Chair of Media Technology
TUM Department of Electrical and Computer Engineering
Technical University of Munich

Interdisciplinary Project, Master's Thesis, Bachelor's Thesis, Ingenieurspraxis, Forschungspraxis, Assistant (Student)

Digital Twinning of a Smart Home for Semantic Communication

This project is about creating a dynamic digital twin of a smart home:

- A **realistic 3D representation** of the apartment, the furniture, and the objects in it in should be created for our game-engine based activity simulator. A **2D CAD model** of the apartment is available as a starting point. Our activity simulator is based on the **Unity3D game engine**.
- The smart home is equipped with a variety of **sensors** -- ceiling-mounted mocap cameras, magnetic contact sensors for doors and drawers, pressure sensors in the floor, werable IMUs and eye-trackers, etc. These **sensors should be simulated in Unity3D**.
- The digital twin should be made **dynamic** -- human activity and changes effected in the physical smart home by a human should be reflected in quasi real-time in the digital twin.

Research questions:

- How can the digital twin be used to support seamless interpersonal video conferencing under variable data rate or lossy network conditions? (investigate blending/transition between real and simulated video).
- How to minimize the sim (digital twin) - to - real (physical smart home) gap for automatic activity recognition?

This project is part of a collaboration with the TU Ostrava (Czech republic) Biomedical Engineering Research Group. The apartment mentioned abive refers to TU Ostrava's "Living Lab".

Advisors

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