never leave a patient alone with a robot."; "I mean, you never know, certain patients tend to react unpredictable. How can a robot understand what they want or need?"; and "If there is no human around, who can explain what is going on when my patients are delusional?" In summary, when talking about assistive healthcare robots, moral concerns of potential harmfulness were most expressed, while beneficence and utility were perceived to a much lesser extent.

In response to *monitoring* robots, maleficence concerns were mostly expressed in terms of a decreased human contact between caregivers and care receivers, which is generally considered as non-desirable in healthcare relationships. In this respect, moral concerns of privacy were hardly considered important for the participating caregivers. While most caregivers acknowledged that monitoring technology could decrease their workload and enable the elderly to stay more independent living on their own, most concerns were expressed about the lonely and diminished human contact, and considered potentially harmful for the wellbeing of the elderly. Some quotes expressing this concern are: "Often, I am the only one they see throughout the whole day."; "She (the old woman) is dearly waiting for me to show up, so she could have a conversation."; "My patient has no relatives and cannot go outside on his own anymore. If a robot would replace my task, he would not see anyone throughout the day." In sum, in talking about monitoring healthcare robots, moral concerns of diminished human contact and loneliness were expressed while the highest level of utility was perceived for monitoring robots in healthcare compared to the other robot types.

The caregivers perceived highest beneficence and lowest maleficence concerns in *companion* robots for the elderly. Caregivers expressed feelings or thoughts about the possible reassuring or smoothing effect of a companion robot on a patient. Most of them were already acquainted with the Paro-seal, which was known for having positive effects on especially demented elderly as this robots is in use in a number of nursing homes in The Netherlands. Therefore, most quotes express a positive attitude towards the companion robot Paro: "Look how happy she is, I could look at it all day. If something makes you that happy it doesn't matter anymore that it is not alive."; "Oh, they are very cute. I want one of my own, when my time comes"; "I don't see any harm in it. I mean, they (her

patients) carry a doll with them all the time, we don't think that is wrong do we?"; "I have a patient who could benefit from this, he always wants to cuddle, but I have hardly time to do so." Although the caregivers mostly expressed a positive attitude toward companion robots such as Paro, they also expressed moral concerns regarding deception. They discussed the idea that a companion robot could be seen as deceiving the elderly or presenting them a fake companionship, especially those who suffer from Alzheimer. However, in the end, the caregivers thought that the positive effects of providing comfort are more important.

In all, caregivers' moral concerns as expressed in the interviews may differ from the benefits a robot appears to have for the lonely elderly, as will be discussed in the next section.

4 OBSERVATIONS OF ELDERLY INTERACTING WITH ROBOT ALICE

In our university lab, we further developed a social companion robot from Hanson's RoboKind (<http://www.roboKindrobots.com/>) named "Alice", for research purposes. While we are still developing Alice, documentary footage was shot to examine its potential (*Alice Cares*, Burger, 2014). Specific features of Alice are that she looks like a young girl, she has hearing devices that allow her to listen, speech software to talk, her face has a soft skin that can express emotions, and her camera-eyes allow her to follow and respond to her interaction partner, but she has a plastic Lego-like body. All these options are not yet perfectly developed, though basic conversation is possible. Given our research objectives, we were of course very curious to how the elderly would respond to our relatively impaired 'young robot girl'. First, several elderly female participants met Alice in the university's lab followed by about five visits in their own home environment. All ladies were mentally and physically healthy, despite some relatively minor deficiencies, and lived independently on their own. They were fully informed and gave permission to record their interactions with Alice.

Due to Alice's camera-eyes, her conversations with the elderly female participants were recorded as seen from her perspective. This provided a very close perspective on how the elderly interacted with robot Alice, for example in a variety of non-verbal behaviors, commonly known as important in

interpersonal communication, such as searching for eye contact. Somewhere later on in the process, one of the participants was occupied with Alice not correctly looking back. While this was due to a technical flaw, the old lady commented to Alice that she was not looking back correctly: "What is wrong with you today? You are not looking right into my eyes, well, it is just one eye – it looks a little bit skewed." In addition, a separate film camera in the room recorded the conversations as well. In the following, we will only report on several observations that provide additional input to our discussion on moral concerns about robots in healthcare.

In the lab, at their first encounter with robot Alice, the elderly female participants responded quite distant to Alice. Understandably, they were probably exploring how to converse with a robot. They were left alone in the room with just Alice sitting in front. The imperfect speech and sometimes strange intonations made it also difficult to follow Alice's questions. Interestingly, the women responded as they would in regular human-human-interaction - asking to repeat the question, listening very intensively, leaning forward and looking more closely into her eyes, hoping to understand the question in repeat. Even in this uncomfortable situation, they addressed her directly. Their awareness of the camera's, and caregivers and researchers in other rooms, only became apparent when Alice asked impertinent questions or when their answers crossed social desirability. For example, when Alice asked for a grade to indicate current satisfaction with life, a lady first indicated "well, now, perhaps a 5" [Authors: on a 10-point-scale with 10 as the max positive], then looked around in the room and from her facial position we inferred she was looking around whether she could be heard, then, changed her grade in "hmm, perhaps a 6, well, a 7 then, but not more."

