Preferences, Patterns, and Wishes for Agents in the Home

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Abstract AI systems in the form of voice-activated agents, such as Amazon Echo and Google Home, are becoming increasingly prevalent in home environments. While these are becoming more prevalent in homes, there is little understanding of people's preferences, desires, and boundaries for AI systems in the home. A design toolkit and long-term home experience with Amazon Echo Dot and Jibo described in this paper provided an opportunity to explore 69 intergenerational users' preferences, usage patterns, and design wishes for future AI systems in the home.

Keywords social robot design, user studies

1 Introduction

Through participatory design sessions and long-term experience, this work explores users' preferences, usage patterns, and wishes for AI systems in the home. Voice-user interfaces (VUIs) are becoming more present in homes, offering a "natural" interface for users through voice. VUI agents can engage people in various ways depending on their methods of interaction and engagement. They can largely be classified as either transactional or relational. Transactional VUIs support an assistant-like role focused on functionalities such as reminders or timers [1, 2]. Relational VUIs emphasize social relationship development similar to a companion-like role [3].

User studies utilize a range of understand participants desires and thoughts regarding technologies including interviews, surveys, simulated lab studies, and home visits. To truly understand users' thoughts surrounding technology, it is crucial for users to live with these devices in home environments to shape and develop their opinions. Incorporating users earlier in the design process can obtain deeper understanding of their motivations and desires and inform the design of future technologies [4, 5]. This work incorporates a human-centered participatory design approach using several principles to guide the work including incorporating multiple generations through a tangible and understandable process, creating a language of engagement surrounding the technology to better enable participation, and understanding the technology being conscious of how the technology integrates into participants lives.

2 Initial Insights

2.1 User Study Overview

The shared insights are initial findings from a long-term study engaging 69 children, adults, and older adults (age range: 5 to 98 years of age, mean age: 42 years old) who participated in participatory design sessions and a long-term experience living with an Amazon Echo Dot or Jibo, social robot, for a month. The participatory design sessions occurred at the beginning and end of the living experience to understand users' preferences towards various agent actions and learn about their experience with the agent. The sessions included an agent action card sorting activity where participants sorted their desired actions for a future agent across six categories: (1) reminders, (2) information, (3) suggestions, (4) agent sharing something, (5) someone trying to reach user, and (6) someone sharing something with the user. These categories were included to encompass current abilities of the technology and future actions such as the agent being a communication tool. While in the home, participants recorded their use of the agent on a sheet and indicated the type of interaction they completed and their level of satisfaction for two weeks. A portion of the participants (34) completed both the beginning and end workshops and living experience.

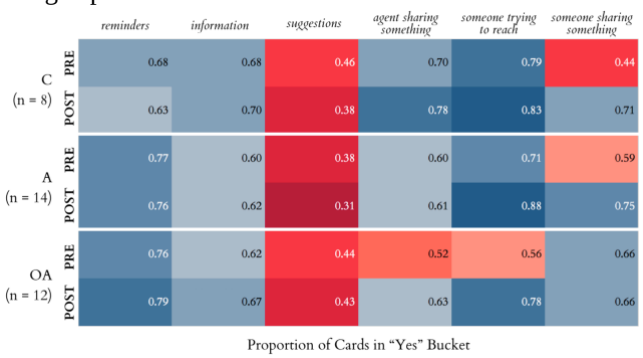

Fig. 1. Participants preferences for various agent actions across generations.

2.2 User Preferences

Across the long-term study, users' preferences for various agent actions changed overtime (Figure 1). Generations preferred different agent actions before living with the agent. All generations expressed dissent towards suggestions for actions which encroached on their autonomy such as taking a nap or suggesting eating. Older adults preferred the agent sharing something with them or someone reaching them through the agent more so than adults or children. Adults were the least open the agent sharing something with them or someone reaching them through the agent.

After living with the agent, all generations showed similar preference patterns across the various action categories. Suggestions remained a polarizing topic across generations but all generations were more comfortable with the agent

sharing something with them or someone reaching them through the agent.

2.3 User Usage Patterns

While living with the agent, the generations exhibited different usage patterns (Figure 2). Older adults and children's usage was anchored in entertainment and social features of the agents. Adults usage was anchored in the functional features of the agents.

