Places Patients in Navigable Virtual Environments to Perform Cognitive Tasks under the Guidance of a Therapist

This flexible interactive virtual grocery store environment, called V-Mart, is a therapist-guided tool that aids in the assessment and treatment of cognitive and emotional impairment associated with post-traumatic stress disorder (PTSD) and other stress-induced disorders, as well as forms of dementia such as Alzheimer’s disease. More than 5 million Americans live with Alzheimer’s dementia, and an estimated 7.8 percent of Americans experience PTSD during their lifetimes. Cognitive therapy has proven to be the most effective type of treatment for stressor-activated disorders like PTSD because it changes patient’s thought patterns or behaviors to better handle the external stressors. No available virtual reality (VR) software places patients in critical environments, such as retail stores, to offer cognitive assessment or therapy for these types of disorders.

Researchers at the University of Florida have designed software offering a realistic representation of a grocery store environment, allowing users to remain in a safe and controllable setting while receiving treatment from a therapist. Therapists are able to customize important parameters based on patients’ needs, such as the tasks they must perform or stressors they may encounter.

Application

Virtual reality environments, experienced with either a VR headset or on computer, to assess and treat patients with PTSD, Alzheimer’s, or other cognitive, emotional, or stress-related disorders

Advantages

• Based on actual grocery stores with hundreds of real items displayed on virtual shelves, representing a realistic and familiar environment
• Assists therapists in treating people with mental impairments like dementia or PTSD, helping them to cope and adapt to daily challenges as they seek successful reintegration
• Web accessible, allowing treatment between therapist and patient regardless of proximity
• Customizable by therapists, allowing personalized treatment based on the patient’s own type of stressors and behavior level
• Operates on home computers or virtual reality headsets, placing each patient in the virtual environment controlled and customized by therapists
Technology

This virtual reality software operates via two internet-connected computers. On one computer, the therapist controls the Therapist Console. This entails a control panel, which allows the therapist to set the parameters of V-Mart, and a view of the patient’s screen. On the other computer, the patient operates the V-Mart grocery store application. In this program, the patient must perform cognitive tasks while being emotionally challenged.

Patients can navigate the store, search for and compare items, interact with other shoppers, and then check out while interacting with cashiers and other workers, and even make payment transactions. The program allows therapists to control many parameters of the patient’s experience, including the shopping lists, item prices, available funds, cashier characteristics and the ambient grocery store sounds. Therapists also control the conversation between the patient and the cashier. The program has built-in situations that challenge the patient's experience, varying from overhearing provocative conversations between other patrons to receiving incorrect change from the cashier. Using a Microsoft Xbox controller, the patient virtually pushes a shopping cart through the store to accomplish specific goals outlined by different scenarios.

Inventors

Benjamin C. Lok, Ph.D., is a professor in the Department of Computer and Information Sciences and Engineering at the University of Florida. His research focuses on virtual humans and mixed reality in the areas of computer graphics, virtual environments, and human-computer interaction. Dr. Lok received a NSF Career Award in 2007. He and his students in the Virtual Experiences Research Group received best paper awards at ACM I3D and IEEE VR in 2008. Dr. Lok earned his Ph.D. in computer science in 2002 from the University of North Carolina at Chapel Hill.

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