

## **Exoskeleton-Based Stroke Rehabilitation with Augmented Reality**

The primary objective of the proposed project is the development of an innovative strategy to provide effective exoskeleton-based rehabilitation that is matched by the user need and response characteristics. Specifically, the two main goals of the project are to design an upper extremity exo-skeleton device (Goal 1) that will be combined with novel training protocols, integrating action-observation learning and robotic rehabilitation techniques (Goal 2).

For over 50 years motor control researchers have used behavioral demonstrations to facilitate the learning of difficult motor skills. Thus, the development of training protocols that combine action-observation therapy with a robotic exoskeleton providing physical corrective force feedback might lead to more successful rehabilitation outcomes. The simultaneous effects of physical interactions and visual stimulations are expected to induce high motivation and active participation of post-stroke patients. Since the observational learning involves a higher-level cognitive process in the Central Nervous System (CNS), the proposed training protocols have a high chance to propel a transfer and/or a generalization of restored motor function to ultimately improve performance with regard to Activities of Daily Living (ADLs).