

May technology strengthen tele-rehabilitation processes?

We present some innovative approaches adopted in our Lab to improve the communication of ALS patients and to monitor and reinforce the tele-rehabilitation practices of patients with severe impairment due to traumatic brain injury and stroke.

We describe the adoption of Brain Computer Interfaces (BCI) for enabling ALS patients at the advanced stage of the disease to express choices only by eye movements. The bio-signals are processed and interpreted to associate them to the user's expression of choice, in particular to express positive and negative answers.

We present then a series of software tools, based on OpenCV library and the Kinect SDK, which enable the therapist to quantitatively monitor the tele-rehabilitation practices of patients with severe traumatic brain injury and stroke. The tool enables Nu!Reha to automatically detect the correctness of some rehabilitation practices, identifying the objects moved by the patient and assessing the type of movement performed.

Lastly we present Nu!RehaVR, a series of virtual environments designed to enable the patient to perform rehabilitation exercises mimicking real contexts in which the patients cannot act: dangerous situations or contexts requiring some capabilities the patient do not have. In the virtual environment the patient has the possibility of facilitate the recovering of the damaged neural functions, performing ad-hoc designed exercises.