Technical University of Munich
TUM School of Engineering and Design
Chair of Computing in Civil and Building Engineering

Master Thesis Proposal

A generalizable BIM logger for recording and replaying detailed BIM authoring process

BIM model files preserve end states, not the authoring that produced them. The existing BIM log often contains limited command information that cannot represent a detailed BIM authoring process. This thesis targets a vendor-neutral, stream/dynamic logging approach that records the sequence of modeling actions (events, parameters, and instances) in a way that can be replayed across different software. The main research question is: How can we represent the BIM authoring process independent of a specific system? Two sub-questions guide the work: (1) What information is required, aligned with standard data schemes such as IFC and ISO 19650, and how should it be represented (classes/instances; transactions/UI events)? (2) How do we reconcile discrepancies in class/instantiation and transactions (UI executions and database updates) across different authoring platforms?

This thesis will propose a compact, tool-agnostic logging schema and a pair of prototypes: (a) loggers that capture detailed authoring actions in at least two tools (e.g., Blender/Bonsai and Archicad), and (b) a replayer that reconstructs the modeling session from those logs. An example logger implemented in Revit will be provided as reference. Validation could include comparing replayed models against ground truth.

Task

1. Literature review on the state-of-the-art in relevant domains
2. Implementation of a suitable workflow that includes:
   - Developing generalizable logging schema across different BIM authoring platform according to the OOP principles
   - Proposing generalizable software architecture/methodology for implementing logger/replayer in different BIM authoring platform based on the reference provided
   - Developing prototypes with limited scope in different BIM authoring platforms
3. Evaluation of the proposed method

You have

1. Solid programming skills (Python, C++, or C#) and motivation to work in the field of software engineering and plugin development for BIM authoring software.
2. As a plus:
   - Experience with Revit, Archicad, Bonsai, or Vectorworks
   - Experience with API programming
   - Experience with vibe coding tools

Supervision

Changyu Du
changyu.du@tum.de

Suhyung Jang
suhyung.jang@tum.de

Zihan Deng
zihan.deng@tum.de