Challenges for searching and browsing 3D heritage collections

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Access?

Potential users
(beside the scholar)

Amateur archaeologist – support to identify findings


Non-expert tourist – learn more about particular objects

Artisan crafter – find inspiration for designs

Requirements

Searching vs. Browsing

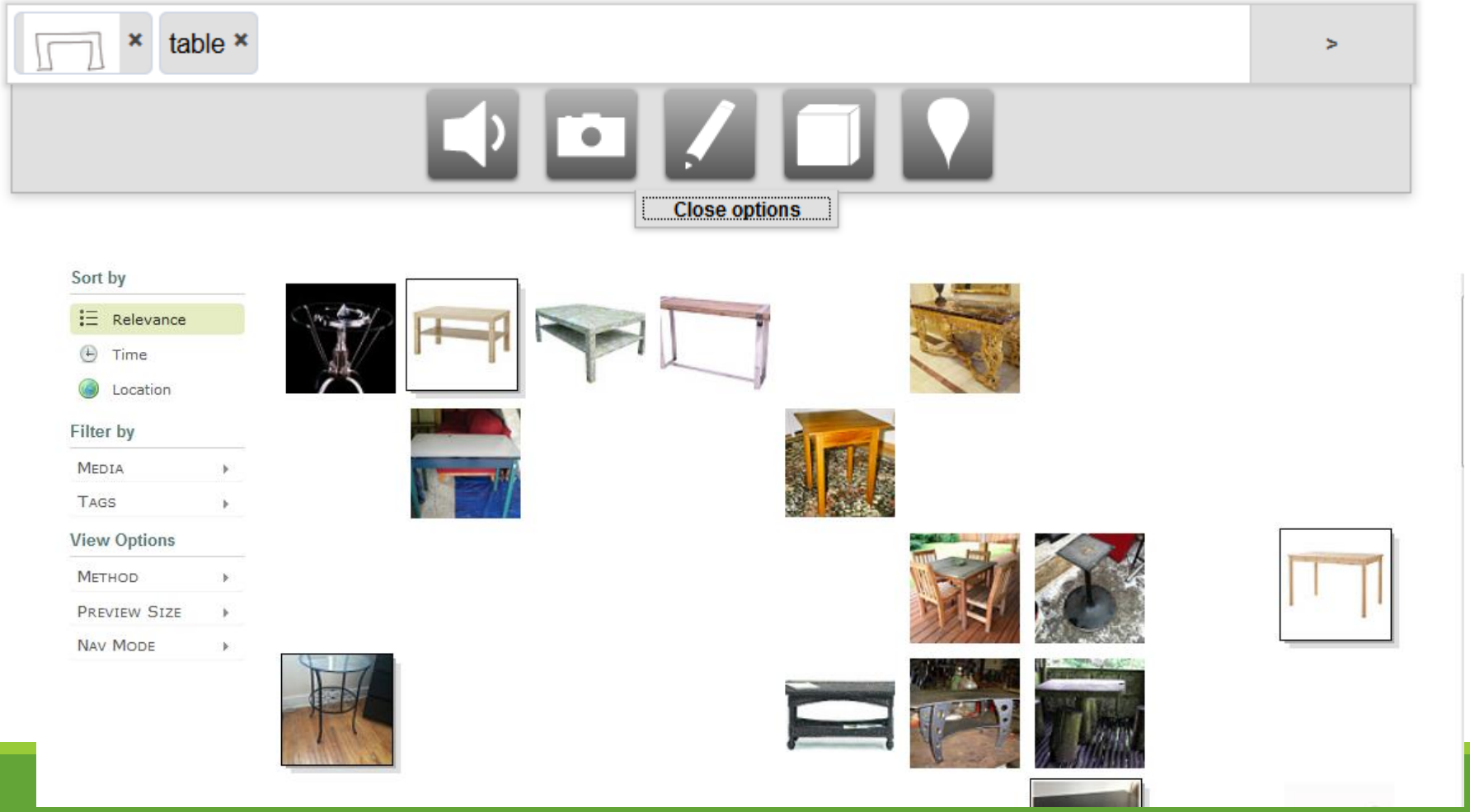
Some users have a better idea of what they are looking for

