COMP39/9900 Computer Science/IT Capstone Project
School of Computer Science and Engineering, UNSW

Project Number: P23

Project Title: Gamification for rehabilitation using HMD VR

Project Clients: Juno Kim

Project Specializations: Software development; System/game development; Human Computer Interaction (HCI).

Number of groups: 2

Background:

Patients with sensorimotor dysfunctions (e.g., follow stroke or vestibular damage) often require extensive rehabilitation that requires continuous monitoring by clinical staff who provide patients with feedback on their performance. What if this feedback could be provided automatically to patients engaged in task-orientated activities using virtual reality (VR)?

The project aims to develop a standalone VR application that can be used to perform a quick assessment of patient sensorimotor control. This will require the use of a standalone VR headset used to immerse patients in virtual environments.

Requirements and Scope:

Recreate an existing WebXR application (similar to Whac-a-mole) or create a new interactive environment for running a visual search task (e.g., virtual supermarket aisle).

The application workflow

1. You will create an immersive environment using 3D content development software.

2. You will adapt or create a new game engine to assess sensorimotor performance in head-mounted display (HMD) based VR.

3. Position and orientation of the HMD and hand remotes will need to be monitored to assess performance in basic reaching tasks involving virtual target objects.

4. Users should receive a score for each round of game play.

5. A simple usability assessment will be undertaken at the end of the project.

Required Knowledge and skills:

Knowledge about game development and application development for virtual reality (e.g., Unity, Unreal engines).

Expected outcomes/deliverables:

A standalone application and all source code to be delivered with a brief report on usability of the system.

Supervision:

Juno Kim

Additional resources:

You will have the ability to work with a team of researchers based in UNSW School of Optometry and Vision Science, Prince of Wales Hospital (POWH) and Royal Prince Alfred Hospital (RPAH). The primary client will be based at UNSW.

The proposal can support up to 2 groups that will work on different games (different environments, but similar functionality).