Immersive VR Environment for Guided Autobiographical Memory Retrieval via Sensory Stimulation

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Abstract

Advances in virtual reality (VR) technology have created innovative opportunities to enhance cognitive functioning and develop targeted therapeutic interventions for mental health conditions. This paper presents a novel IoT-VR system designed to investigate the psychological and immersive efficacy of a multisensory VR exposure protocol for autobiographical memory retrieval, compared with traditional odor-evoked memory techniques. By integrating 3D visual environments, olfactory stimuli, and motion-based interaction, the system stimulates autobiographical recall through personalized stimuli linked to participants' past experiences of personal fulfillment. We detail the architecture and implementation of this IoT-VR framework, which is part of a multidisciplinary Romanian ARUT-funded research project that is bridging computer science and psychology to explore memory-driven therapeutic outcomes. The study underscores the potential of multisensory VR environments to foster optimism and mitigate stress by reactivating positive autobiographical memories.

Keywords

Autobiographical memory, multisensory virtual reality, odor-evoked memory retrieval, VR therapy, stress reduction.