



Thesis Project Form

Title (tentative): Depth and relative speed estimation in virtual environments representing natural and urban scenarios

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Description

Motivation and application domain

In the literature, there are many works addressing the issue of estimating depth perception in VR.

This thesis aims to extend the methodologies developed in the literature to:

- understand the role of the visualized scenario in-depth estimation (e.g., to understand how cluttered scenarios, or natural scenes affect depth estimation)
- understand the role of the self-motion of the observer with respect to the motion of other agents or objects in the scene

General objectives and main activities

The student should:

- analyze the state of the art of depth perception and speed estimation, with specific attention to methods developed in immersive VR
- create at least two virtual environments representing an urban scenario (e.g., an urban street) and a natural one (e.g., a forest). Specific attention must be paid to the visual appearance of the created scenes.
- create the sw to set the movement of the user and of other agents and/or objects (e.g. cars or animals) should move, in a controlled way
- visualize the virtual environments with an head-mounted display
- design a user study to understand the influence of the relative speed between the user and the other elements of the scene, the number of details (cluttering) of the scene, the field of view, the characteristic of the scene (natural vs urban) with respect to depth estimation.

Training Objectives (technical/analytical tools, experimental methodologies)

- Development of immersive VR scenarios with Unity 3D
- User study in immersive VR
- Data collection and analysis

Place(s) where the thesis work will be carried out: DIBRIS Villetta Puggia

Additional information

Pre-requisite abilities/skills: Programming in C++ or C#

Maximum number of students: 1