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

Thesis Project Form

Title (tentative): Optic Flow Patterns, Scene Structure and Visually Induced Motion Sickness in immersive VR

Thesis advisor(s): Chessa Manuela, Fabio Solari

E-mail: Manuela.Chessa@unige.it

Address: Via Dodecaneso, 35 stanza 329

Phone: (+39) 010 353 6663

Description

Motivation and application domain

If an observer is in motion, or vice versa if 3D objects are moving around him, then characteristic patterns of optic flow (OF, i.e. the apparent motion of the image brightness pattern over the image plane) arise. In immersive VR, the influence of the OF impinging the retinas and elaborated by the visual cortex is confirmed by HMD producers, who suggest to avoid an intensive display of visual flow while developing VR applications.

General objectives and main activities

The thesis has the main goal of understanding the influence of visual motion (i.e. OF) in the motion sickness (MS) perceived by the users, also with respect to the actions performed by the user himself, and the 3D structure of the virtual scene. The main outcome will be the characterization of MS with respect to the pattern of optic flow of the stimuli presented to a static and passive observer. Such a characterization will also take into account the kind of considered visualization system (monitor, immersive VR, AR). From this characterization we expect to be able to predict MS, and to minimize its effects by subtracting the component of visual flow that most affect the users. Moreover, the influence of the usersâ€™ action inside the VR/AR environments on MS will be analyzed.

Training Objectives (technical/analytical tools, experimental methodologies)

1)To analyze the state of the art of motion perception in the human brain
2)To implement a set of stimuli to be presented in VR, which replicate the pattern of optic flow and the selectivity found in MST area. Both synthetic and natural stimuli will be taken into account.
3)To build a model that describe MS with respect to the displayed pattern of optic flow.

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

Additional information

Maximum number of students: 1