Searching and browsing technologies

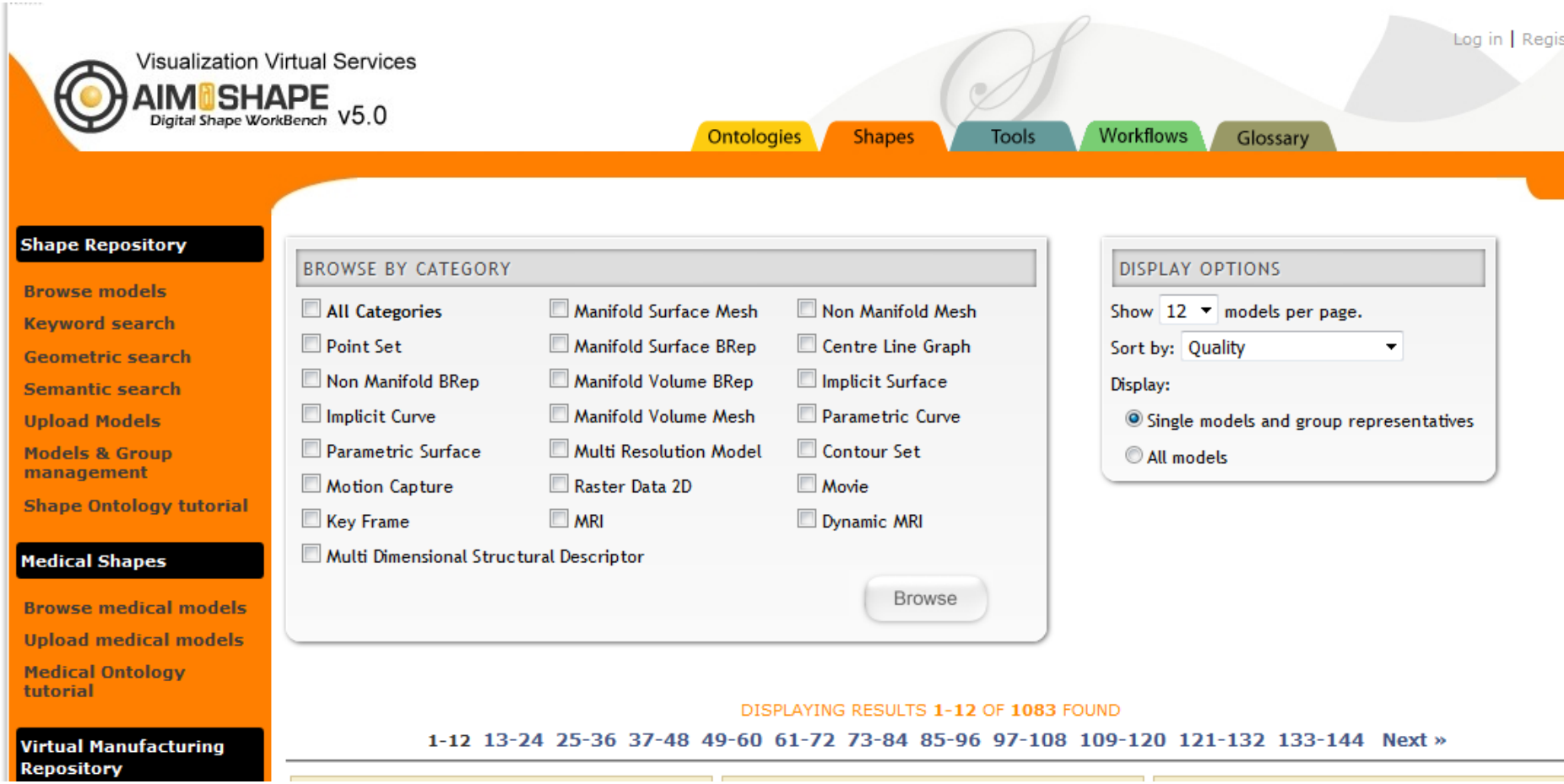
State of the art

- 3D is starting to be included in repositories.
- Relevant projects: I-SEARCH, AIM@SHAPE, 3D-COFORM, CARARE, 3D-ICONS.
- Data services: Europeana, ADS, Archeogrid.
- Systems work with specific datasets which have been organised to support searching and browsing.

