HarmonyHeal A-VR: Enhancing Cognitive Rehabilitation in Alzheimer's Patients Using VR/AR Technologies

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One in 14 people is affected by Alzheimer's Disease (AD), a progressive neurodegenerative disorder that impairs cognitive function and daily activities, resulting in a declined quality of patient life and increased caregiver stress. This research explores the ability of Virtual Reality (VR) and Augmented Reality (AR) technologies to reduce the progression of AD through practicing physical and cognitive skills via a virtual environment and customized content, also engaging olfactory, auditory, and visual senses to help patients and caregivers. In the VR system, daily activities such as washing dishes were simulated to stimulate cognitive function, and interaction with avatar(s) was enabled to discuss emotional memories and remind patients of their loved ones. A virtual garden was provided to help bedridden patients engage in outdoor activities. The AR system facilitated patient-caregiver communication, enabling real-time doctor consultations, daily reminders, and personalized care support. Eight participants (4 “experimental group” and 4 “control group”) were chosen to test the hypotheses: 1)VR improves patients' cognitive and psychological states compared to in-person therapy, 2)VR/AR is simple to navigate, and 3) caregivers feel less overwhelmed while using the AR application. The results revealed that participants enhanced cognitive function in terms of the learning process and memory retention, achieved a higher level of interest, emotion, comfort, and motivation, and showed increased limb engagement throughout VR sessions. This study also found that AR applications help caregivers reduce stress. These findings imply that VR/AR technologies can support cognitive rehabilitation and enhance the quality of life for both Alzheimer’s patients and their caregivers.

Awards Won: