

Designing AI for Partnership in Care

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Abstract

As the global population ages, promoting active aging and enabling older adults to age in place has become increasingly important. This paper explores the role of technology in this process, particularly in helping older adults identify and pursue meaningful activities and provide care for loved ones. Through two example projects – the design of a social robot that supports older adults’ experience of a sense of meaning and purpose (ikigai), and an exploration of how technology can assist with caregiving – we demonstrate how technology can enhance the care for older adults. This short paper highlights how technology can create a more fulfilling and supportive active aging experience, empowering older adults to engage with what and who they care about and enhancing their caring relationships.

Broader Impact Statement

Promoting active aging is an essential area for developing AI to support aging in place by helping the care needs of older adults, including supporting them in activities they care about and providing care for loved ones. This paper presents two studies that explore these aspects of technology related to care.

The first study focuses on initial usability testing, deployment, and evaluation with older adults who are healthy and those living with dementia. We provide two examples from our previous studies, showing how the Interactive Robot for Ikigai Support can facilitate reflection on what matters most to individuals.

The second study centers on caregivers of older adults, some of whom are older adults themselves caring for loved ones with or without dementia. We highlight the challenges faced by an older adult caregiver as she navigates her husband’s declining health and the multiple roles she must fulfill. This example emphasizes designing technology to support caregivers in their multifaceted roles, especially for older adult caregivers whose health is declining.

The contribution of this work is to emphasize how AI development for aging in place can center on active aging through care, fostering reflection on what people care about and providing meaningful support.

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Introduction

The concept of active aging is promoted as an individual lifestyle or societal goal that empowers older adults to address the growing demographic shift towards an older population – by 2030, an estimated 1 in 6 individuals will be 60 years old or older, increasing the population from 1 billion in 2020 to 1.4 billion (Organization 2023). Active aging emphasizes older adults’ continued participation in education, lifelong learning, contribution to society, staying active, and making social connections (Organization 2023). Technology can play a significant role in supporting older adults maintain an active lifestyle and participate in their own and others’ *care*.

Care is inherently part of our lives, and technology can motivate or enhance someone’s ability to pursue active aging by engaging in activities they care about. When individuals care about education and economic activities, such as volunteering, technology can provide the necessary learning and education, such as learning computer programming (Guo 2017) or forming a learning community and connecting with others who share their interests (Zhao et al. 2022). Similarly, for those who care about community and volunteering, technology can enable older adults to participate in crowdsourcing efforts, such as identifying and categorizing TED and TEDx subtitle errors (Skorupska et al. 2018). Thus, technology can help older adults engage in the aspects of active aging that resonate with them by providing tools to motivate and enhance their involvement in care.

To effectively support the increasing aging population, we can leverage technology to foster active aging by enhancing older adults’ ability to reflect on what is meaningful to them and engage in activities they care about. This approach not only addresses the practical challenges of aging but also promotes emotional and social well-being, leading to a more fulfilling and engaged life for older adults (see Fig. 1). In this short paper, I use two example projects to describe how we can design for the motivation of activities that older adults care about and explore how to support older adults in providing care for someone who matters to them.

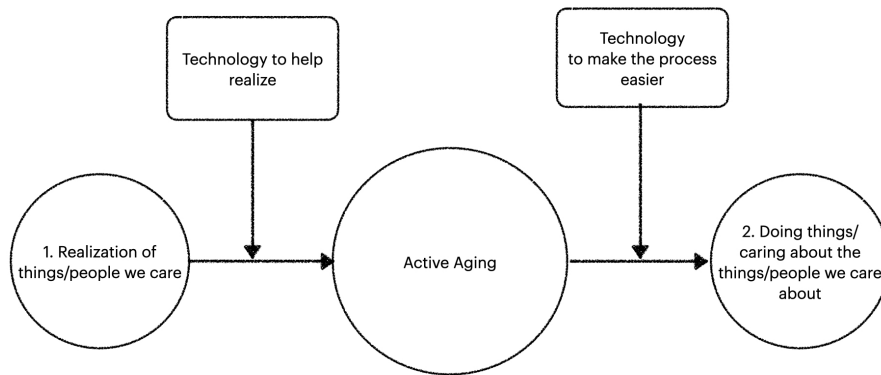


Figure 1: How technology can help active aging: (1) through helping with realization of things or people we care and (2) doing things or caring about the things or people we care about

