



ScanNet: Richly-annotated 3D Reconstructions of Indoor Scenes

Angela Dai¹, Angel X. Chang^{1,2}, Manolis Savva^{1,2}, Maciej Halber², Thomas Funkhouser², Matthias Nießner^{1,3}

¹Stanford University ²Princeton University ³Technical University of Munich

IEEE 2017 Conference on
Computer Vision and Pattern
Recognition

CVPR
July 21-26
HONOLULU 2017

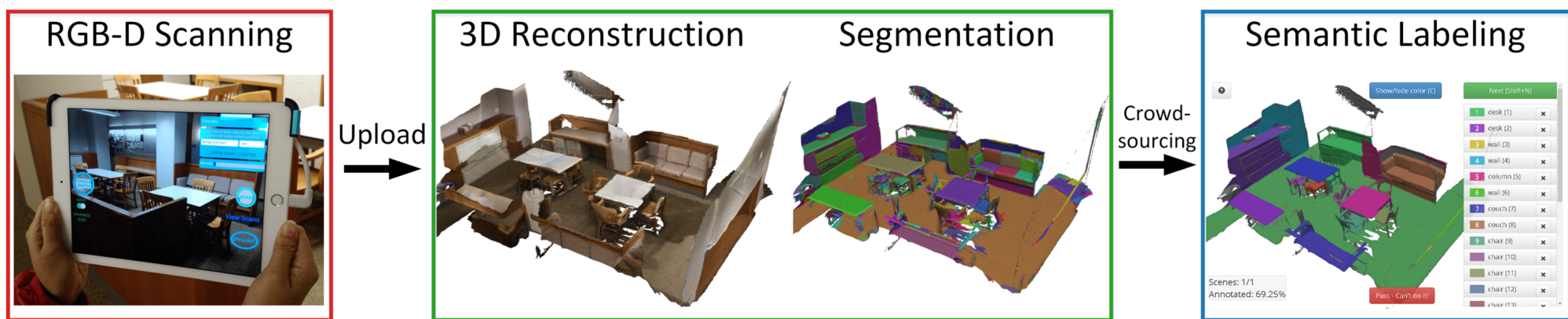
Introduction

One of the main challenges of applying deep learning models is the availability of large, labeled datasets. Unfortunately, current densely reconstructed RGB-D scene datasets cover only a small range of scene views and have limited semantic annotations. To address this, we introduce *ScanNet*, an RGB-D video dataset of 1500 scans annotated with 3D camera poses, surface reconstructions, semantic labels, and CAD model placements

