ARMin and VR in Peripersonal Space To Improve Rehabilitation of Paretic Arm

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Motivation

•To improve arm rehabilitation.

•To develop and evaluate biologically inspired control of robot and virtual reality hand eye coordination exercises.

Plasticity-based Approach

•Target brain regions associated with voluntary motor control.

•Personalize robot support and virtual reality agent.

•Observation and Imitation exercises.

•Sensory Motor stimulation and feedback.

•Reach and grasp, manipulation.

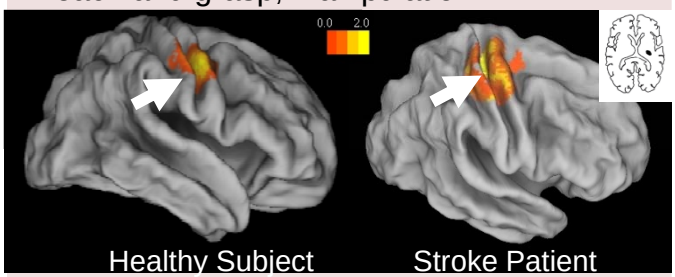

Figure 1 Target Brain Regions

Tasks

Observation and Imitation with robots in virtual reality Peripersonal Space.

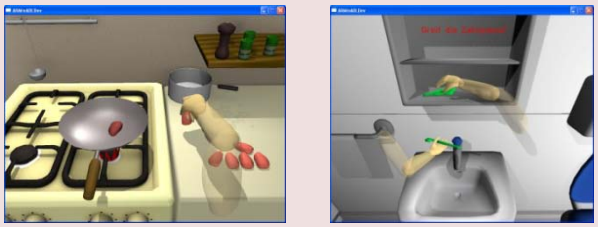

Figure 2 Activities of Daily Living

Methods

Sensors record ipsilesional limb. Program robot control, virtual agents.

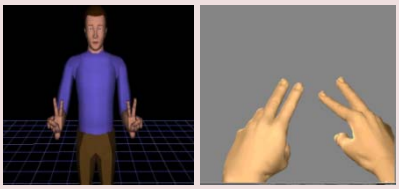

Figure 3 3rd Person Agent, 1st Person Agent

Cognitive System Robot

1. Sensors record tasks performed with ipsilesional limb.

2. Therapist establishes boundaries.

3. BioFeed ARMin guides paretic arm with personalized control program.

Figure 4 ARMin Personalized Programming

Conclusion

Recodings of the ipsilesional limb may be used to program ARMin and VR for personalized therapy to support plasticity-based approach – targeting neural regions associated with voluntary control of movement.

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