Does anyone want to talk to me? – Reflections on the use of assistance and companion robots in care homes

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1 Introduction: Robotic Companions for Elderly People

A growing number of research efforts worldwide aim at developing assistive robots to help elderly people in their own homes or in care homes. The rationale for home assistance robotic technology is based on demographic changes in many countries worldwide, with an ageing population. For example, it is predicted that in the European Union the number of people over 65 years will almost double (by 2060) and the number of people between 15-64 years will decrease by over 10%. Health care costs are also rising [33]. Developments into home companions and solutions for Ambient Assisted Living (AAL) in elderly peoples homes or care homes have grown significantly in the EU, see projects such as SRS[12] , Hermes[5] , Florence [4] , KSERA[7] , MOBISERV [9] , Rubicon [11], ACCOMPANY [1] or ROBOT-ERA[10] , to name a few. Recent videos of results on smart home companion robots and the type of assistance they can provide have been illustrated for MOBISERV[29] and ACCOMPANY[15] . Products for robots used in peoples homes are beginning to be marketed, cf. Toyota's Human Support Robot (HSR)[13], Mitsubishi's communication robot Wakamaru[14] , Aldebaran's Pepper robot [2], or Cynthia Breazeal's Jibo robot[6]. These robots come in different shapes and sizes, and appearance and behaviour will influence which roles these robots are being assigned to by their users and the human-robot relationships that may emerge.

One of the authors has been involved in European projects on home assistance robots since 2004, as part of the COGNIRON [3] , LIREC [8] and ACCOMPANY [1] projects. COGNIRON was one of the first projects in Europe on home companion robots. One lesson learnt during the project was the need to move out of the laboratory and into a realistic home setting, which led to the acquisition and development of the University of Hertfordshire Robot House, a smart home equipped with a sensor network and robots being able to detect daily living activities and provide physical, social and cognitive assistance. A second lesson was the need to move away from Wizard-of-Oz (remote controlled) studies. In LIREC the emphasis was on developing fully autonomous home assistant robots, with an emphasis on social assistance. During ACCOMPANY, this direction has been elaborated and extended through allowing the robot to be taught and shown new behaviours and routines by the user, including evaluations with elderly users and their formal and informal carers in long-term studies in three European countries. The ACCOMPANY project has particularly advanced a direction where such au-

tonomously operating companion robots, as part of a smart home infrastructure, socially engage and assist the user, using personalization and human-robot teaching and co-learning for reablement of the user[36] . While these projects have focused primarily on the use of robot within home settings, a separate strand of research within the University of Hertfordshire's work in ACCOMPANY actively elicited the views of residents and staff at a local care home, through the use of theatre prototyping[34] followed by interviews as previously reported in Walters et al.[45]. The current position paper draws on these experiences and findings, as well as those from the other projects, to consider the role that social robots may play in a care home environment.

2 Roles of Robots

Different roles of robots in human society have been proposed[21] , including a machine operating without human contact; a tool in the hands of a human operator; a peer as a member of a humaninhabited environment; a robot as a persuasive machine influencing people's views and/or behaviour (e.g. in a therapeutic context); a robot as a social mediator mediating interactions between people; a robot as a model social actor. Opinions on viewing robots either as friends, assistants or butlers have been investigated [23] . It has been suggested the robot can act as a mentor for humans, or information consumer whereby a human uses information provided by a robot[25] . Further roles that have been introduced view robots as a team member in collaborative tasks [19] or roles for robots as learners [39, 28]. Companion robots have been defined as robots that not only can carry out a range of useful tasks, but do so in a socially acceptable manner [22] . This role typically involves both long-term and repeated interaction, as is the case for robots used in an elderly person's home or in a care home. Will people develop human-like relationships with such companion robots? Some studies have tried to address these from a user-centric point of view. Beer et al.[18] found that participants primarily focused on the ability of the robot to streamline and reduce the amount of effort required to maintain their household. However, a recent study based on both recent literature research and focus groups with 41 elderly people, 40 formal caregivers and 32 informal caregivers in the Netherlands, UK and France, the most problematic challenges to independent living were identified mobility, self-care, and interpersonal interaction and relationships [17].

