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Cognitive Stimulation of Elderly Individuals with Instrumental Virtual Reality-Based Activities of Daily Life: Pre-Post Treatment Study

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Abstract

As the demographic structure in western societies ages, the prevalence and impact of cognitive decline rises. Thus, new solutions to tackle this problem are required. The use of Information and Communication Technologies (ICT)-based cognitive exercises has emerged in the last few decades, though with inconsistent results. Hence, we conducted a pre-post treatment study to further investigate this approach. We designed a set of virtual reality exercises that mimic activities of daily living by which the patient can train different cognitive domains. Twenty-five participants, ages 65-85, underwent 12 training sessions between the pre-treatment and post-treatment assessments. Significant increases were seen between the two assessments for some of the neuropsychological measures: visual memory, attention, and cognitive flexibility. Results also suggest that participants with lower baseline cognitive performance levels improved most after these sessions.

Keywords: cognitive stimulation, virtual reality, serious games, elderly

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Design and development of patient health tracking, monitoring and big data storage using Internet of Things and real time cloud computing

Imran Shah, Sadia Din, Siddique Feroze, Isahel de la Torre Diaz, Jose Brufosa, Julio César Martínez Espinosa, Imran Ashraf

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Results and discussions
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With the outbreak of the COVID-19 pandemic, social isolation and quarantine have become commonplace across the world. IoT health monitoring solutions eliminate the need for regular doctor visits and interactions among patients and medical personnel. Many patients in wards or intensive care units require continuous monitoring of their health. Continuous patient monitoring is a hectic practice in hospitals with limited staff. In a pandemic situation like COVID-19, it becomes much more difficult practice when hospitals are working at full capacity and there is still a risk of medical workers being infected. In this study, we propose an Internet of Things (IoT)-based patient health monitoring system that collects real-time data on important health indicators such as pulse rate, blood oxygen saturation, and body temperature that can be expanded to include more parameters. Our system is comprised of a hardware component that collects and transmits data from sensors to a cloud-based storage system, where it can be accessed and analyzed by healthcare specialists. The ESP-32 microcontroller interfaces with the multiple sensors and wirelessly transmits the collected data to the cloud storage system. A pulse oximeter is utilized in our system to measure blood oxygen saturation and body temperature, as well as a heart rate monitor to measure pulse rate. A web-based interface is also implemented, allowing healthcare practitioners to access and visualize the collected data in real-time, making remote patient monitoring easier. Overall, our IoT-based patient health monitoring system represents a significant advancement in remote patient monitoring, allowing



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