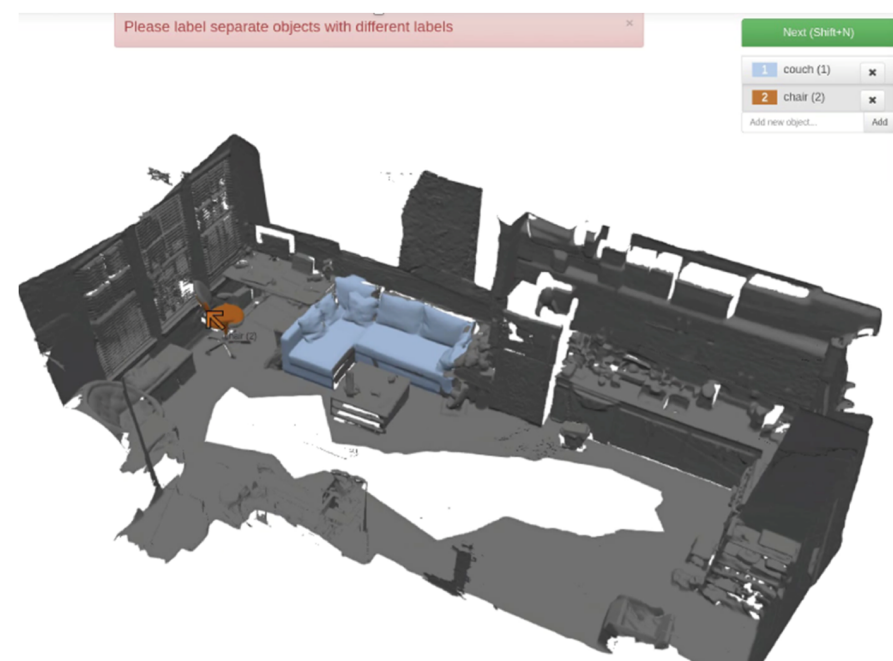
<http://www.scan-net.org>

Framework

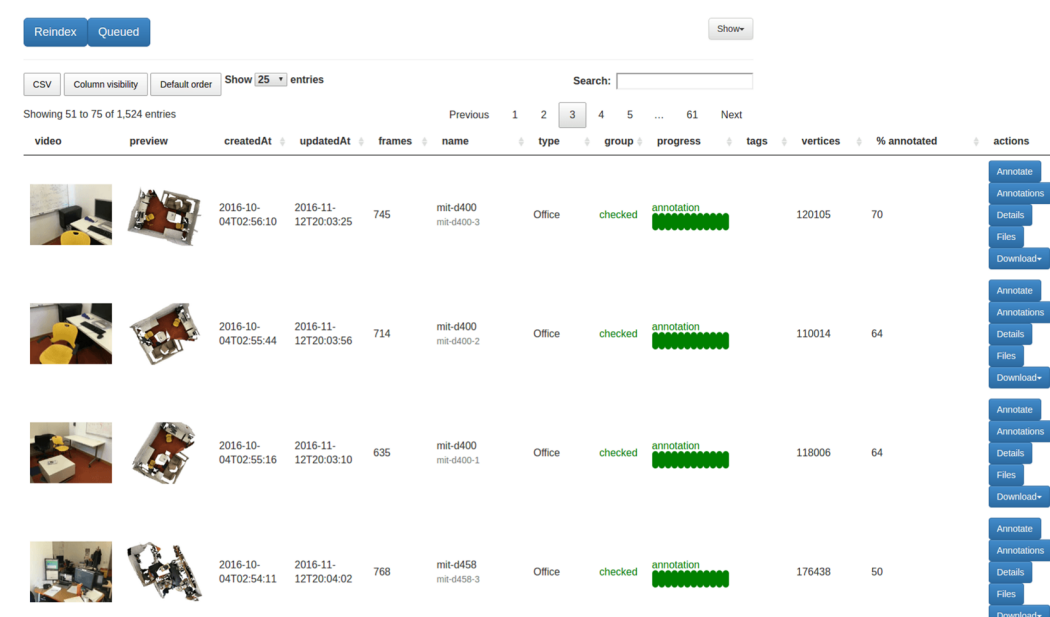
Our RGB-D scanning and semantic annotation framework was designed to enable scalable, crowdsourced data acquisition.



Crowdsourced Semantic Labeling



Data Management Interface



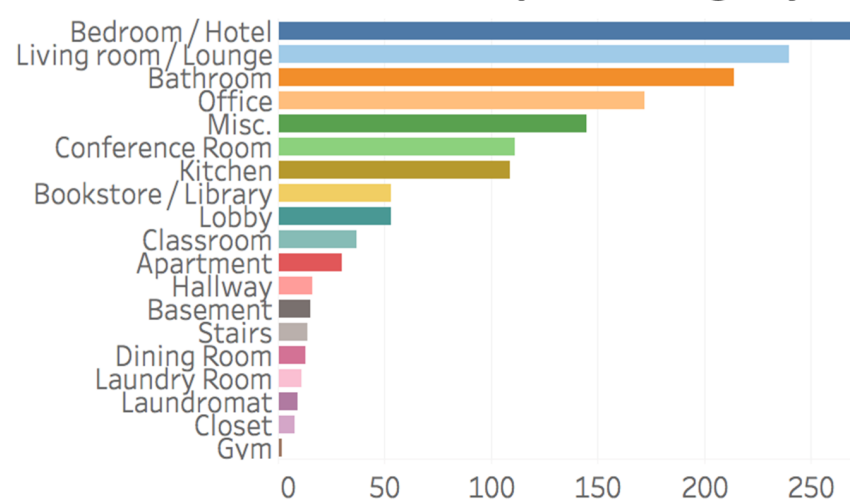
Related work

There is a lack of large-scale, semantically annotated dense RGB-D reconstructions of real-world scenes.

