

2D Window Detection and Fusion with Building Models for Energy Simulation

Task

The general goal of this topic is to automatically fuse different data from 2D images to 3D models and enable automatically enriched building energy models (BEM).

Develop a pipeline to automatically fuse segmented 2D images of Windows to the related faces of a 3D surface model:

- Test existing Deep Learning approaches to semantically segment Windows in 2D images, such as DeepFacade or DeepWindows [1]
- Develop an approach to fuse the detected window surfaces from the 2D images to the corresponding 3D surfaces in the model by projection, e.g. by parameters from data acquisition or estimated using photogrammetric methods
- Test the pipeline with several case studies from the TUM Stammgelände using different data sources (see [2])

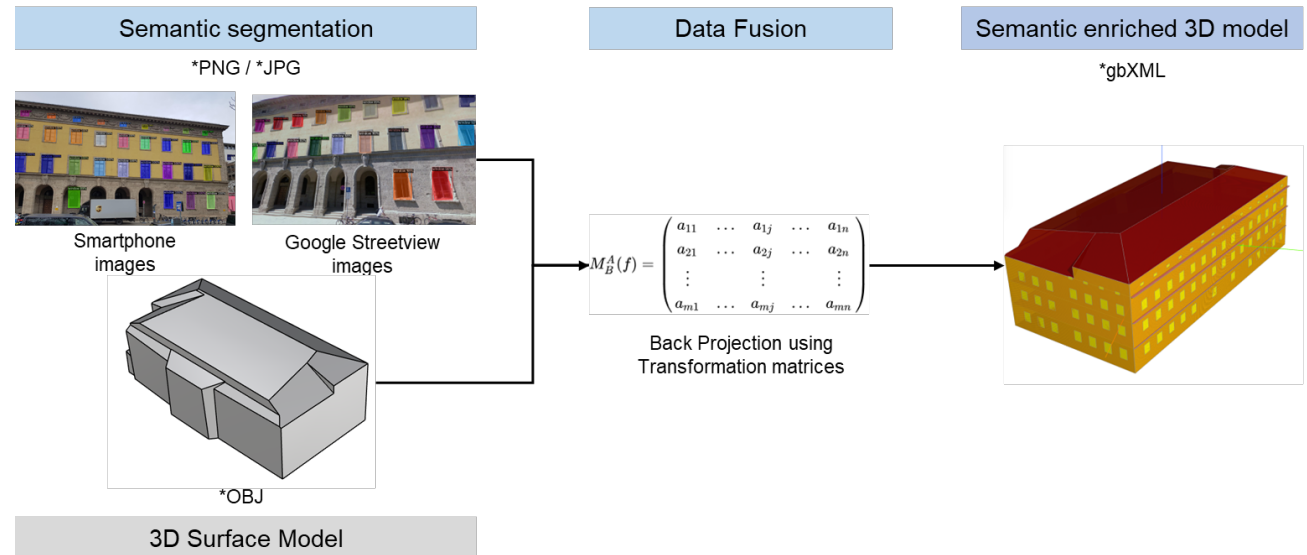
Project Characteristics

Modeling:

Mathematics:

Programming:

Science:



[1] Sun, Yanwei; Malihi, Shirin; Li, Hao; Maboudi, Mehdi (2022): DeepWindows: Windows Instance Segmentation through an Improved Mask R-CNN Using Spatial Attention and Relation Modules. In: IJGI 11 (3), S. 162. DOI: 10.3390/ijgi11030162.

[2] Forth, K.; Noichl, F.; Borrmann, A. (2023): LCA Calculation of Retrofitting Scenarios using Geometric Model Reconstruction and Semantic Enrichment of Point Clouds and Images. In: Proc. of the ASCE International Conference on Computing in Civil Engineering 2023.