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UT3 Paul Sabatier, IRIT, Auditorium J. Herbrand

Noura EL HAJE
Team REVA - IRIT

A Heterogeneous Data-Based Proposal for Procedural 3D Cities Visualization and Generalization

Jury:
- Gilles Gesquiere – LIRIS - Rapporteur
- Stéphane Mérillou – XLIM - Rapporteur
- Nancy Destruel – LIRMM - Examinateur
- Cédric Sanza – IRIT - Examinateur
- Véronique Gaildrat – IRIT - Directrice de thèse
- Jean-Pierre Jessel – IRIT - Directeur de thèse

Abstract: Procedural modeling covers a number of techniques in computer graphics allowing to automatically create 3D models and textures from a set of rules. This automatic generation has been largely adopted by researchers in order to solve the manual generation burdens such as time and cost charges. Procedural modeling has been an active research topic for at least thirty years and therefore many works have been established on tools, concepts and techniques that allow the generation of 3D virtual worlds in general and urban contents in particular.

Treating and managing real urban data have been a challenge, the main reason being the heaviness of the 3D les that the developer is usually working on and his obligation to go through a preprocessing step for les preparation and conversion before usage in an application for city construction or simulation. Many software have been developed and adopted for constructing, editing and visualizing 3D geographic data-based cities. They are destined for visualization, simulation or games contents creation and sometimes they have the capability to deal not only with geometric, but semantics for performance and consistency improvement. However, the visualization and optimization of this kind of data on the web is still restrictive. In this thesis, we propose a solution for real cities visualization and optimization based on standards, tools and APIs. The procedural work in the 3D city modeled is highlighted by the procedural texturing and an optimized multi-resolution rendering.

We will also investigate multiple representation methods for the distinguished buildings throughout the animation rendering. In this context, a saliency method is applied to compute the important points in the scene. The overall contribution of this thesis is to highlight the necessity of optimizing the visualization of large urban data, and knowing how to keep the focus on the objects of high interest by means of saliency and texturing during the visualization process.

This is also to show how some methods and techniques could be unied in one platform to solve the challenging problems of visualizing large 3D urban data.