

Setting up a Prototype for the Artificial Interactive Reality Unified System (AIRUS) to Transform Psychosocial Environment in Occupational Therapy

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Abstract : Background: Many children with high incidence disabilities, such as autism spectrum disorder (ASD), struggle to participate in the community in a socially acceptable manner. Occupational therapists (OTs) often find difficulties in creating natural scenarios in clinics for their clients to practice the life skills needed to overcome their real-life challenges. Virtual reality (VR) offers potential solutions to resolve the existing limitation faced by clinicians to create simulated natural environments for their clients to generalize the facilitated skills. Research design: The research aims to develop a prototype for an interactive VR system to provide a realistic and immersive environment for clients to practice skills. The descriptive qualitative methodology is employed to design and develop the AIRUS prototype. It involves creating an interactive VR data management system that made use of 3D camera, Oculus Quest Pro's tracking tools, and the Unity game engine to create simulated real-life social scenarios, in which the users interact with people, objects, and environmental elements inside the virtual environment using natural eye-gazes, hand and body movements. The eye tracking (e.g., selective or joint attention), hand- or body-tracking (e.g., repetitive stimming or fidgeting), and facial tracking (e.g., emotion recognition) functions allow behavioral data to be captured and managed in the AIRUS architecture. Impact of project: Using 360-degree video footage of real-life scenarios to create the surrounding environment, our users are immersed in simulated daily life experience to feel as natural and realistic as possible. Instead of interactional controllers or sensors, the hand tracking software enables the users to interact naturally with the simulated environment using daily life behavior such as hand shaking and waving to control and interact with the virtual objects and people. These two innovative aspects of the AIRUS alone carry the existing interactive VR technology to the next horizon and open numerous possibilities for breakthroughs in the design of technology-based psychosocial assessment and intervention in occupational therapy. Implications for future projects: Extending from this pilot AIRUS prototype, AI technology will be deployed to identify the objects and people in the 360-degree videos to allow more efficient data capturing and interpretation, such as where the user is visually attending at any given moment. This will allow us to quickly identify objects in the videos and convert them into data points that the software will be able to capture. These datapoints can be used to pinpoint our users' focus and where their interests lie. Additionally, AI can help interpret the stored objective quantifiable data so that OTs can advance their psychosocial assessment and intervention programs to the technology-based level.

Keywords : occupational therapy, psychosocial assessment and intervention, simulated interactive environment, virtual reality

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