Simplifying the Design Process for Personal Fabrication

Background

Digital fabrication devices (e.g., laser cutters, 3D printers) have become increasingly accessible to a broad range of users. Online platforms such as MakerWorld, Printables, and Thingiverse offer vast libraries of community-generated designs, making it easy to fabricate existing objects. However, creating personalized items tailored to individual needs requires 3D modeling skills and engineering knowledge, posing a substantial barrier for novices and non-experts. Users may encounter hurdles while measuring, creating CAD models, or picking the right settings for their device. This thesis explores how personalization in digital fabrication can be made more accessible through new interaction paradigms and supportive technologies, such as augmented reality (AR) or generative AI, to lower the skill threshold and enable broader participation.

Approach

Relevant literature on digital fabrication, personalization, and interaction design is reviewed to identify common barriers and opportunities for support. Based on these insights, a prototype system is developed that explores potential solutions to make personalized fabrication more approachable. The prototype could incorporate Mixed Reality technologies, artificial intelligence, or even self-built hardware. The system is evaluated through user studies to assess its usability and its potential to empower users with limited technical experience.

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Focus in this project

Personal Fabrication
Hardware/Software Prototype
User-Centered Design
User Evaluation

The scope of this thesis is adjusted based on Bachelor or Master level.