Example-based Synthesis of 3D Object Arrangements

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Introduction
Creating 3D scenes is a laborious task which is a significant bottleneck for 3D content creation. We present a system for synthesizing plausible scenes from a small number of user-provided examples and a large scene database. The database adds variety while the examples control specificity.

Scene Database
A database of scene structures for prior knowledge of scene composition and realism diversity. Our database consists of 30 scenes annotated with a static support hierarchy, indicating model categories and generative support relationships.

Approach
Our probabilistic model has two components: an existence model (what?) and an arrangement model (where?). We learn these models from both the user-provided example scenes and a relevant subset of the scene database. We then sample from these models to generate high probability scenes.

Implementation

Evaluation
To evaluate the plausibility of our synthesized scenes we asked people to rate randomly sampled and manually curated dining tables, game desks and office desks on a 5-point scale.

Results

Future Work
Many new high-level interactive tasks can be powered by our framework.

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Contact
More details and project site at our website: http://graphics.stanford.edu/~msavva/