INTERFACE PROVIDERS IN NEUROREHABILITATION

NON IMMERSIVE VIRTUAL REALITY AND MOTORIC NEUROREHABILITATION: REHABILITATION GAMING SYSTEM

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The abstract would be (again, if You agree) from http://rgs-project.eu/research:

RGS integrates a paradigm of action execution with motor imagery and action observation [1, 2] where the underlying hypotheses is that functional recovery can be promoted by capitalizing on the life-long plasticity of the brain and the assumption that neuronal plasticity is governed by only a few computational principles or objectives [3]. The. hypothesis behind the choice to combine movement execution with the observation of correlated action of virtual limbs in a first-person perspective is that , within this specific scenario, recovery can be accelerated and enhanced by driving the so called, mirror neuron system (MNS) that can be seen as an interface between the neuronal substrates of visual perception and motor planning and execution [4]. We hypothesize that the MNS can define a task and context relevant state of the afferent and efferent pathways that are disrupted by the lesion inducing conditions for functional recovery and rescue. As a rehabilitation and diagnostics technology RGS incorporates essential features of successful rehabilitation while reducing the need for direct supervision by therapists and clinicians.

The clinical trials that have been performed thus far suggest that RGS accelerates recovery of acute and chronic stroke while it is at least as effective in recovery of movement speed as intense – and therapist dependent – occupational therapy [1, 2]

[1] M. S. Cameirao, et al., "Virtual reality based rehabilitation speeds up functional recovery of the upper extremities after stroke: A randomized controlled pilot study in the acute phase of stroke using the Rehabilitation Gaming System," Restor Neurol Neurosci, vol. 29, pp. 287-98, 2011 (Full Text, PDF).

[2] M. S. Cameirao, et al., "Neurorehabilitation using the virtual reality based Rehabilitation Gaming System: methodology, design, psychometrics, usability and validation," J Neuroeng Rehabil, vol. 7, p. 48, 2010 (Full Text, PDF).

[3] R. Wyss, et al., "A model of the ventral visual system based on temporal stability and local memory," Public Library of Science Biology, vol. 4, pp. 836-43, 2006 (Full Text, PDF).

[4] G. Rizzolatti, and Craighero, L., "The mirror-neuron system.," Annu Rev Neurosci, vol. 27, pp. 169-192, 2004 .