

# Shape Anchors

## for Data-driven Multi-view Reconstruction

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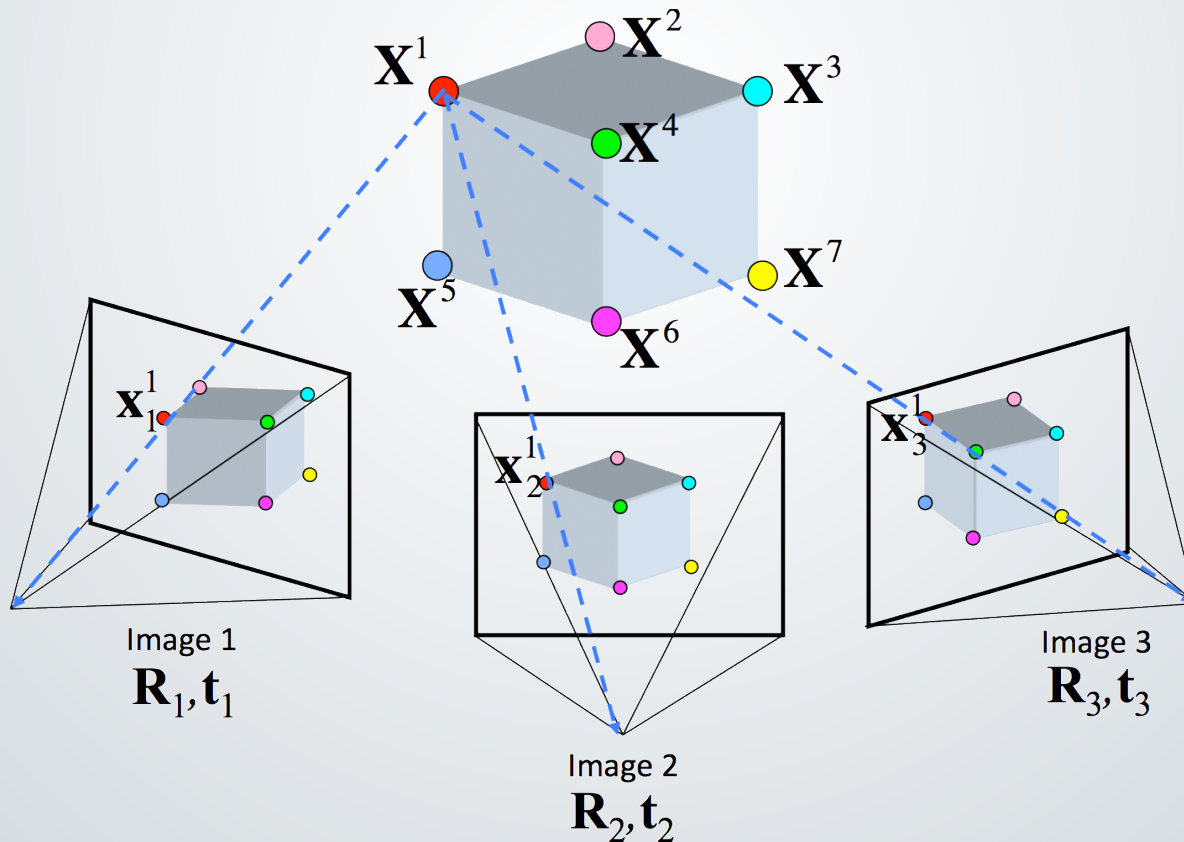


PRINCETON  
VISION GROUP

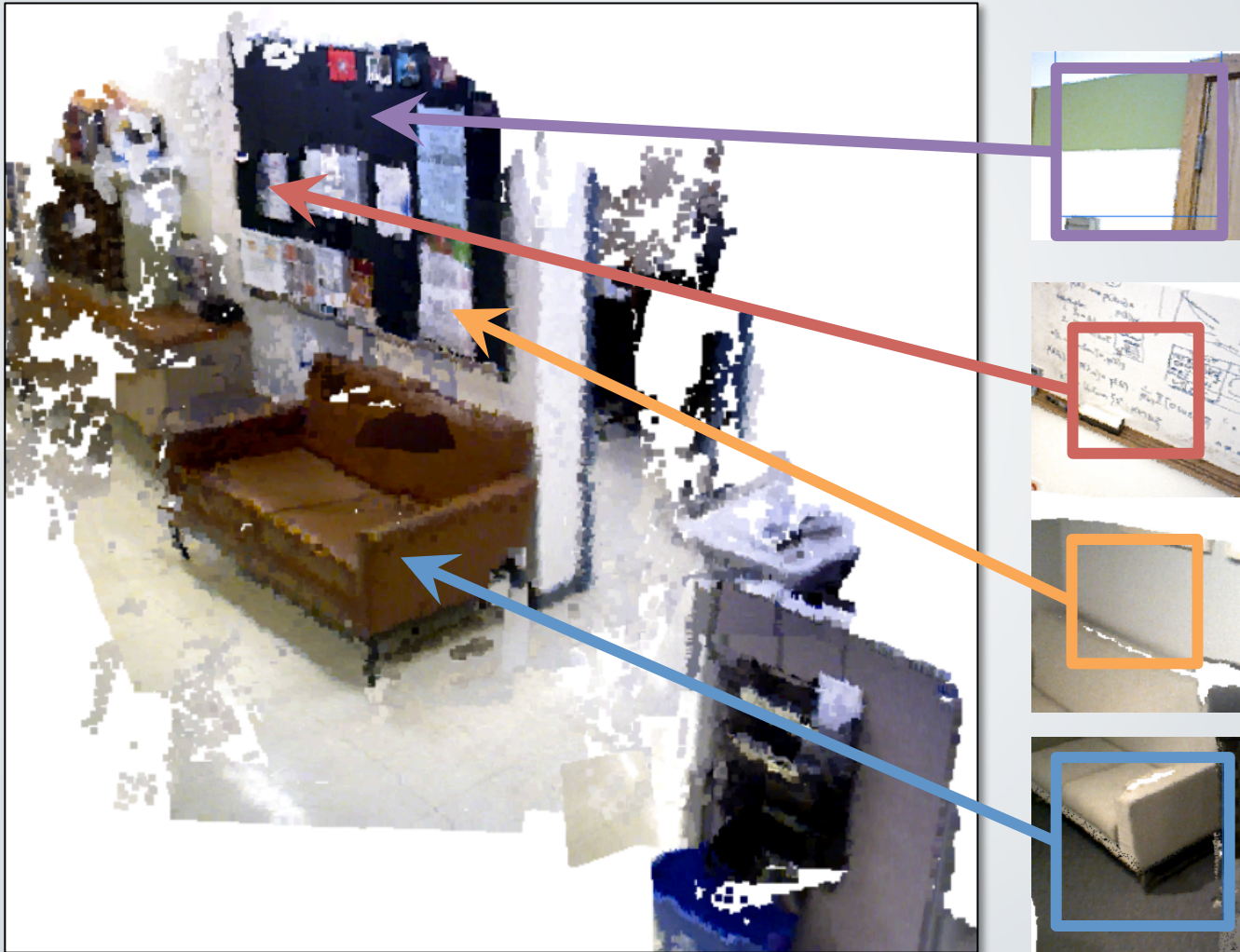
# Multi-view 3D Reconstruction

**Likelihood:** Multi-view photo consistency

**Prior Info:** Appearance infers geometry

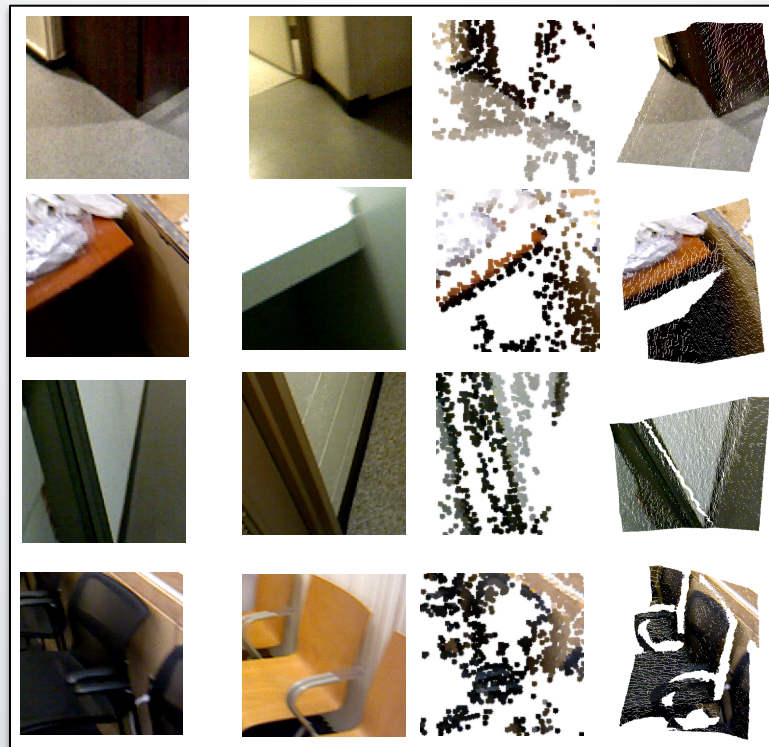


# Prior + Likelihood



# Shape Anchor