Thus, there seem to be two domains where robots are envisaged to assist in: the physical and/or cognitive domain, providing e.g specific assistance in remembering events and appointments, or to move around, and the domain of social relationships.

This duality of roles do exist in how robots are being proposed to be used in such settings, while surveys of envisaged use scenarios

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Figure 1. A companion robot at the University of Hertfordshire

indicate that medical and healthcare personnel see robots as tools that can provide physical assistance with their tasks [40] , however, there are also studies investigating the value of robots as companions in these settings[38].

This approach is grounded in that, apart from physical needs, a key problem in care homes is the resident's loneliness. It impacts upon ' quality of life and wellbeing, adversely affects health and increases the use of health and social care services . A number of interventions have been used, e.g. one-to-one approaches such as Befriending, Mentoring, group services such as lunch clubs, or community engagement through public facilities (sports etc) [46]. Interestingly, in a recent approach chickens have been introduced to a care home, and proved popular with both staff and residents[35]. The impact of robots and animals can be directly compared[16]. Could robots become part of such services?

3   Ethical Issues

While this short position paper cannot comprehensively address the ethical issues involved in the adoption of robots in elder care and the associated literature, we note that elsewhere the danger to anthropomorphise and romanticise robots has been highlighted[20]. The roles that are ascribed to robots and the human—robot relationships discussed in the research community are predominantly based on terms that originally describe human-human interactions. So there is a tendency to use terms robotic 'assistant' or robotic 'carer' and apply the human equivalent literally which automatically implies a whole range of different human-like qualities and abilities, that robots at present cannot address, in terms of their physical and cognitive abilities, as well as in terms of their emotional intelligence, as well as ethical and moral judgements. A number of ethical considerations need to be considered when fostering social relationships between robots and elderly people. Sherry Turkle[41] has previously discussed the danger of 'relational artifacts', i.e. robot designed specifically to encourage people to form a relationship with them. She argued that such 'non-authentic' interaction may lead to people preferring the (relatively easy and predictable and non-judgemental) interaction with a robot compared to interactions with real people. Specifically with regard to eldercare, Amanda and Noel Sharkey[37] pointed out

risks involved in using robots in elder care, including the potential for the reduction in the amount of human contact as well as concerns about deception and infantilisation. The theme of deception, infantilisation and the possible reduction in human contact is also emphasized in other reflections on ethical norms of using robots in caring role for elderly people[42, 24].

Interestingly, designing robots as interactive systems that people can engage with, e.g. play games with, is technically feasible. Even pet-like, non-humanoid robots such as Paro have been shown to be successful companions[30]. On the other hand, providing physical assistance involves many technical challenges e.g. in terms of object manipulation, navigation, safety, etc. Thus, if it is 'easier' to build robots as socially interactive companions, and to focus on its role to engage people, shall one concentrate research efforts on this aspect? Is it ethically justifiable, desirable and acceptable by elderly people and their carers, given the above mentioned concerns of deception, infantilisation, and providing non-authentic experiences? In order to shed some initial light on these issues, one of the authors conducted interviews in a care home for elderly people.

4   INTERVIEWS STUDY WITH RESIDENTS AND CARER IN A CARE HOME

An interview study was conducted with carers and residents of a care home in UK. In this study, residents and staff at the residential care home were shown a play which focused on how the adoption of personal home companion impacted the relationships in a domestic household. The play and other aspects of the study is briefly summarised here, details are provided elsewhere[45] . While the play focused on the use of a robot in a different environment, it served to raise awareness of how robots may assist in, and influence the daily life of their users. We would also note that there was no verbal interaction from the robot in the play. Three months after the play, a follow-up study was conducted in which three residents, all with learning disabilities and/or physical disabilities were interviewed, followed by interviews of three experienced registered nurses. The 15-20 min interviews took place in the communal dining room of the home that is familiar and comfortable to both residents and carers. A semi-structured interview technique was used since it is considered a reliable and flexible method and can cater for some of the residents' disabilities[32]. The interviewer wrote down the interview data during the interview, an approach considered less intrusive than audiotaping the interviews. Based on these notes, the interviewer conducted a content analysis of the interview data a number of themes emerged that are described in detail in Walters et al. [45]. Relevant for the present article are the following themes and comments from residents and carers: Concerning acceptable boundaries for care by humans and robots, one resident said that the most important care for her from the robot was psychological care:

'Make me feel lovely in myself and give me a boost...make things different...I want to dance with it'.
'I would like the robot to be chatty and to nod his head to show he has heard me'.

