

Goals

- ❖ Explore how robotic tele-presence systems can help people with physical disabilities with repositioning assistance
- ❖ Design an accessible web interface of providing self-directed and tele-presence repositioning assistance to individuals with physical disabilities via the Internet

Background

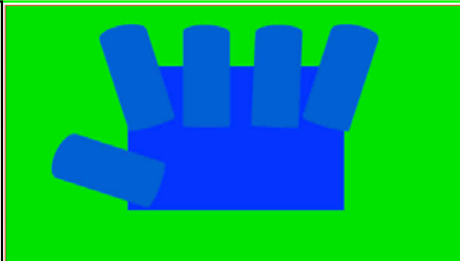
- Few studies on robotics control for people with disabilities
- Domestic robots for household chores, not self-directed care [1]
 - Robots interface inaccessible for people with varied functionality [2]

👉 Need for Telepresence and Self-Directed Hand Repositioning 👈

Independence is essential to sustain a good quality of life for people with physical disabilities. Health care is expensive so hiring nurses is difficult & insurance coverage is limited. Hand repositioning via web can allow friends anywhere to help remotely with care.

Interface Design and Implementation

Using WebGL, JavaScript, HTML, & Blender for 3D graphics & animation, a prototype interface was developed to simulate hand repositioning. Users can mouse click a finger & the selected finger will rotate. When reselecting a second time, it is redirected to a `w e b p a g e .`



Changing Directions

If shift is currently pressed, the camera will rotate a bit in the chosen direction, if shift is not being held, the camera will move

1. Press 'a' key to tilt to the right
2. Press the left arrow to rotate to the left/move along the - X axis
3. Press 'd' key to tilt to the left
4. Press the right arrow to rotate to the right/move along the + X axis
5. Press 's' key to look down/move along the - Y axis
6. Press the up arrow to zoom in/move along the - Z axis
7. Press 'w' key to look up/move along the + Y axis
8. Press the down arrow to zoom out/move along the + Z axis

Conclusion

This proof-of-concept robotic web interface proves the feasibility of the proposed technology for providing people with disabilities hand repositioning assistance via the Internet.



Using this robotic web interface, individuals with a physical disability can directly reposition their hands or they remotely can assist a friend with a disability with hand repositioning anywhere `i n t h e w o r l d .`

Future Work

An experiment will be conducted to test the interface with a large pool of subjects in the future. We will also use an actual robotic device that can be controlled by the interface from a remote location to evaluate the effectiveness of tele-presence technology.

Demo at <http://www.cs.umbc.edu/~kavi1/keyboard>

For more information about *AccessComputing*, visit uw.edu/accesscomputing

References

- [1]. Liu, K., Sakamoto, D., Inami, M., and Igarashi, T. Roboshop: multi-layered sketching interface for robot homework assignment and management. In Proceedings of the 2011 annual conference on Human factors in computing systems, CHI '11, ACM (New York, NY, USA, 2011), 647–656.
- [2]. Haigh, K. Z., and Yanco, H. Automation as caregiver: A survey of issues and technologies. In Proceedings of the AAAI-02 Workshop "Automation as Caregiver" (2002), 39–53. AAAI Technical Report WS-02-02.