**Definition:** Shape anchors are distinctive image patches whose 3D shapes can be predicted from their appearance alone.

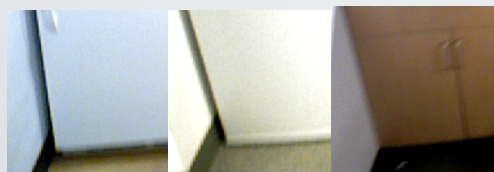
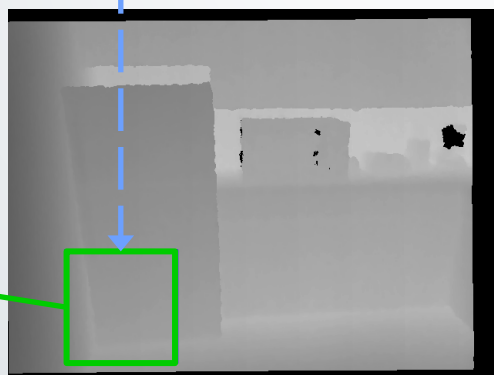
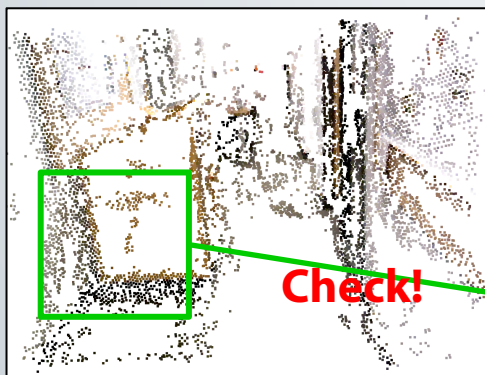
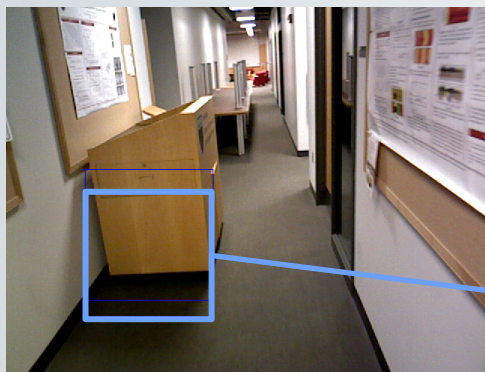




