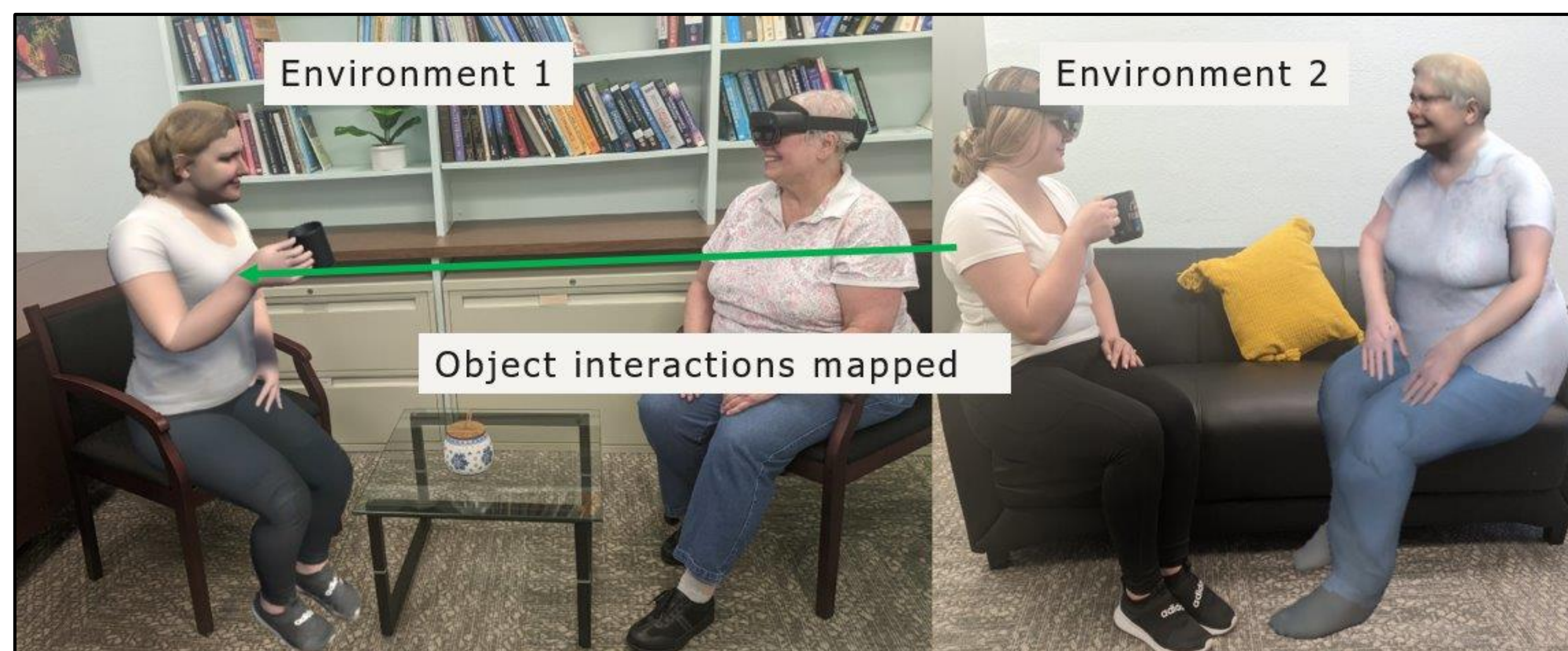


Reducing Loneliness for Long Term Care Older Adults through Collaborative Augmented Reality

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Award Type: IRG [2225890]



Project Challenge

Address loneliness in older adults residing in long term care communities (LTCs) by enabling virtual 3D visits and shared activities between an older adult and their family member through a novel real-time collaborative AR interaction framework.

Intellectual Merit

Engineering Contributions include:

