Lightweight Capture, Display and Manipulation of Urban Environments

Doctoral Thesis Topic

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In this thesis, we will develop novel algorithms which will allow the capture, display and manipulation of urban environments using image-based techniques.

The idea will be to develop new algorithms allowing image-based rendering using a small number of images, without complex capture calibration and measurement steps. The goal is to allow efficient and high-quality display of these environments, as well as they ability to change lighting conditions easily. An additional constraint will be the ability to use the resulting algorithms in high-resolution, real-time constrained settings of an immersive environment, such as the immersive space we have at INRIA Sophia-Antipolis (see for example http://www-sop.inria.fr/reves/Basilic/2011/CVCCHD11/ for example research in this setting), but also on low-end devices such as tablets or smart phones.

This project is in the continuity of our approach for using Virtual Reality in therapy (see http://www-sop.inria.fr/reves/NIEVE) and will involve integration of these techniques in a complete system including multi-sensory audio-visual display.

Requirements

An ideal candidate will have a Masters in Computer Science, with a specialization in Computer Graphics or a close area (such as computer vision). Basic and graduate courses (or equivalent experience) in Computer Graphics are a requirement, as is programming experience in OpenGL or DirectX.