# Algorithm

Input

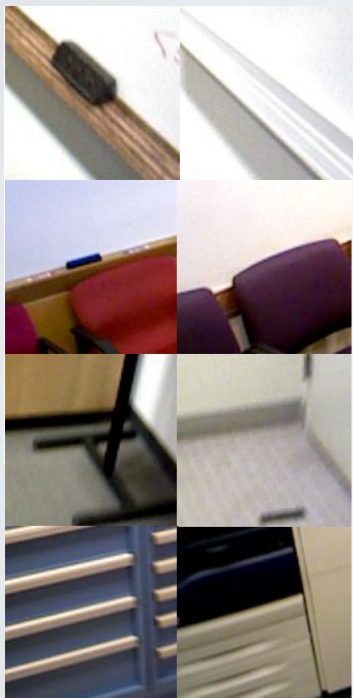
Big 3D Database



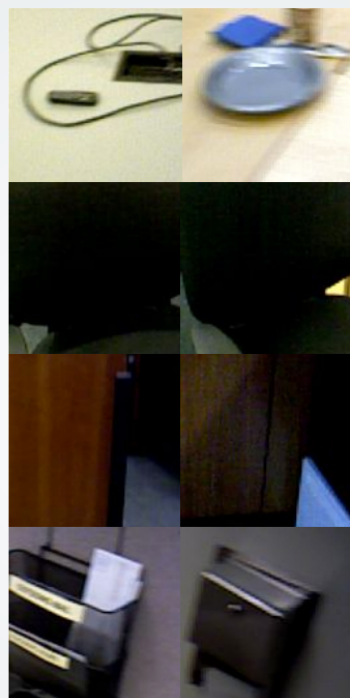
# Shape Anchors



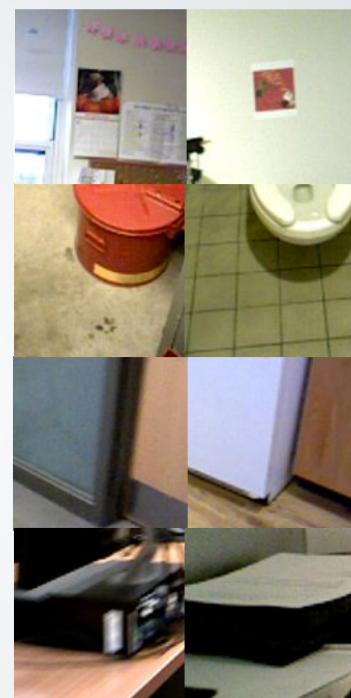
Anchor Match



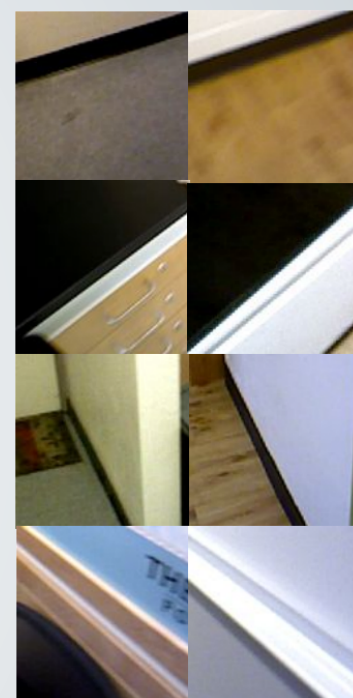
Anchor Match



Anchor Match



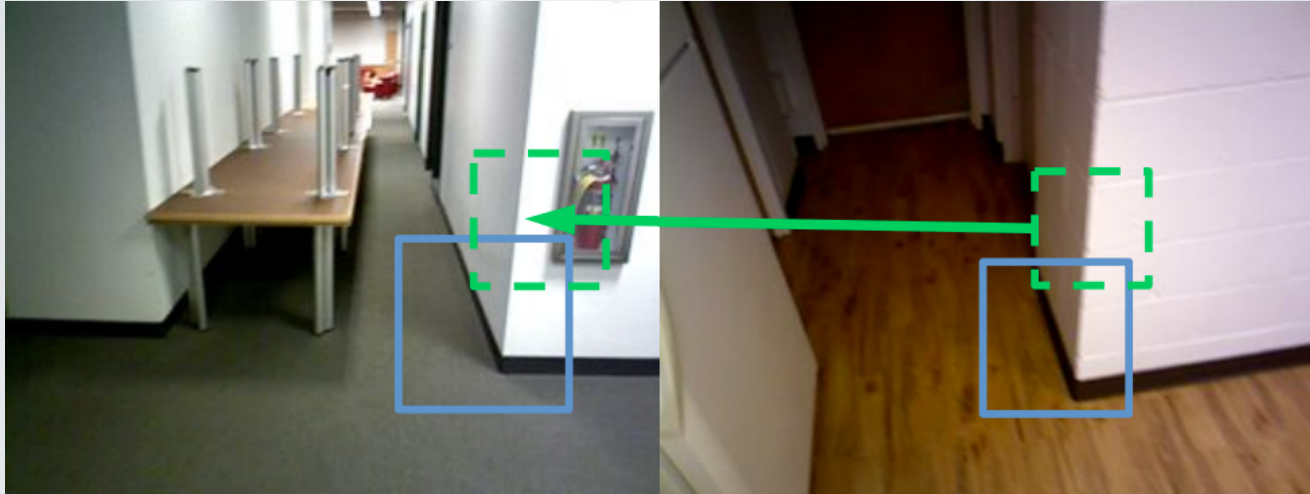
Anchor Match



Anchor Match

The corresponding stereo point clouds are not shown, but they are used as part of the scoring process.

