

Master topics in cooperation with Thomas H. Kolbe

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In cooperation with Thomas H. Kolbe (TUM)

Development of a CityGML Point Cloud ADE

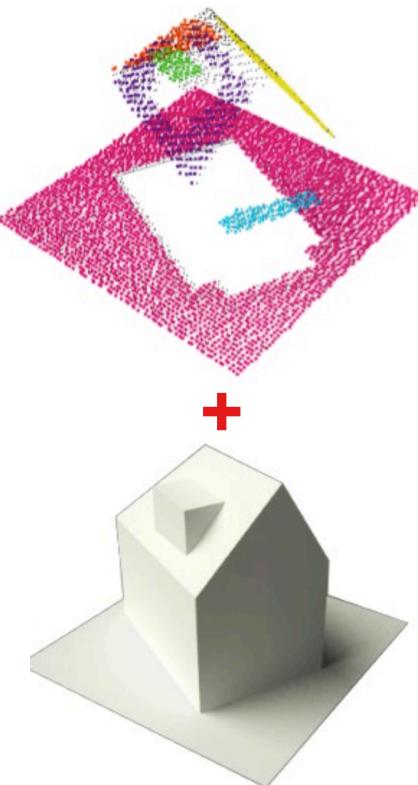
In CityGML the geometry of 3D objects are represented by vectors or boundary representations. This research shall work on **extending CityGML to also allow for point clouds** to represent the geometry of the different CityGML feature types.

Besides the development of a formal data model using UML, also a way has to be found to **segment and classify point clouds into CityGML feature types** using vector geometry from given CityGML datasets in LOD1/2. By this method, the given CityGML datasets shall be enriched by the point cloud data.

Finally, a **deviation measure between the point cloud representation and the vector representation** shall be developed.

Group affiliation: GISt

Co-Supervisor @ TU Delft: Edward Verbree



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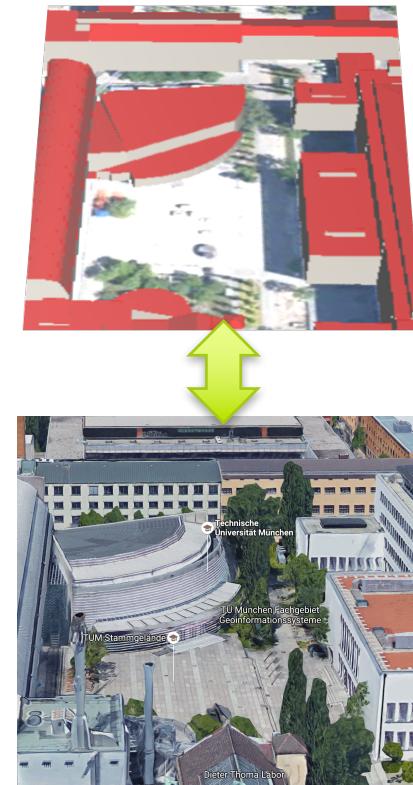
Relate CityGML and popular mesh-representations / views

The aim of this research is to **integrate object-based 3D city models with high-resolution textured mesh representations** like the ones used in Google Maps 3D or Apple Maps today. The purpose is to enrich CityGML data by high-resolution 3D mesh geometries on the one hand and to enrich high-resolution 3D meshes by semantic information on the other hand.

Possible **applications** which should also be investigated are **change detection or validation** of CityGML datasets; **solar potential analysis** including vegetation and other obstacles like installations on the roofs; or the **creation of LOD3 based on existing LOD1/2 models** plus the meshes. An existing software module of TUM can be used to perform solar potential analysis.

Group affiliation: 3DGeoInfo

Co-Supervisor @ TU Delft: Hugo Ledoux or Abdoulaye Diakité



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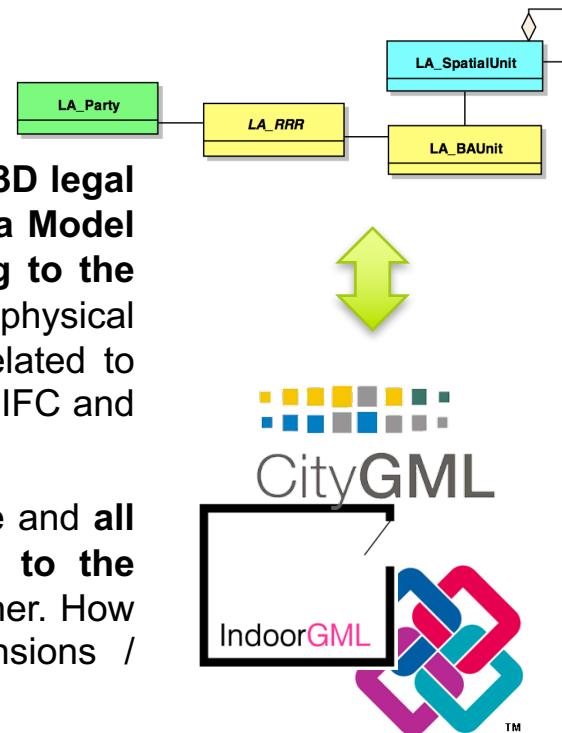
For LADM 2.0 revision (ISO 19152) develop model

This thesis project shall investigate the **relationships of 3D legal spaces as described by the Land Administration Data Model (LADM) with 3D building models specified according to the CityGML / IndoorGML / IFC standards** representing the physical objects. To which extent can the LADM concepts be related to existing real-world data given in CityGML, IndoorGML, or IFC and where are possible problems?

A catalog of aspects on the matching should be made and all three standards should be evaluated with respect to the integrability with LADM and compared against each other. How could the matchings be improved by possible extensions / changes to LADM (in direction forward to LADM 2.0)?

Group affiliation: GISt

Co-Supervisor @ TU Delft: Peter van Oosterom



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Indoor Localisation using Google Tango and a 3D Building Model

In this research it should be examined to which extent the **Google Tango tablet** can be used for **automatic localisation and orientation in indoor spaces** based on the 3D scans matched with a 3D BIM model. Methods to be investigated come from the field of **mobile robotics**. Localisation likely will require tracking of movement.

As soon as the position of the user is determined, a **3D view of the building model shall be shown aligned with the orientation of the device** (possibly as an overlay to the current scan). It should be investigated, if a 3D object in the view can be clicked and highlighted on the screen.

Group affiliation: 3DGeoInfo

Co-Supervisor @ TU Delft: Abdoulaye Diakité

