Generalisation of 3D city models

Keywords: Geographic Information Systems, 3D, Generalisation, City Models, Data Quality, Standardisation

Urbanism Department
Area of Research: 3D Geoinformation

Research Summary: This research is part of a larger project entitled ‘Urban modelling in higher dimensions’, which aims to foster a solution for delivering 3D data at application-specific Levels of Detail (LoDs). 3D city models are necessary for monitoring and forecasting processes in urban areas (e.g. noise and flooding modelling). Each application requires its own semantic and geometric LoD of the 3D data, and currently a tremendous amount of effort is exerted in the collection and transformation of 3D datasets. This research will focus on determining the most efficient generalisation methodology for deriving different LoDs from the same 3D dataset. The methodology will be applicable to generalising individual city objects as well as city models as a collective unit. This research will contribute to the integration of LoDs within a 4D data structure that can be sliced to obtain error-free 3D data at application-specific requirements.

Research Methodology: The development of generalisation algorithms for 3D objects (buildings, bridges, etc.) to move from different LoDs in relation to geometry and semantics (e.g. roofs). The methodology will be applicable to any LoD and the output will be in conformance with the 3D GIS standard CityGML which supports both the concept of LoDs and the 3D data modelling for urban applications (noise, energy, etc).

Key Publications:


Main Question: What is the most efficient generalisation method in 3D to derive different LoDs from the same 3D base data in order to serve different applications?

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Deliverables: An open-source methodology that standardises the generalisation of all city objects in a 3D City Model, including buildings, bridges, terrain, etc.

Link(s)
https://3d.bk.tudelft.nl/alabetski

Updated: October 31, 2016