Two other residents wanted the robot to *'Tidy my room and maybe feed me in the future'* and *'comb my hair'*. Regarding conversation and companionship, one of the interviewed residents wanted the robot to be able to start a conversation and then acknowledge that he had heard about her sore knee. Another wanted the robot to dance with her. One theme arising from the interviews of the registered nurses concerned how the robot could provide assistance to staff and

residents, while they still preferred a human to a robot colleague. All 3 nurses thought the robots would help with both physical and psychological care:

> *'They could provide company, socialise and boost morale'.*
> *'They could be friendly, shake hands and make friendly sounds; talk to them and reduce loneliness'.*
> *'Help with feeding and walking beside them would be helpful'.*

Concerning conversation and companionship all three nurses would really value robot that can engage in conversations with residents and provide stimulation:

> *'Stimulation helps residents feel important'.*
> *'Helpful when staff are busy'.*

5 Reflections

The interview study above highlighted a number of issues in favour of robot providing social interaction and communication with residents in a care home in order to help with their loneliness. There are also a number of practical issues, based on experience gained by the second author in care homes, that would support robots in that role:

- The group of residents in care homes is often diverse, ranging from people with dementia, people with learning disabilities, people terminally ill e.g. with cancer, and others. This diversity can impact on the willingness and enjoyment of residents to talk to each other
- Residents in a care home do not know each other prior to joining the care home, they are not a naturally formed unit of friends or family. We cannot expect randomly created groups of people to make friends easily, or even to be interested in talking to each other, while having to live under the same roof under a daily basis.
- Care staff is often very focused on task and efficiency, often under a lot of time-pressure to 'get things done'. There is a large spectrum in the quality of care, but in some care homes social interaction with residents might not be high on the priority list of care staff and their managers.
- From the point of view of care staff, interaction with residents may not always be as enjoyable as one might envisage, e.g. due to memory problems people with dementia may engage in very repetitive conversations.
- In a social environment such as a care home, residents might feel not 'getting along with the others', due to real or perceived conflicts with other residents.
- Some residents may have psychiatric conditions which make them feel paranoid and sometimes aggressive.
- Care home staff and/or residents may not all have English as their first language which affects their ability to communicate with each other smoothly. There may also be differences in intercultural understanding of what is socially acceptable conversation.

Thus, while in an ideal world, care homes should be places where carers and residents live together as 'one happy family', the reality often differs. And it may be useful for robots to provide opportunities for communication and interaction, even if interaction with robots is mechanical, and lacks authenticity and depths of human contact as we have argued elsewhere[41, 22] . For example, present robots cannot replace the gentleness and meaningfulness of a person stroking someone's hair, or touching someone's hands, or a comforting word. This does not always mean that the robot will have to replace carer-resident or resident-resident interactions. Rather, it may function as a social facilitator, or mediator, and may be able to assist residents and carers in overcoming some of the practical issues that often restrict human-human interactions in care homes. Previous research has suggested that the presence of a robot in a care may work to facilitate a greater degree of interaction between the residents of the care home [27, 43] , and this effect may be leveraged further by using features like a memory visualisation system (which uses photos and text to create narratives of previous interaction)[26] to aid further when trying creating common ground between human interactants . In addition, there is also the possibility to adapt and apply research in using robots to increase dyadic interactions in other user-groups [44, 31] in order to further the ability of a robot companion as a social facilitator or mediator. While it can be argued that some of the issues, in particular the staff's focus on task and efficiency can be mediated by the adoption of robots to provide physical support with some of the tasks, this does not necessarily address the other points raised here. We do not argue for robots to replace carers or human contact in general, however, we argue that in situations where residents can expect, and may suffer from, only very little human contact that in such circumstances robots could be beneficial to them and their carers, by helping them to feel less lonely, not only through the direct interaction between the resident and the robot, but also through the robot's ability to mediate interactions between residents and residents and carers — and thus improving the health and well-being of the residents as well as the working conditions and atmosphere at work as experienced by the staff.

ACKNOWLEDGEMENTS

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