

Integration of Semantic 3D City Models and 3D Mesh Models for Accuracy Improvements of Solar Potential Analyses

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Integration of Semantic 3D City Models and 3D Mesh Models

What is it good for?

- Incorporate unrepresented features from the 3D mesh model in the semantic 3D city model
 - Vegetation
 - Technical building installations and architectural features

How to achieve that?





Integration of Semantic 3D City Models and 3D Mesh Models

Match *mesh triangles* to *semantically classified building surfaces* of a LoD2 CityGML model to create a semantically segmented mesh model





• Pre-selection of candidate triangles







Distance measures between triangles and semantic surfaces

- Pre-selection of candidate triangles
- Distance measure #1: Point-to-plane distance







Distance measures between triangles and semantic surfaces

- Pre-selection of candidate triangles
- Distance measure #1: Point-to-plane distance
- Distance measure #2: Volume distance





Matching results

Classification of the matching

• Green = match

• Yellow = uncertain

• Red = not matching





Distance measures between triangles and semantic surfaces

- Pre-selection of candidate triangles
- Distance measure #1: Point-to-plane distance
- Distance measure #2: Volume distance
 - ➔ Not good enough jet
- Region growing using plane fitting
 - ➔ Heal holes and shortcomings at surface borders





Case study: Solar potential analysis

- Open data from the City of Helsinki
- Solar potential analysis tool developed at TUM
- Comparison of two simulation runs with and without 3D mesh integration
- How big is the overestimation of solar irradiance without mesh integration?













Case study: Results

Overestimation of the annual global solar irradiation for the entire test area

- 8% on roofs
- 38% on walls

Questions?

- Mesh integration method
- Solar potential analysis tool
- Case study
- → Find me after the session
- ➔ Read the paper