Designing for Motivating Participation in Activities Older Adults Care About: Interactive Robot for Ikigai Support

One of the essential aspects of aging is finding continued meaning and purpose in life, which is a crucial part of well-being (Ryan and Deci 2001). As people grow older and face aging-related limitations, their abilities and social circles often shift, sometimes leading to a perceived loss of meaning and purpose. Technology can serve as a motivational tool, reminding people of what they care about and encouraging them to engage in meaningful activities, thereby achieving the goal of active aging.

In the past three years, we have been working on a robot project based on the concept of *ikigai*, a Japanese term for meaning and purpose in life (García and Miralles 2017; Kamino et al. 2023). We used a social robot as a communication interface because robots have contributed to the well-being of older adults (Alves-Oliveira et al. 2015; Chen et al. 2020), enhancing emotional well-being (Scoglio et al. 2019), and fostering self-reflection on what is essential in their lives (Randall et al. 2022, 2023b).

The project began with interviews, surveys (Randall et al. 2022), co-design sessions with ikigai experts (Kamino et al. 2023), and observations and collaboration within a local community (Hsu et al. 2023a,b). We implemented our design on the QT robot platform, using a robot programming interface called 'Engine' (Swaminathan et al. 2024), which features pre-scripted questions and LLM-generated responses or follow-up questions (Hsu et al. 2024a). During the conversation, the robot subtly nods its head, displays a listening expression with slight changes in its eyes, and gently moves its arms, all to convey attentiveness while listening (from the feedback of older adults (Hsu et al. 2024b)). The resulting Interactive Robot for Ikigai Support (I.R.I.S.) engages in three main activities:

- **Photograph Activity:** The photograph activity was inspired by observations in a local community facility, where group activities followed the TimeSlips and Life Story Work modules (George and Houser 2014; Truong et al. 2019) to engage older adults in conversations about photographs and created stories based on them. Through such directed conversations, the older adults could connect and share their life experiences (Ansello 2020). We saw an opportunity for the robot to interact with older adults in a similar way. Rather than providing a photograph, the robot asks the participant to show a personal photo and discuss it, asking whether the people or events in the picture are meaningful to them.
- **Reflection Activity:** The PERMA model suggests measuring well-being across five dimensions: positive emotion, engagement, relationships, meaning, and accomplishment (Seligman 2011). Drawing on this multidimensional view of well-being, the robot prompts reflection on topics such as recent events, accomplishments, and future plans, asking whether these events are meaningful (Randall et al. 2023a; Hsu et al. 2024a). This activity was selected for its ability to encourage self-reflection and foster meaningful engagement.
- **General Chat:** This activity was developed in response to feedback from older adult panelists who participated iteratively in our sessions (Hsu et al. 2024b), sharing the need in having free-flowing conversations with the robot about things they like. Thus, the robot would engage in an open-ended chat where the older adult can discuss anything, including updates in their life and topics they care about.

Our main goal for this robot is that through long-term interactions with these different activities, older adults have a chance to reflect on what gives their life meaning while the robot learns what they care about and suggests local events

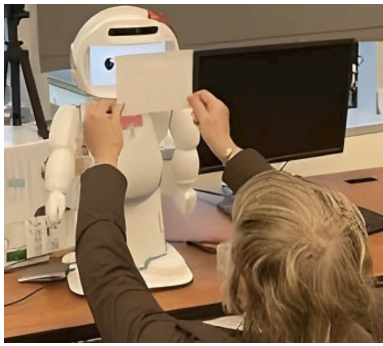


Figure 2: An older adult participant showing a personal photograph to the robot.

that match their interests.

To ensure the activities function smoothly, we conducted user testing with the autonomous robot, involving the photo activity with 20 older adults and the reflection activity with 19 older adults (Hsu et al. 2024a). These two activities were selected for evaluation because they followed a structured interaction, in contrast to the free-flowing nature of general chat.

