

OPP: APPLICATION FIELDS & INNOVATIVE TECHNOLOGIES

Perspectives of older adults and their caregivers on the development of a robotic exercise coach

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Purpose Physical activity through exercise helps to delay, prevent, or reverse functional decline in older adults (Bean et al., 2004). Recently, various technologies, including assistive robot coaches, have been developed to engage older adults in physical activities (Avioz-Sarig et al., 2021). Nevertheless, there is a lack of understanding regarding the specific needs, preferences, and potential barriers faced by older adults and their caregivers when interacting with this technology (Fasola and Mataric, 2012). This study is part of the interdisciplinary AI@WZC project, aimed at developing an AI-driven robotic exercise coach for older adults living in a residential care home. We aimed to acquire insights from residents and their caregivers to inform the design of this robotic coach. **Method** We organized two semi-structured focus groups with respectively five and four care home residents (age: 70-90 years old; gender: session 1 with three females and two males, session 2 with two females and two males; MMSE: 18-30) and two caregivers (one physical therapist, one nurse), adhering to the participatory design principles of the PERCEPT methodology (Bourazeri and Stumpf, 2018). During the first workshop, we gained insights into their technology use, physical challenges, and daily activities. This discussion aided the participants to co-create personas for a care home resident, a physical therapist, and a nurse. In the second workshop, these personas served as a basis to facilitate further discussions. Here, we asked participants to rank their preferred physical exercises related to training specific body parts (e.g., ankle, shoulder, neck), and inquired about their preferences related to functionalities the robot should have, with emphasis on the information that the robot should provide to them through its interface. **Results and Discussion** Participants have varying physical abilities and preferences regarding physical exercises they engage in. For example, care home residents use different mobility aids (e.g., walker, wheelchair), which impacts which exercises are suitable and safe. Therefore, it is necessary that caregivers can individually assess care home residents' training progress with the robot, and make adjustments to ensure the exercises fit their individual needs. Flexibility is also important regarding the planning of the robotic coach' visits. For example, the residents often engage in group or individual exercise sessions with a physical therapist. As such, participants voiced that training with the robot should not be scheduled too close to a session with a physical therapist. Furthermore, participants want to know in advance when an exercise session with the robot is planned, and want to have the freedom to cancel or reschedule such a session when it does not suit them, e.g., in case of unexpected family visitors, appointment with their doctor, or other activities. The design needs to take into account their limited experience with technology, while avoiding burdening caregivers with additional work load to manage the robot's schedule. Regarding the interface of the robot, participants indicated that feedback primarily needs to be straightforward and functional, e.g., the robot needs to inform them about their progress during the training, letting them know how long it takes before they completed the exercise. Participants also expressed the wish not be interrupted during their training with the robot, meaning that non-functional distractions (e.g., visual embellishments, abundant feedback or encouragement) should be kept to a minimum. Summarizing these results, we identified two key user requirements based on the data collected during the two sessions. (1) The robotic coach needs to serve as an assessment tool, allowing caregivers to monitor functional decline and ensure the safety of exercise regimens. (2) It needs to enable personalization of exercise regimens according to individual preferences and physical limitations of care home residents, therefore allowing them to maintain agency regarding their exercise routines. At the same time, interaction between the robot and residents should be minimal, with a focus on functional feedback during exercises. In conclusion, this approach and the findings from this study can inspire and guide future researchers in developing assistive physical exercise technologies for use in residential care homes.

References

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