ABSTRACT

Mixed reality rehabilitation systems and games are demonstrating potential as innovative adjunctive therapies for health professionals in their treatment of various hand and upper limb motor impairments. Unilateral motor deficits of the arm, for example, are commonly experienced post stroke. Our TheraMem system provides an augmented reality game environment that contributes to this increasingly rich area of research. We present a prototype system which “fools the brain” by visually amplifying users’ hand movements – small actual hand movements lead to perceived larger movements. We validate the usability of our system in an empirical study with forty-five non-clinical participants. In addition, we produced early qualitative evidence for the utility of our approach and system for stroke recovery and motor rehabilitation.

Categories and Subject Descriptors
H.5.1 [Multimedia Information Systems]: Artificial, augmented, and virtual realities; J.3 [Life and Medical Sciences]: Health

General Terms
Human Factors

Keywords
Augmented Reality, Therapy, Physical and Motor Rehabilitation

THE DEMONSTRATION

We demo a prototype system which has been used in for academic and clinical studies: The user of this system sits in front of two black boxes and placed the hands in them. A webcam inside of each box videotapes the user’s hands. Computer mediated video manipulation is applied and the hands are displayed in an augmented manner on the screen above the boxes. Curtains in front of boxes mask the user’s direct view of their own hands.

In the TheraMem setting of the ART system, the user controls a virtual memory game using only the hands. The game consists of two virtual boards with 12 (4x3) virtual cards (tiles) each. Tiles, coloured in gray, are displayed upside down. By moving the hand(s) over the tiles, the user is able to activate a colour change from grey to red. When the user places a hand over an individual tile and pauses for a short while, the tile flips over to reveal the content assigned to it (see Figure). The task is to find all matching pairs of 3D models between the left and the right side.

This work is also published here:

(go to http://www.igroup.org/regenbre/publications.html for paper manuscript copies)

The second author is will be the demonstrator for this system. We invite attendees to try the system and provide feedback.