Title (tentative): Engagement assessment for Serious Games

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Motivation and application domain
The aim is to improve the quality of life of older people, especially apathetic patients with Alzheimer disease through Serious Games (SG), e.g. a virtual coach with an avatar. The user should be able to interact freely, when s/he moves at home. Older people with dementia meet many difficulties in using regularly and efficiently SG in their cognitive training. We propose a virtual agent that can enhance the performance and engagement of the player using engaging strategies.

General objectives and main activities
This internship consists in the improvement of the engagement recognition process using RGB sensors and new machine learning techniques, such as Deep Convolutional Neural Network (CNN) to enhance the performance of interactive systems (i.e. Serious Game) for older adults. For instance, recent advancements in CNN have made possible the detection of the user skeleton from RGB videos. Nevertheless, there is a need to go beyond human detection to analyze appearance and dynamics of both face and body, towards recognition of identity, gender, age, as well as mental and social states to allow for successful holistic analysis of humans, beneficial in the early detection of frailty symptoms for health care and better interaction with automated interactive systems.

To validate the internship we will assess the proposed approach on homecare pilots from Nice Hospital to evaluate technologies to keep older adults functioning at higher levels and living independently.

Training Objectives (technical/analytical tools, experimental methodologies)
The goal is also to have a research experience, going beyond the State-of-the-art in machine learning by combining the output of CNN with logical inference in order to detect frailty symptoms of older people and to support them in their cognitive training. This work should lead to the publication of a paper in an international conference.

Additional information
Pre-requisite abilities/skills: Computer Vision, Human-computer interaction, background in C++ programming

Maximum number of students: 2