Chair of Computational Modeling and Simulation
TUM School of Engineering and Design
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Modeling:
Mathematics:
Programming:
Science:

Software Lab:

DorWin: Door and window detection in indoor environments using multi-sensor datasets

Description

Today, with the comprehensive development of the built environment and increasing demand for generating indoor as-built digital twin models, automatic door and window detection is becoming an important subject in scan-to-BIM processes.

In this regard, one of the main tasks for creating a digital twin model of an indoor environment with rich semantics and coherent geometry is to simultaneously detect the location of the door and window in the scene and recognise their state (open, closed or semi-open) [1].

We aim to provide a method consisting of object detection and classification tasks..

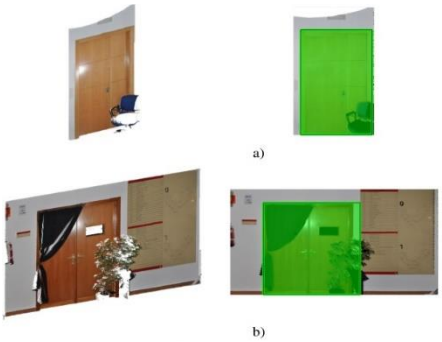

Figure 1: Door and window detection in indoor environments [1].

Task

1. Annotation of doors and windows (closed, open, and semi-open) in point cloud and image datasets (>= 300 instances).
2. Implement a method that project images in the point cloud, knowing the relative transformation between the LiDAR and the Camera sensors.
3. Develop an automatic workflow for door and window detection in indoor environments using the 3D LiDAR point clouds and RGB images, using for example: Image processing, computer vision [1], AI and hybrid networks [2-4] techniques.
4. Validate with a prototypical case study with data form the TUM main campus.

Figure 2: real LiDAR and Camera for data collection.

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References

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