Title (tentative): Exergames for the assessment of the cognitive status of elderly people

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Motivation and application domain

A Multidimensional Prognostic Index is routinely carried out in elderly patients in a geriatric acute ward. It include clinical, cognitive, functional, nutritional, and social parameters. Cognitive status is assessed by the Short Portable Mental Status Questionnaire (SPMSQ), a questionnaire that assesses orientation, memory, attention, calculation, and language. This thesis aims to develop exergames based on virtual reality, to improve the clinical evaluation done by using the SPMSQ.

General objectives and main activities

The main objective of this thesis is the development of a human-computer interaction system (e.g. an exergame), based on virtual/mixed/augmented reality to assess (and potentially improve) the mental status of elderly people. In particular, the motivation under this work is the necessity of having a more complex and interactive system, which should improve the evaluation traditionally done by using the Short Portable Mental Status Questionnaire, in order to overcome the limitation of the use of self-reported assessment. The main activities of the thesis will be: (i) study of the state-of-the-art in the field of cognitive assessment of elderly people; (ii) study the state-of-the-art of the cognitive assessment by using virtual reality and exergames; (iii) development of a prototype that should be installed into the MO.DI.PRO facilities at Ospedali Galliera; (iv) experimental evaluation of the developed system.

Training Objectives (technical/analytical tools, experimental methodologies)

- Analysis of the state-of-the-art in cognitive assessment with geriatricians 
- Analysis of the state-of-the-art in VR and HCI applications to assess cognitive functions.
- Development of tools based on VR and HCI and of an innovative protocol to assess the Mental Status of patients.
- Setup of the system by using a TV, a PC, a RGBD sensor and eventually a Leap Motion Controller
- Experimental evaluation of the functionalities of the developed tools are expected (comparison with standard methodology)

Place(s) where the thesis work will be carried out: DIBRIS and MO.DI.PRO (c/o Ospedale Galliera – Genova)

Pre-requisite abilities/skills: Object oriented programming (C++ or C#), experimental evaluation/assessment

Maximum number of students: 2