



Thesis Project Form

Title (tentative): Comparing Egocentric and Allocentric Approaches for Virtual Reality-Based Spatial Memory Performance

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Description

Motivation and application domain

The goal of this thesis is to study how egocentric (first-person, self-referenced) and allocentric (third-person, world-referenced) spatial memory function in virtual reality with the final aim of improving cognitive rehabilitation programs.

General objectives and main activities

Understanding spatial memory is essential for developing effective rehabilitation strategies for individuals with neurological disorders or cognitive impairments. This thesis investigates how egocentric (first-person, self-referenced) and allocentric (third-person, world-referenced) spatial memory function in virtual reality, with the goal of improving cognitive rehabilitation programs. A VR-based experiment will be designed to assess participants' ability to learn, recall, and navigate virtual spaces under different spatial encoding conditions. The study will evaluate key behavioural and physiological metrics, such as memory accuracy and cognitive load, to identify how these two spatial strategies are affected by various human factors (e.g. age, neurological conditions, prior experience, etc). The results could inform rehabilitation techniques for Alzheimer's patients and individuals with spatial neglect, as well as contribute to the development of VR-based cognitive training tools.

Training Objectives (technical/analytical tools, experimental methodologies)

The application will be developed using Unity 3D (scripting in C#). Optimization of the application 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)

Additional information

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

Maximum number of students: 2