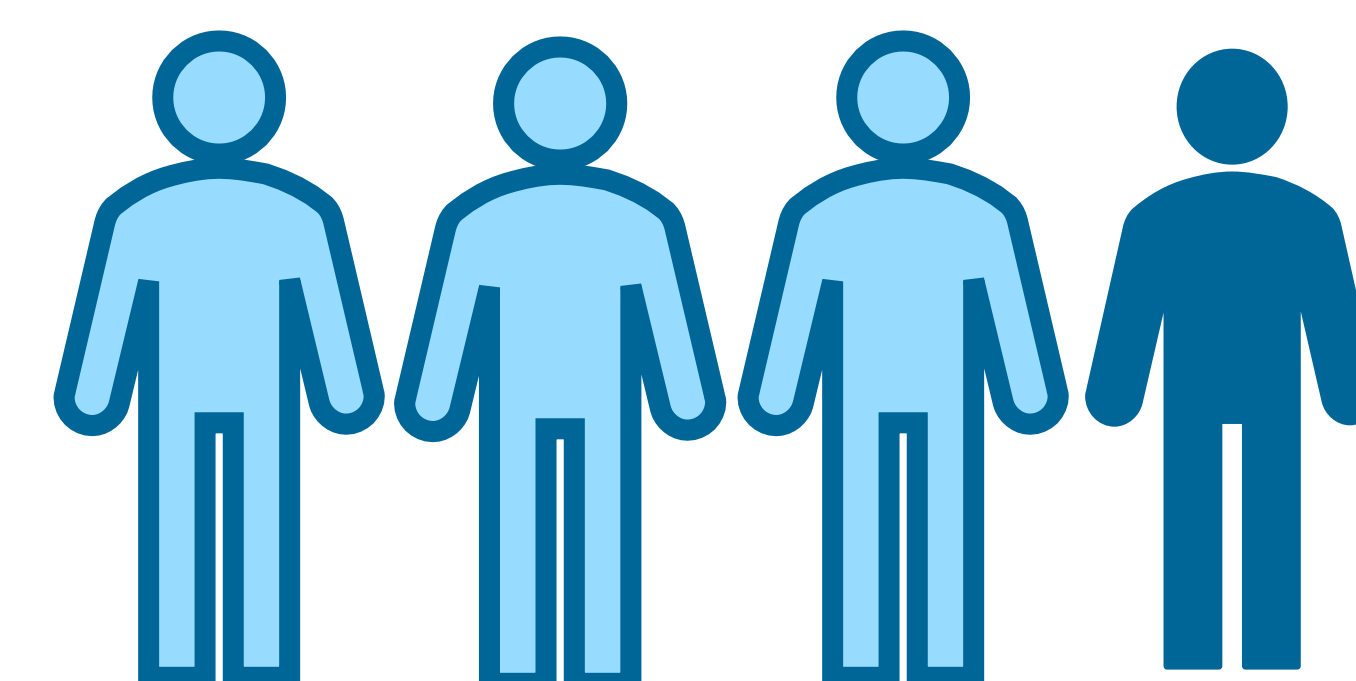
- 1) a novel optimization framework that preserves avatar pose while accommodating local and remote environment differences.
- 2) new motion mapping method that creates naturalistic avatar motion respecting user-avatar environment differences.
- 3) scalability and deployment factors in LTCs and family homes.

Behavioral Science Contributions include:

- 4) understanding and evaluating social presence in collaborative AR for older adults with varying cognitive impairment levels.
- 5) exploring collaborative AR's impact on mitigating loneliness.
- 6) insight and guidelines for design of activities that reduce loneliness in older adults.

Broader Impact

3 in 4 older adults living in LTCs report loneliness



Older adults Older adults reporting loneliness

That is over 4 million people!

AT THE RISK OF



Cardiovascular Diseases



Cognitive Decline



Mental Health Issues

Socioemotional selectivity theory indicates that as we age, we want to spend face-to-face time with those who hold the most meaningful roles in our lives.

Our project immediately empowers older adults by enabling them to engage in activities they may be physically and/or logistically unable to do with their loved ones.

"I cannot play Checkers in real life. I can actually do this (through collaborative AR). This is cool."

Long-term impacts of our work includes:

- 1) more inclusive approach to further develop Augmented Reality as an Interactive Communication Technology.
- 2) validation of a system that has the potential to reduce loneliness in older adults who are geographically separated from their loved ones.
- 3) adaptation of this system to help other groups vulnerable to loneliness.

Major Outcomes/Progress

Pose Preservation:

We have developed an algorithm that adjusts the user's interaction to their avatar's environment while maintaining the original body pose.



Person in a local environment (left). Their avatar in the remote environment (right)

Iterative Participatory Design of Activities

We have utilized iterative feedback from 8 older adults, 2 family members, and 5 LTC staff to design activities for collaborative AR.



An older adult participant testing the design of activities

Future Goals

1) We will perform a longitudinal field study to allow older adults and their family members to interact through Collaborative AR while measuring changes in the degree of loneliness.



Real images (top) and avatars (bottom) of the older adult (left) and their loved one (right)

2) We will develop a comprehensive framework to allow for naturalistic locomotion and pose preservation of the avatar in local-remote interaction.