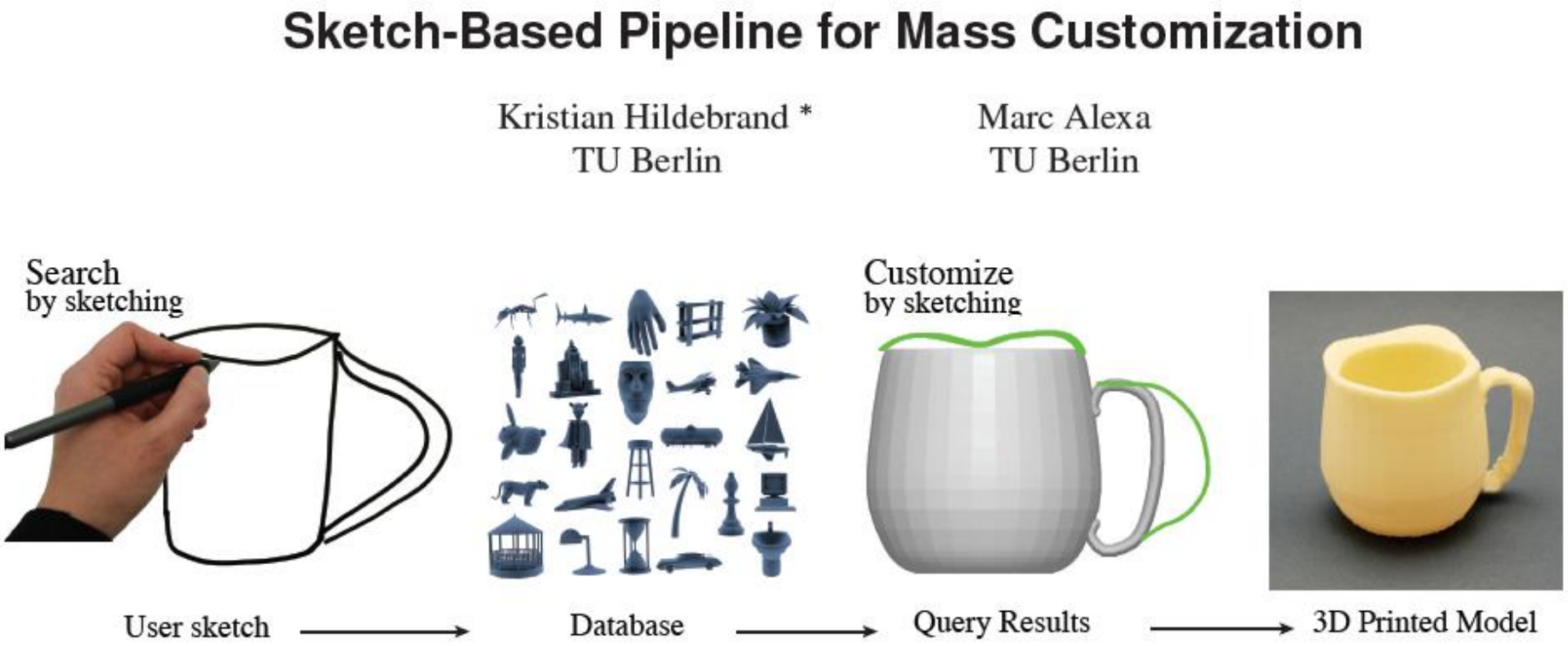
Multi-modal search engine



Metadata-based browsing and searching



Sketch based searching



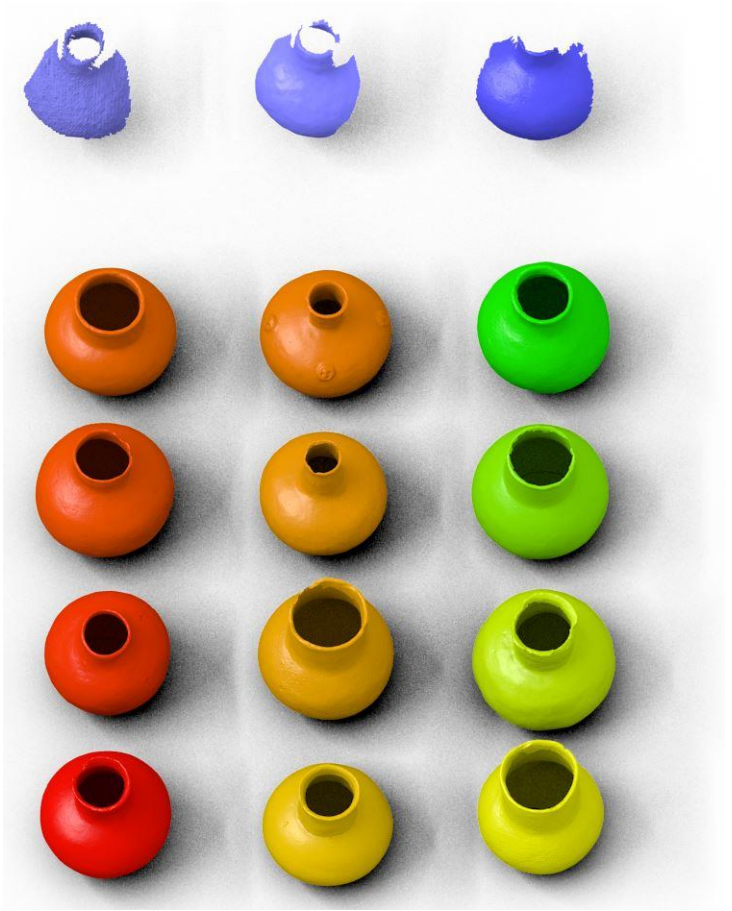
3D shape retrieval methods

Content

Text

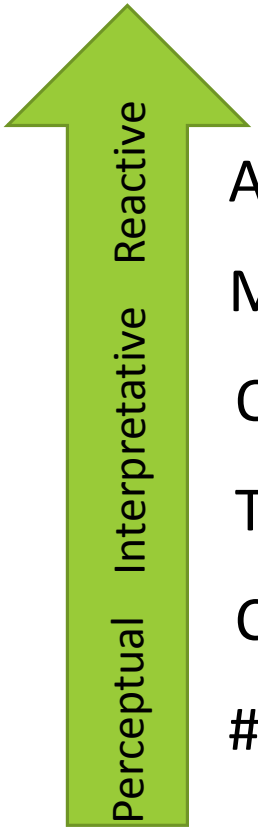
Content-based methods

- Rely on shape descriptors of features of interest.
- Automatically generating and matching shape descriptors for high level semantic concepts is not a solved problem.



Ioannis Pratikakis et al. 2016. Partial Shape Queries for 3D Object Retrieval. SHREC2016 - 3D Shape Retrieval Contest 2016

