We desire a context model:
1. Whole-room: number of objects make sense; high-order statistics.
3. Built in 3D: more invariance in relative size and position.
4. No small gap to walls.

Our Task
Input: Single-view panorama
Output: Room layout and objects represented by cuboids.

PanoContext:
Input: Whole-view panorama with 360 degrees FOV.
Output: Room layout and objects represented by cuboids.

Motivation
Narrow field of view:
1. Little interplay among objects.
2. Visibility is unpredictable.
We desire a context model:
1. Whole-room: number of objects make sense; high-order statistics.
3. Built in 3D: more invariance in relative size and position.

2D/3D Panorama Dataset
Annotation tool               User annotation                      Initial         Re/fined
Input: a single-view panorama Output: 3D reconstruction

Evaluation
Object detection comparison: DPM vs. PanoContext

Method
Input
Data-driven Sampling
Bottom-up score:
- rectangle detection
- image segmentation
- semantic classification

Semantic Classification
- Size
- Aspect ratio & Area
- Distance to walls
- 3D & context features

Holistic Ranking
Hypothesis
\[ \min \left\{ \sum_{i=1}^{n} w_i \right\} \]

Distances to walls
Narrow field of view:
1. Large interplay among objects.
2. Visibility is predictable.

Input
Whole Room
Annotation tool               User annotation                      Initial         Re/fined

More Results