# Anchor Propagation



PMVS



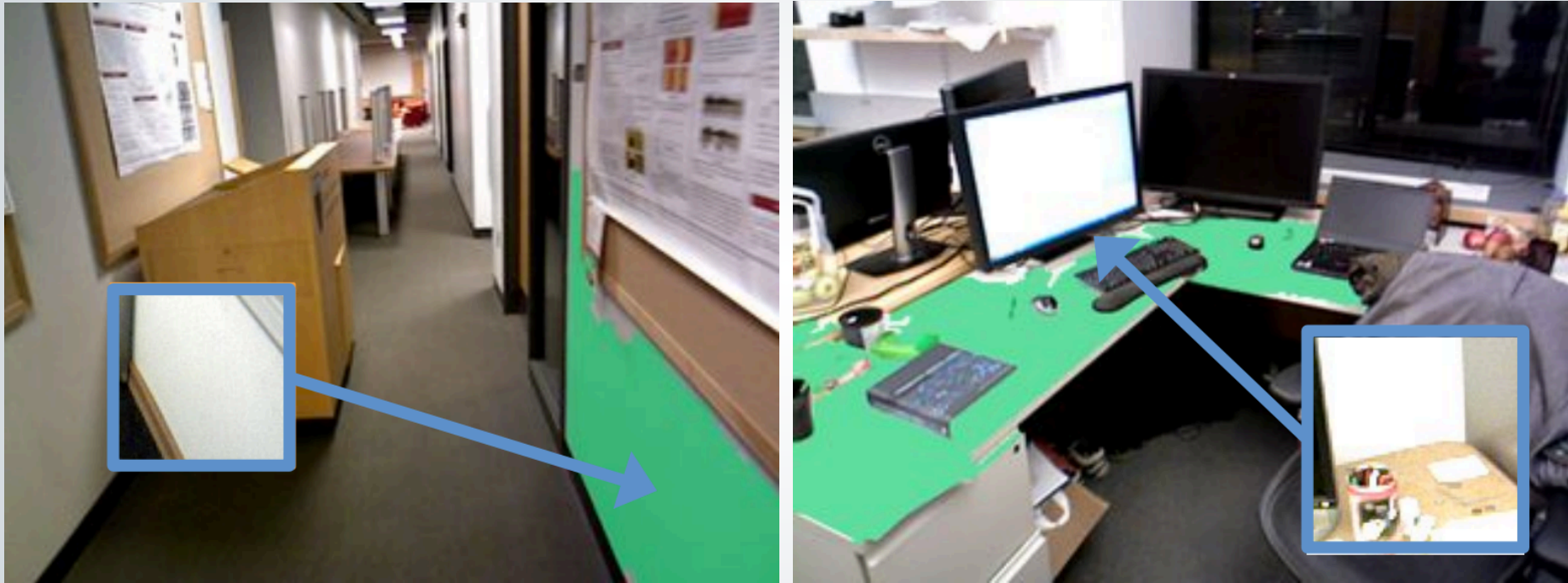
Shape Anchor



Anchor Propagation



# Plane Extrapolation



If a shape anchor's reconstruction is mostly planar, we infer the support of the plane (green).

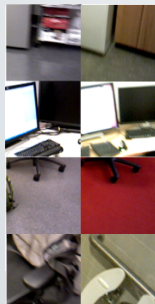
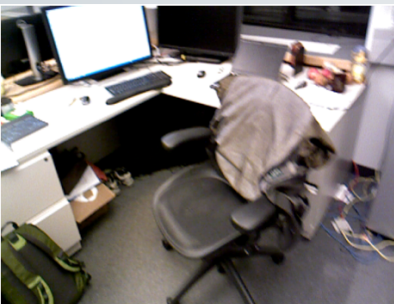
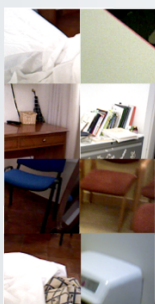
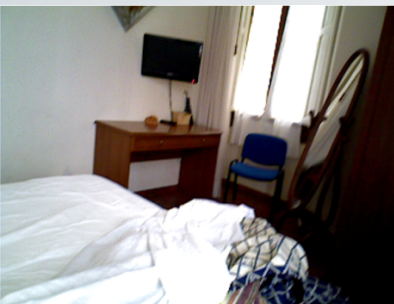