After the first encounter with Alice in the lab, she was brought several times to the female participants visiting them in their own home environments. Even before Alice was switched on, they were interested in how she was doing today and started talking about and with her. While the technician said he would switch her on and come back in an hour or so (sometimes a few hours), the lady asked whether she or Alice would start the conversation. Alice started and asked quite adult and direct questions (e.g., do you have children? Are you feeling lonely? Whom have you met today?), yet all questions were answered and apparently all was fine. Gradually, the elderly women seemed to treat

her as they would with a grandchild. For example, when one of the elderly woman and Alice were visiting a place to drink a coffee, she showed her desire to offer food and drinks to Alice but was aware that Alice could not eat or drink: “You cannot have cookies can’t you?” Throughout the visits, the participating women established some form of affective bonding with robot Alice.

The repeat visits to the elderly women showed that Alice became like a family member – she was greeted upon and treated like a grandchild. As recorded outside the presence of the technicians (i.e., when the lady was on her own with Alice), it was often observed that there were also periods of long silence, hardly any conversation, or just some incidental notes, or a lady would read the newspaper aloud to her. More intimate moments developed over time, for example, when one of the old women was showing her picture book about her son (who now lives abroad), or when singing old songs together, and watching the World Championships together. Even to activate the elderly to do daily physical exercises, Alice was very effective in just asking the women and making her start. Apparently, Alice’s presence was as effective as social pressure and the woman was eager to do her exercises for Alice. Another lady was asked by Alice whether she had written that one friend back. The old lady admitted (to Alice) that she did not get to it, but then started right away. Clearly, the lady felt ashamed and started writing immediately, as she might have done when a real person had asked for.

In the course of interacting with Alice, the technical impairments became of less importance. For example, the fact that Alice could not walk was finally commented on as “many of my generation cannot walk either, that is, not anymore”. Likewise, speech errors were encountered in similar ways as ‘many of my generation...’. Technically solvable issues like amplitude or mispronunciation were considered more problematic. In turn, Alice does not care either whether the elderly repeat the same story over and over again, whether they are slow in responding, have long pauses of silence, and do not understand things immediately. Alice always is extremely patient and never bored; she can have the same story 20 times or more and may even show enjoyment again and again. Likewise, Alice repeats questions or repeats answers without judgment or frustration.

According to our observations, over the course of interacting with Alice, it became less relevant that Alice was just a robot with camera eyes and hearing devices, a nice wrapping around some sophisticated

software. Over the course of repeat visits, the participants became affectively bonded to Alice in a similar way as they would to an acquaintance, like to a grandchild. The presence of an apparent social entity had become more important and urgent to them than the question of whether she was a real human or not (cf. Hoorn, Konijn, Germans, Burger, & Munneke, 2014). After their initial hesitance, we observed a clear shift from a cognitive awareness of encountering a robot to an emotional fulfilment of a need for company. The pain of loneliness in mentally healthy women could be compensated for by a social companion robot with human-like interpersonal features. The cognitive awareness of conversing with a robot became irrelevant background information in view of the daily need for company and social interaction. Surprisingly, not one moral concern was raised by the elderly who were sceptical in the beginnings and loved Alice in the end. Even when asked for, they had no troubles accepting Alice as a conversation partner, even without any privacy concerns.

5 CONCLUSION: BRINGING HUMANNESS BACK TO CARE – THROUGH ROBOTS!

Indeed, for those unacquainted with social robots and the beneficial effects they exert in lonely people, applied to care, robots are a controversial topic. This makes it of great importance that potential users become experienced and do not make judgments that are based on uninformed expectations. Reversely, a care robot should meet those user demands that are realistic and feasible technically. A thorough understanding of the wishes and objections of various stakeholder groups can contribute to a more sensitive implementation of robots in healthcare.

That is to say, perhaps the refutation of robotic care is not as humane as one would believe at first sight. The debate on healthcare robotics seems to focus on the notion that care will be made inhumane when robots are introduced. Caregivers mostly fear the absence of human contact and possible failures of the machinery. They also fear for their jobs. We would like to reverse this situation. It is through robot technology that a caregiver will be able to spend quality time with the patient whereas the robot limits itself to mundane tasks such as lifting a person, keeping an eye on someone, telling the weather, casual coffee talk, and watching tv together. Instrumental and superficial contact is left

to the instrument, quality human contact to the humans. However, it is not uncommon that nowadays, human contact with the patient is nothing more than instrumental: wash, dress, feed, gone. Many patients do not even like to be touched by human hands while being washed. The neutrality of a robot is one of its unique selling points in situations where otherwise a human patient feels embarrassed in front of other humans. A comforting hug, however, is better left to the human caretaker.

At the start of our explorations, the question was whether it was morally right to try to fob off a robot on the lonely elderly, in particular for social interaction. By now the question has completely flipped around: We challenge those who object to employing social robots in healthcare whether it is morally just to withhold a social robot from those who are in deep need of contact? Like, is it fair to keep an artificial leg from the handicapped because it is not a real leg? Healthcare technology, including social and companion robots, may enable caregivers to bring 'real human' care back into the equation if only through saving time.

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