AssemblyMixT
Designing Mixed-Media Assembly Instructions

http://www.cs.berkeley.edu/~peggychiIKEA/AssemblyMixT/

Problem
Assembly instructions provide step-by-step operations for building up everyday products from parts in a procedural way. However, following instructions can be challenging, especially for complicated tasks such as composing furniture pieces, electronic devices, and 3D printed objects. Followers need to interpret the instructions, match with the real-world pieces, and transfer the knowledge into physical actions to manipulate the objects.

Motivation
There are two popular formats of assembly instructions:

- **Static instructions** effectively depict the important parts and actions. Common visualization techniques include ordering and orienting the parts, showing guidelines and arrows, and adding callouts for details.

- **Video instructions** demonstrate the exact actions of a person performing the task. Editing techniques including cuts, transitions, zooms, picture-in-picture views, and visual highlights, are often applied.

How do we combine the benefits of both formats and design a new interface for navigating assembly instructions?

Test View
Step-Centric View
Shot View

Instruction viewing modes in the AssemblyMixT system.

Results
8 IKEA videos were collected as the input of the system to generate a set of mixed-media assembly instructions. Preliminary evaluation will be conducted to collect early feedback from people who have furniture assembly experiences.

Future Work
A larger scope of this project is to generate mixed-media assembly instructions from author demonstration. Our previous work has shown that for software application tasks such as image manipulation using Photoshop, mixed-media tutorials are more effective than static, step-by-step instructions with text and screenshots and screencast videos. We have designed a system to automatically generate such tutorials. However, assembly instructions involve physical objects and abstract illustrations, which are different from the software domain. We’re exploring toward this direction to create interactive visualizations.