In both activities, the older adults participated in the interactions, followed by interviews about their experiences and thoughts on the activities. Through qualitative and thematic analysis, we found that the interactions allowed some of the older adults to reflect on activities and people they enjoy and care about. Although detailed analysis is presented in other papers (Hsu et al. 2024a) and is ongoing, here we present quotes used in the thematic analysis that focused on whether the robot prompted reflection on their *ikigai*. These quotes illustrate how the robot was able to facilitate conversations about things the participants care about.

During the photo activity, one older adult (P12, 92/M) showed a photo of a wetland and wildlife, along with a favorite picture of his late wife. The robot asked about things he enjoyed with his wife, prompting him to share stories of hiking trips with his children and outdoor activities when his wife was alive. He mentioned: *“That was [something] I did not expect. Yeah, those were some pleasant memories that weren’t in my mind as I was thinking about this event. So that was good.”* This interaction highlighted how the unexpected conversation with the robot about positive memories helped him reconnect with meaningful experiences and activities.

Similarly, during the reflection activity on the topic of planning, P15 (82/M) shared his plans to visit Europe for a month and take cooking classes with his wife. When discussing social connections with the robot, much of his conversation centered around his wife. In the subsequent interview, he reflected on how the conversation naturally focused on their relationship: *“I tried to share with this thing (robot) what [my wife] and I like to do. How we support each other.”* Supporting each other and doing things together, is an act of care. This conversation with the robot helped P15 reflect on his wife, a person he deeply cares about.

Although we did not track participants’ activities outside their interactions with the robot, these sessions provided a space for reflection on what is meaningful in the participants’ lives. This reflection could potentially motivate them to pursue worthwhile activities and remain active in things they care about, with people they care about, whether it is learning, volunteering, or making important connections. Other technologies could explore how to provide hints or nudges to help individuals uncover what they want and encourage them to act when appropriate. By designing for the motivation of activities, these technologies can support older adults in staying active while aging in place.

Designing to Help Care: Understanding Care Partners’ Multifaceted Roles

After identifying what one cares about, another significant challenge is often accomplishing the activity or providing care for someone. Caring for someone is not an easy job, and sometimes technology can provide much-needed support, especially with the “invisible work” care partners must manage to support older adults living with them.

In a previous study (Hsu and Chung 2024), we interviewed 19 informal caregivers of older adults and, through thematic analysis, found that care partners often face numerous challenges while juggling multiple roles. While the detailed findings were presented in this paper (Hsu and Chung 2024), here we provide an example of how one participant (P17) expressed both the love and the difficulty involved in caring for someone she loves as their health declines.

P17 (65/F), who had been married for 35 years, explained why she became a care partner for her husband: *“When you’re married, you love someone, you help them through these things.”* After 32 years together, her husband was diagnosed with rheumatoid arthritis, and she found it increasingly difficult to witness his declining health: *“That general decline is hard, it is terrible to see in the person you love.”* Not only was watching his health decline mentally difficult for her, but managing his healthcare needs, medication, and the increased communication with his care team and insurance companies also required significant mental effort.

This case of P17 was similar across the other 18 interviews presented in the paper (Hsu and Chung 2024). It was not easy to care about someone and simultaneously manage all the assistive roles for the care recipient and, at times, various other people. Technology could help identify and reflect on these multiple roles, coordinate tasks, facilitate role-based scheduling, and support dynamic role transitions. Technology can make them more self-sufficient, thereby aiding older adults to become more active participants and contributing to society, thus facilitating aging in place.

This exploration provides an example of how to enhance the caregiving process, making it less demanding and difficult for those caring for loved ones. Similarly, other components of active aging, such as education, lifelong learning, and social connections, can also present challenges. Therefore, it is essential to explore the possibilities and spaces where technology can provide support and assistance.

Conclusion

In conclusion, technology can play a valuable role in promoting active aging by helping individuals identify what they care about and providing support for their activities and caregiving responsibilities. This paper has demonstrated how technology can be designed to facilitate this process, enhancing both self-care and caregiving activities. By leveraging AI and other technological innovations, we can create solutions that enable older adults to stay engaged, connected, and active in their communities. Ultimately, these advancements will contribute to a more fulfilling and supportive aging experience, empowering older adults to age in place with dignity and purpose, focusing on the things and people they care about.

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