Chair of Computational Modeling and Simulation
TUM Department of Civil, Geo and Environmental Engineering
Technical University of Munich

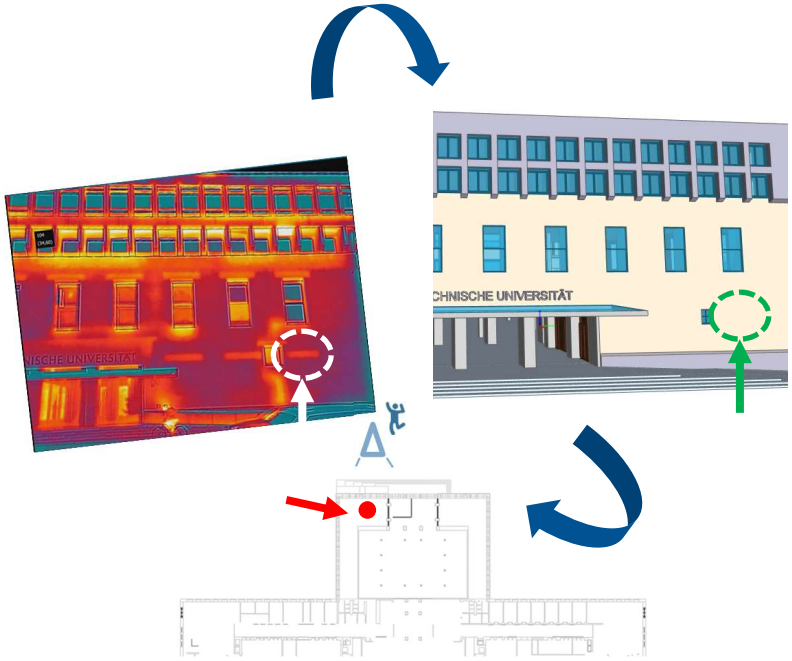
Modeling:
Mathematics:
Programming:
Science:

Software Lab:

On-site indoor scan planning for building hull investigation

Description

Resource-efficient and automated building surveilling can support planners in scaling their renovation projects across the existent building stock. Commonly, an inventory is made with thermal infrared imagery (TIR) and mostly manual geometric measures. The interpretation of the TIR images and the link to the 3D geometry can partially be automated with image segmentation methods and referencing the results to the 3D space represented by a point cloud and/or a BIM model. In this project a quantitative and automated workflow will be built to identify thermal anomalies in the building-hull from the outside, reference them to the 3D geometry [1] and plan the further investigation by scanning from inside the building.



Task

The students will be guided through the following tasks:

- Outdoor data acquisition (LiDAR scan and TIR images)
- Thermal anomaly detection with (ML) image segmentation methods
- Temperature information projection onto the geometric point cloud
- Matching of the acquisition data with building plans / models (BIM)
- Identify sensible indoor scan positions for more detailed investigation
- Conduct indoor surveilling

Supervisor

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References

[1] Hoegner, L., & Stilla, U. (2018). Mobile thermal mapping for matching of infrared images with 3D building models and 3D point clouds. Quantitative InfraRed Thermography Journal, 15(2), 252–270. https://doi.org/10.1080/17686733.2018.1455129