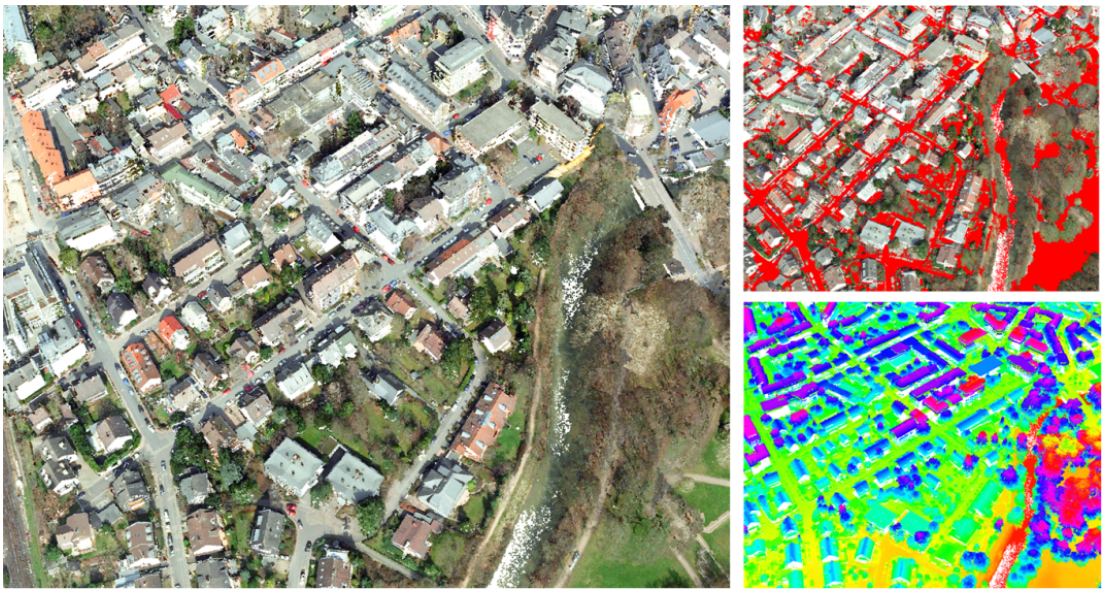
Fachgebiet Computergrafische Systeme
Prof. Dr. Jürgen Döllner
Masterprojekt Wintersemester 2011/2012

Semantics-Based 3D Real-Time Rendering of Point Clouds

Background

The task of this project is to develop concepts and techniques to analyze and visualize 3D point clouds (e.g., generated by laser scans). 3D point clouds can be enriched with semantics information based on the local point environment. This way, each 3D point can be assigned to a feature category such as vegetation, sites, streets, or natural terrain. Based on this classification, specialized real-time 3D rendering techniques can be designed and implemented that achieve more precise and more expressive visualizations.



Description

The master's project is based on an existing research framework for analysis and visualization of 3D point clouds. The master project should investigate the following issues:

1. **Import of geo objects and features:** This system component should import different types of geo objects and features that are used to classify point clouds (e.g., building footprints, road networks, land use data, terrain models).
2. **Classification of 3D point clouds:** This system component should classify each point in a given 3D point cloud based on given reference geoobjects and features.
3. **Real-time, point-based 3D rendering techniques:** This system component should provide a collection of 3D rendering techniques used to visualize 3D point clouds based on their classification. For each category, a specialized technique should be derived from a given base implementation (e.g., non-photorealistic, generalized visualization).

The topic links to current research and software projects of the HPI's Computer Graphics Systems group. It is especially suited for further research in the context of a master thesis or as preparation for a topic of doctoral thesis. Furthermore, the master project can be used to start working as a student assistant.

Contact

Fachgebiet Computergrafische Systeme

- Prof. Dr. Jürgen Döllner (office-doellner@hpi.uni-potsdam.de)
- Rico Richter (rico.richter@hpi.uni-potsdam.de)