UNIVERSITY OF GENOA
DEPARTMENT OF INFORMATICS, BIOENGINEERING, ROBOTICS AND SYSTEMS ENGINEERING
MASTER'S PROGRAM IN BIOENGINEERING

Dibris

Thesis Project Form

Title (tentative): A serious game for the assessment of social interaction in immersive virtual environments

Thesis advisor(s): Solari Fabio, Manuela Chessa, Razeen Hussain, Valeria Manera (UniversitÃ© CÃ´te d'Azur)

E-mail: Fabio.Solari@unige.it

Address: Via Dodecaneso, 35 - 16146 Genova 303

Phone: (+39) 010 353 6756

Description

Motivation and application domain

The goal of this thesis is to develop a serious game for the assessment of social interaction and deficits in social cognition (e.g., intention understanding), by exploiting immersive virtual reality. The early detection of deficits in social cognition may help clinicians to perform an early differential diagnosis (for example, distinguishing between probable Alzheimerâ€™s Disease and Frontotemporal dementia).

General objectives and main activities

Due to the rising average lifespan, we are witnessing a dramatic increase in the incidence of age-related disorders such as dementia, which is often preceded by a pre-dementia stage, known as Mild Cognitive Impairment (MCI). The detection of cognitive impairment at the MCI stage is clinically useful: it has been shown that non-pharmacological interventions at this stage can stabilize or even improve patientsâ€™ cognitive functioning. The objectives are to develop a serious game for the early detection of social cognition deficits and to assess its effectiveness. It is necessary to study the literature to consider the available approaches. Then, to develop a storytelling of the game with the support of psychologists by designing the interactions and the visual appearance of the serious game. Specific attention will be paid to the gamification of the clinical procedure for detection of disorders in social cognition. In this context, the patient will interact with avatars and entertainment tasks. The hardware platform will be mainly immersive virtual reality, e.g. by using HTC Vive and eye tracker. An experimental session with healthy volunteers will assess the developed serious game, possibly patients might be involved. The experimental outcomes will be analyzed.

Training Objectives (technical/analytical tools, experimental methodologies)

The serious game will be developed using Unity 3D (scripting in C#). Optimization of the serious game will be performed in a loop of development and assessment. Participation in the definition of an experimental protocol. Participation in experimental sessions. Analysis of experimental data.

Place(s) where the thesis work will be carried out: DIBRIS Valletta Puggia (Perception&Interaction Lab) and UniversitÃ© CÃ´te d'Azur (Nice, FR).

Additional information

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

Maximum number of students: 2