Physics Inspired Optimization on Semantic Transfer Features:
An Alternative Method for Room Layout Estimation
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Introduction
- This is a room layout estimation method featured by:
  1. Semantic Transfer;
  2. Physics Inspired Optimization
- PIO’s basic idea is to formulate some phenomena observed in ST features into mechanics concepts.

Semantic Transfer
- As a discriminative model, it integrates the relationship between room layout and scene clutter into an FCN;
- As an architecture, it enjoys the benefit of end-to-end training;
- As a training strategy, it provides better network initialization and allows us to train a very deep network under unbalanced data distribution;

Feature Quality Visualization
- This figure illustrates that STN extracts reliable features under various circumstances:

More about Semantic Transfer
- Feature embedding visualization;
- Transfer weights visualization;

Physics Inspired Optimization
- The two core concepts behind PIO: Approximation and Composition

Results
- Qualitative results on LSUN test (with videos):
- Quantitative results:
  http://lsun.cs.princeton.edu/leaderboard/index_2016.html#roomlayout
  https://sites.google.com/view/st-pio/