

ON THE DESIGN OF ASSISTIVE ROBOTICS SOLUTIONS

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Abstract

The aging of population and decline of NHS resources in Europe is opening new problems in healthcare that might be conveniently addressed with robotics solutions, in a near future. This presentation provides a quick overview of the open problems and solutions by focusing to robotic assisted post-stroke rehabilitation. Several design solutions will be outlined and discussed by referring to the outcomes of AGEWELL, a European Co-fund project led by prof. Carbone in collaboration with CESTER laboratory, TU Cluj-Napoca, Romania. Some proposed solutions are outlined as referring to LAWEX, ASPIRE, and PaRReX patented designs. This exploits the possibilities of novel robotic architectures. For instance, the structure of LAWEX is a non-conventional cable-driven open architecture, which allows accessibility of patients under treatment. Using wristbands, cables are connected to the end-effector which covers the limb to be trained. ASPIRE is a spherical parallel architecture intended for shoulder assistance as it can perform multiple feasible shoulder motion ranges. PaRRex can be seen as a wearable exoskeleton with modular structure, consisting of two parallel modules, one for the forearm mobilization (elbow flexion) and the pronation/supination, the second parallel module is designed to mobilize the wrist (flexion/extension and abduction/ adduction).