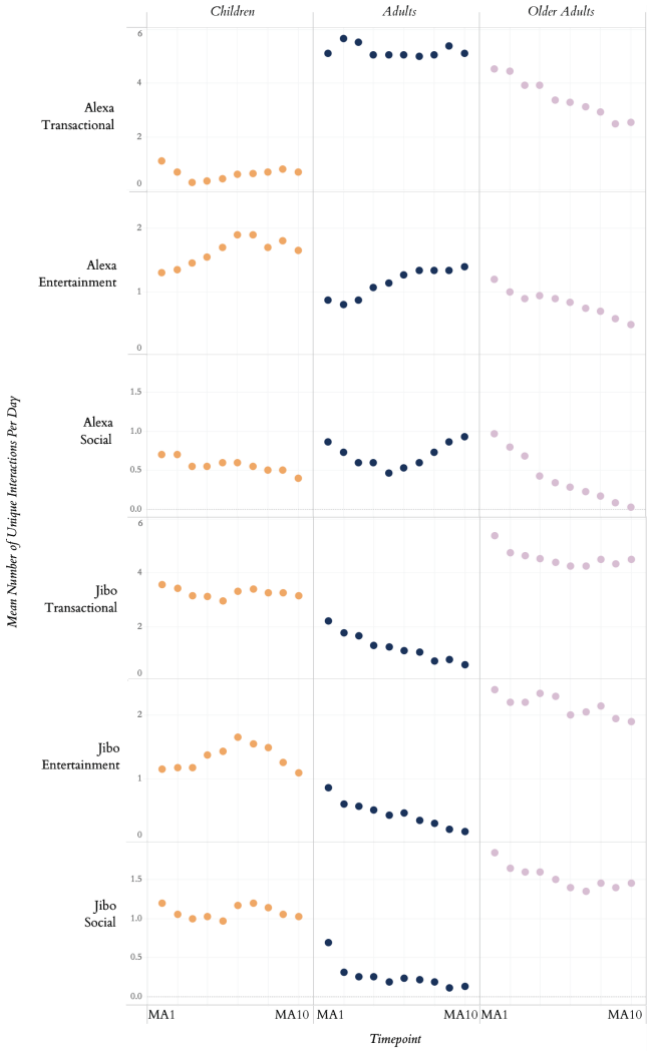

Fig. 2. Participants usage patterns across generations for Amazon Echo Dot and Jibo.

2.4 User Design Wishes

Participants were given the option to write "wishes" or desired functions for the agents on wooden tokens while living with it. The wish tokens were then collected at the end of the study period. The wish categories were different across Amazon Echo Dot and Jibo. Amazon Echo had wishes surrounding movement, functional, proactivity, and humor themes. Participants wanted increased functionality such as wireless charging and parental controls. They also wanted Alexa to have more humor and exhibit proactive activity. Movement was also a desired form factor.

For Jibo, there was a larger range of desired actions including sounds, social, information, entertainment, personalization, parental, movement, functional, and food. Entertainment was the largest desired category for more applications and use of the screen for videos. Participants desired increased functionality, information, and more movement than already provided. Social features such as FaceTime for communicating with others was also desired. The idea of assisting in parenting by reading stories and helping children stay focused when getting ready for school was mentioned. Personalization was also important as participants expressed Jibo should be able to know the family and use the family's phrases and language used with each other.

Participants who hosted Jibo had a wider range of themes for wishes and also ones related to more relational traits such as assisting with parenting and communicating with others through the robot. Amazon Echo Dot's wishes were mostly focused on functional aspects similar to a transactional VUI.

3 Conclusions

Living with a technology such as a social robot or smart speaker VUI changes how participants perceive the agent and the features participants desire for the agent. Through living with the technology, participants across generations converge to a similar preference pattern for the actions they desired in the agent. However, participants' usage was different across generations based on whether their usage was anchored in social and entertainment features or functional features. Participants' design desires were narrow for Amazon Echo Dot but broader for Jibo, including categories like social and personalization. Overall, this work demonstrates the benefits of conducting long-term studies where participants can experience social technologies in their homes to shape their desires and preferences surrounding the technology.

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