Thesis Project Form

Title (tentative):   VR exergames for children with a sensor-endowed orthosis for the upper limb

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Description

Motivation and application domain

The goal of this thesis is to develop a set of exergames for children wearing a specific sensor-endowed orthosis for the upper limb.
Such exercises should be used to perform physical exercises that require the activation of specific limb segments.

General objectives and main activities

Playcuff is a sensor-endowed orthosis for the upper limb in the shape of a soft wristband with embedded pseudoelastic springs that produce joint extension moments. The device, designed specifically for the rehabilitation of children, has a dual function to deliver dynamic postural stabilization of the wrist and hand and act as a wireless video game controller. The wristband is available in different sizes, fit for children of different age groups. The intensity of the joint extension can also be personalized to optimize comfort and posture and avoid spasticity-related hyperreflexia.
Alongside the sensors, Playcuff includes an on-board system for real-time recognition of multisegmental 3D gestures of the upper limb.
The goal of this thesis is to develop a set of exergames controlled by the gestures detected by Plaucuff.

The work is in collaboration with the CNR-ICMATE, in the context of the PNRR PNC Fit4MedRob project.

Training Objectives (technical/analytical tools, experimental methodologies)

The exergames will be developed using Unity 3D.
The interaction will be implemented using the software developed by CNR to interface with Playcuff.
The system should also implement a user interface for the customization of the game by the therapist and record the outcomes and all the necessary parameters, in a way compliant with the interoperability infrastructure of the Fit4MedRob project.

Place(s) where the thesis work will be carried out: DIBRIS Valletta Puggia

Additional information

Pre-requisite abilities/skills: Programming in C++ or C, Basic knowledge of Unity3D

Maximum number of students: 1