

View and shape interpolation from multiple sketches

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Context and Research Goal

Designers commonly use *ideation sketches* to represent variations of a concept from different viewpoints (Figure 1). These sketches help designers to explore the different shapes they have in mind and to show them to their managers and clients. However, ideation sketches can quickly get cluttered and hard to understand, especially to grasp how different shapes and viewpoints relate together. Our goal in this project is to help designers produce more didactic and dynamic visualizations from ideation sketches by generating smooth interpolations between the different shapes and viewpoints they represent.



Figure 1 : Examples of ideation sketches. Note how the designer shows slightly different shapes under different viewpoints. Sketches from [1]

Approach

One approach to generate convincing interpolations would be to estimate 3D models from the sketches and align them in 3D space. This approach was adopted in [2] but is restricted to geometric shapes composed of cylinders and boxes. Instead, we plan to explore an image-based approach to generate plausible interpolations without the need for a complete 3D model. As a first step we will implement a view-interpolation algorithm based on user-provided correspondences [3]. We will then explore adaptations of this algorithm to better handle the specific case of design sketches. In particular, we plan to constrain the interpolation according to the most frequent shape variations observed in sketches, and to propose new rendering algorithms to mimic the sketchy style of the input drawings. Another research direction could be to automate or assist the detection of correspondences between sketches. This direction would require adapting standard strategies based on feature detectors to handle sketchy inputs [4,5].

Requirements

The successful candidate should have taken courses in computer graphics and/or computer vision. A background in Human-Computer Interaction will also be appreciated.

Situation

The internship will take place at INRIA Sophia Antipolis, on the beautiful French riviera. INRIA provides a student stipend/salary of 1100 euros per month to cover living expenses. This work will be part of the ANR DRAO project, <https://www-sop.inria.fr/members/Adrien.Bousseau/drao/> .

The project will start in March 2014, for 5 to 6 months.



References

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[4] Painting-to-3D Model Alignment Via Discriminative Visual Elements, *Mathieu Aubry, Bryan Russell, Josef Sivic*, Inria Tech Report
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