Descriptor's semantic abstraction



Associated concepts

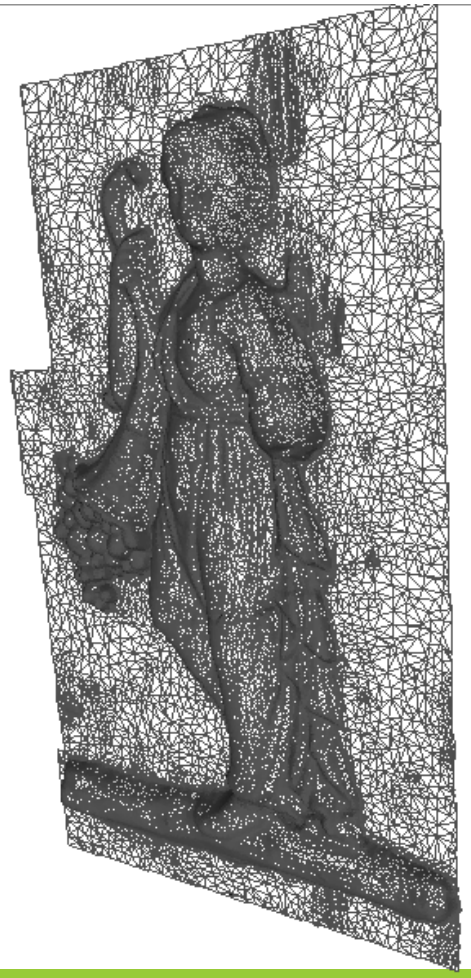
Meaning

Object

Topology

Curvature

# of triangles, colour

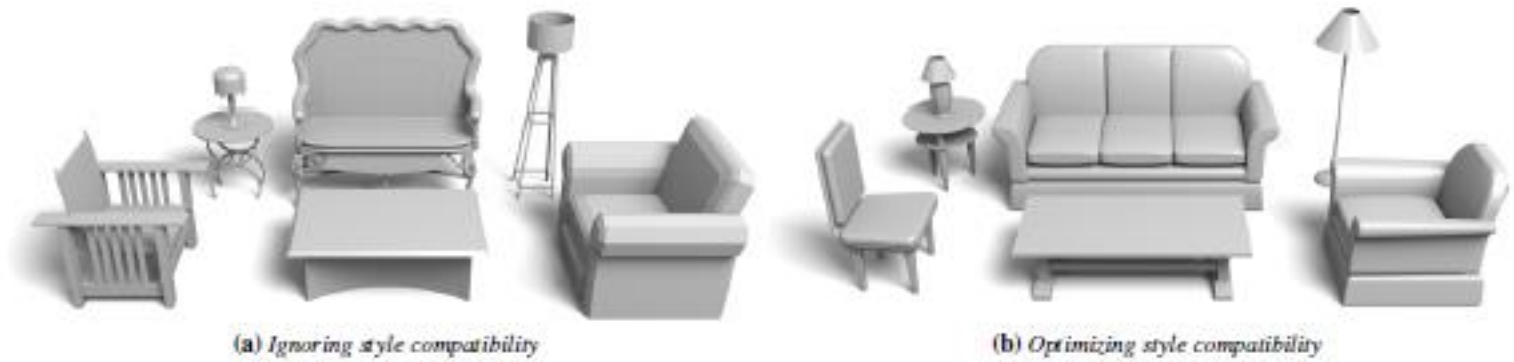


CG approaches for shape matching

- Use of a combination between global and local shape information.

Style Compatibility for 3D Furniture Models

Tianqiang Liu[1] Aaron Hertzmann[2] Wilmot Li[2] Thomas Funkhouser[1]
[1]Princeton University [2]Adobe Research

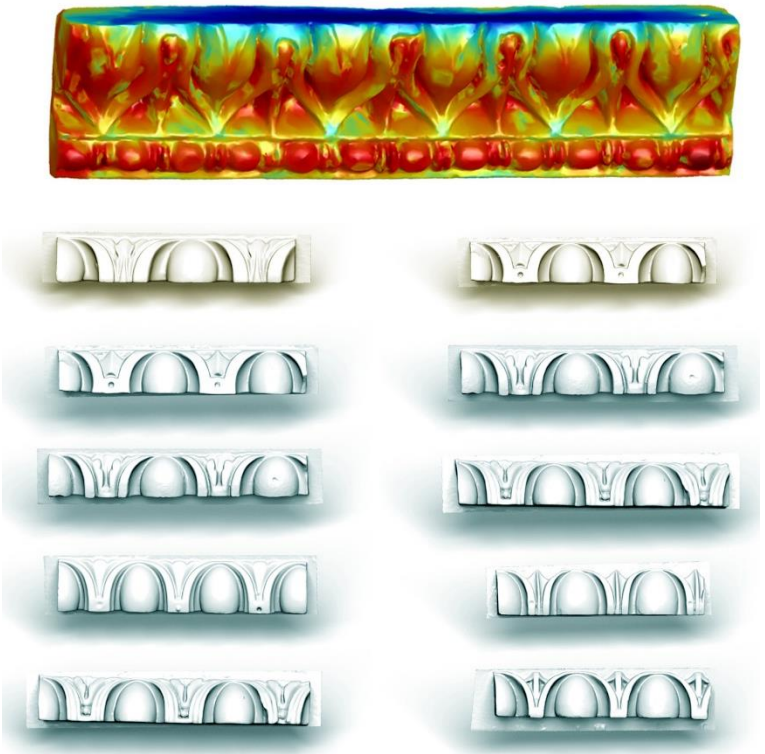


(a) *Ignoring style compatibility* (b) *Optimizing style compatibility*

Figure 1: *This paper proposes a method to learn a metric for stylistic compatibility between furniture in a scene. (a) The image on the left shows a plausible furniture arrangement, but with a randomly chosen mix of clashing furniture styles. The scene on the right has the same arrangement but with furniture pieces chosen to optimize stylistic compatibility according to our metric.*

Text-based methods

- Textual information or concepts linked to the 3D content.
- Manual annotation.
- Automatic enrichment rely on content-based methods.
- Relevant projects for in CH: PRESIOUS, the GRAVITATE project and architectural semantic analysis (Lo Buglio et al 2016).



Rodriguez and Song. 2016. Analysing the Decorative Style of 3D Heritage Collections based on Shape Saliency. JOCCH, 9:4 2016

Future challenges

- Infrastructure to easily connect to 3D content and its metadata.
- Automatic high-level semantic enrichment to support search and browsing.
- Dealing with complex shapes.
- More intelligent multi-modal queries.
- Improved visualisation of results.