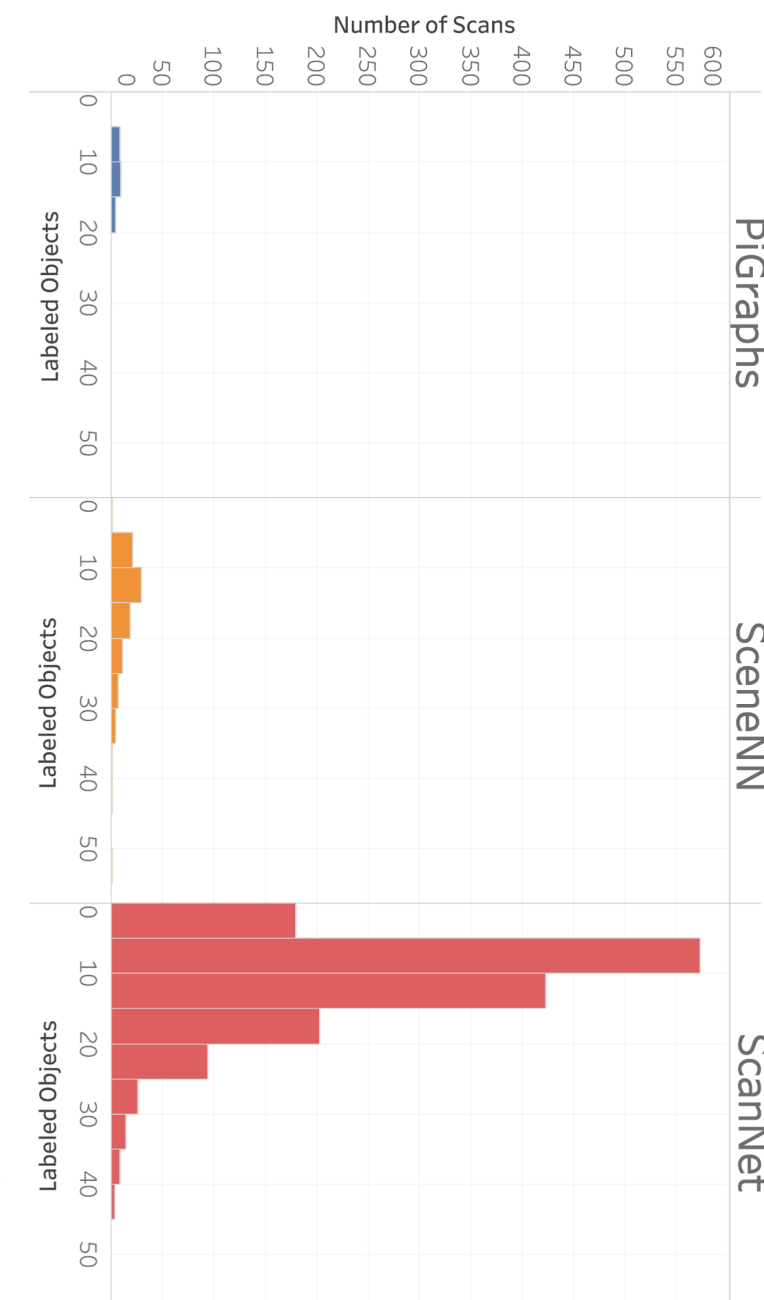
Dataset	Size	Labels	Annotation Tool
NYU v2 [58]	464 scans	1449 frames	2D LabelMe-style [69]
TUM [81]	47 scans	none	-
SUN 3D [92]	415 scans	8 scans	2D polygons
SUN RGB-D [75]	10k frames	10k frames	2D polygons + bounding boxes
BuildingParser [3]	265 rooms	265 rooms	CloudCompare [24]
PiGraphs [71]	26 scans	26 scans	dense 3D, by the authors [71]
SceneNN [32]	100 scans	100 scans	dense 3D, by the authors [60]
ScanNet (ours)	1513 scans 2.5M frames	1513 scans	dense 3D, crowd-sourced MTurk labels also proj. to 2D frames

Data and Statistics

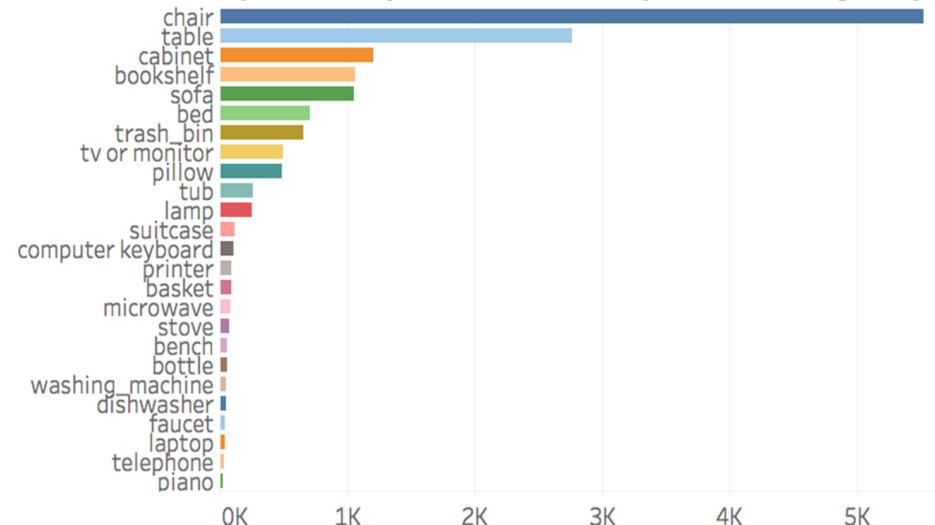
Scan Environment per Category



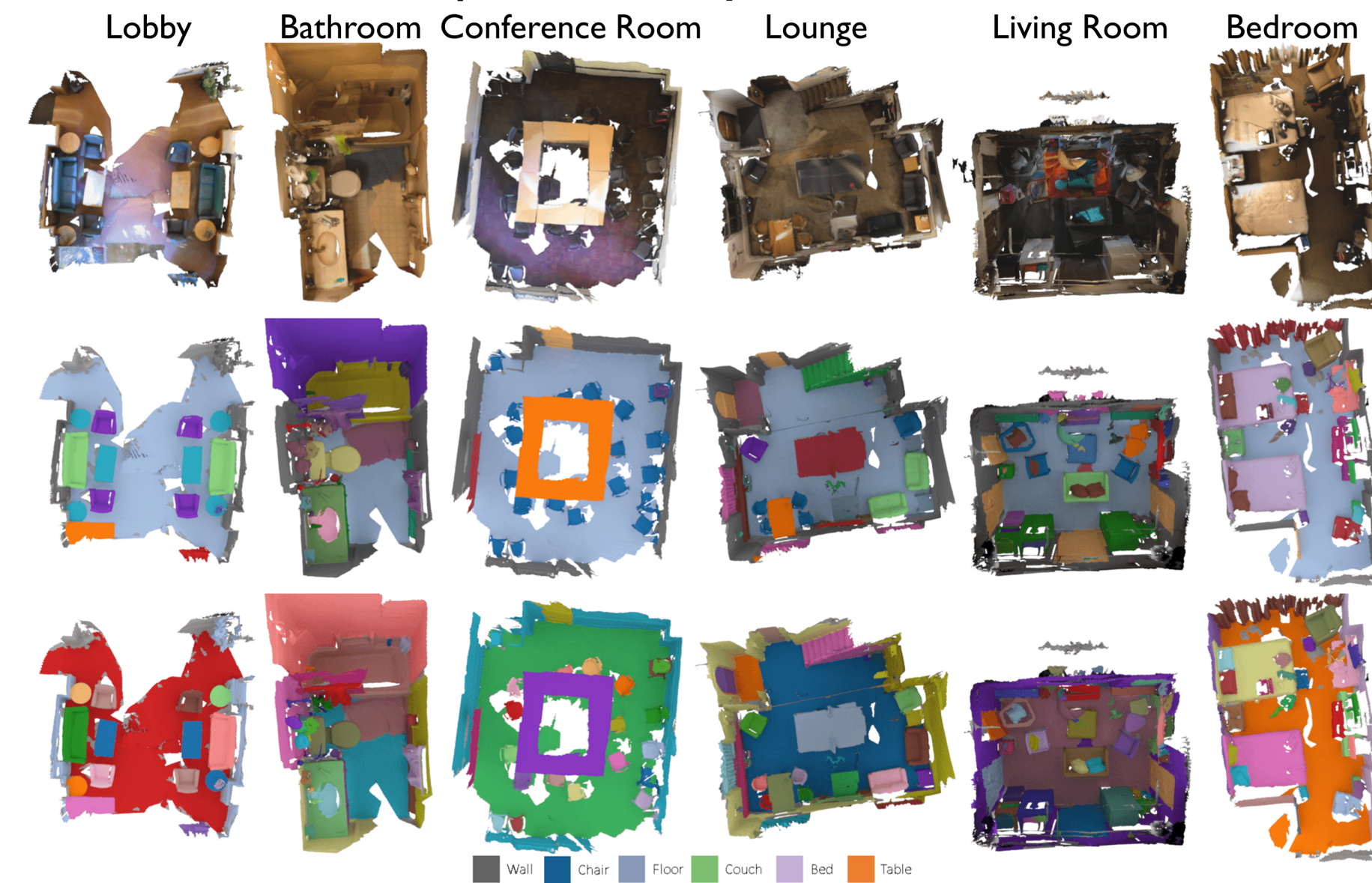
Labeled Object Distribution Comparison



Total Unique Object Labels per Category

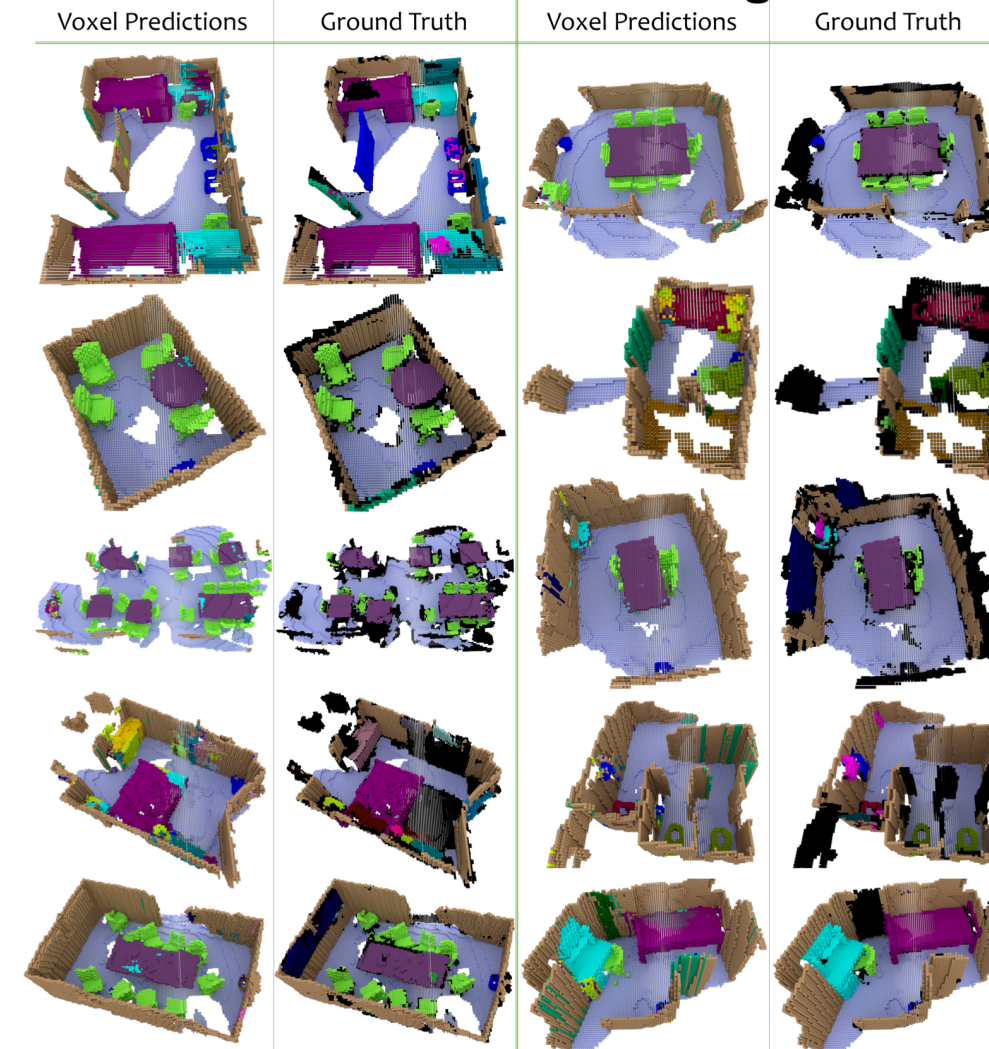


Example Semantically Annotated Scenes



Tasks and Benchmarks

Semantic Voxel Labeling



3D Object Classification

Training Set	Synthetic Test Sets		Real Test Sets	
	ShapeNet	ShapeNet Partial	SceneNN	ScanNet
ShapeNet	92.5	37.6	68.2	39.5
ShapeNet Partial	88.5	92.1	72.7	45.7
SceneNN	19.9	27.7	69.8	48.2
NYU	26.2	26.6	72.7	53.2
ScanNet	21.4	31.0	78.8	74.9
ScanNet + ShapeNet Par.	79.7	89.8	81.2	76.6

Check out our
website for data
and code!