Frame

Anchor Match

PMVS

Ours + PMVS

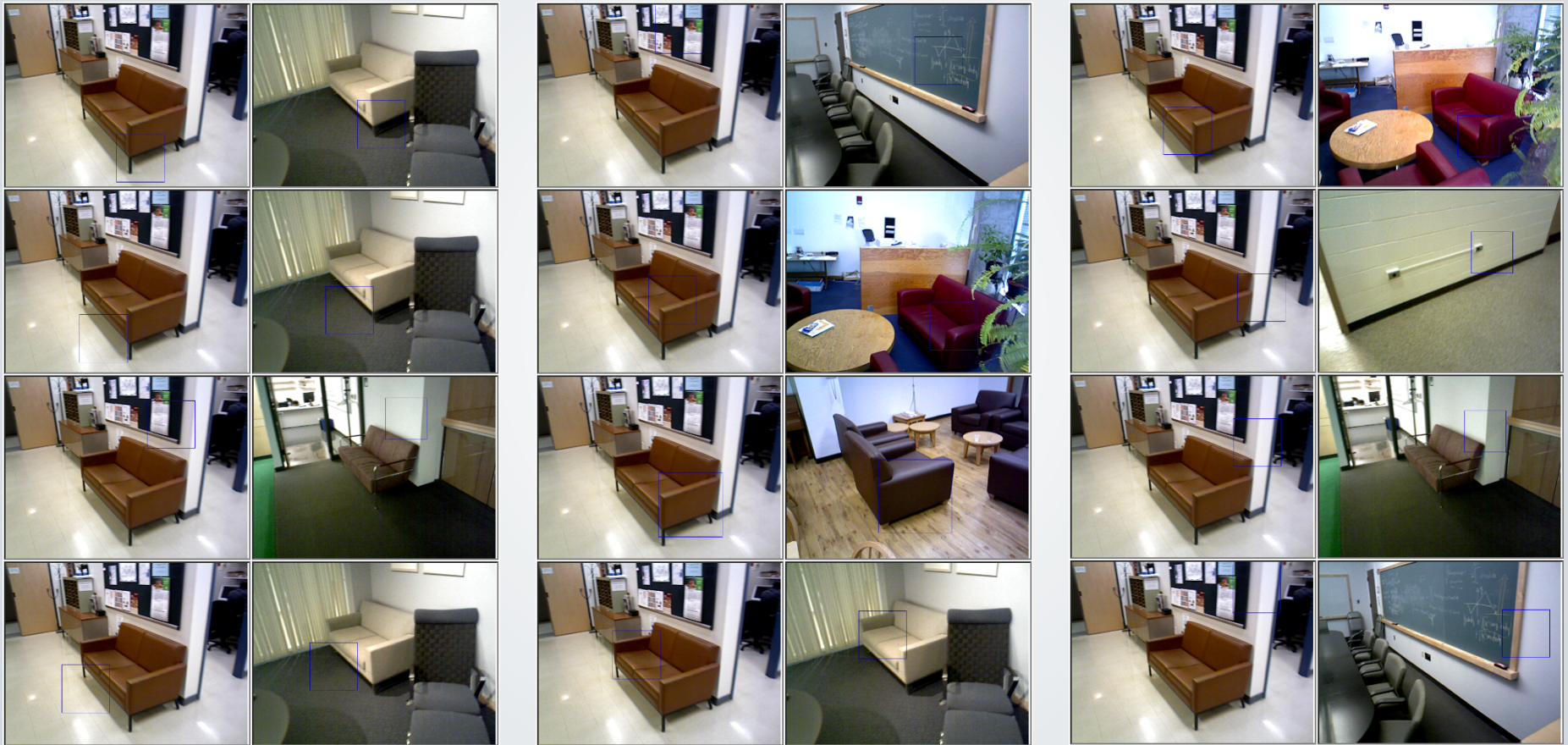
Ours + PMVS (2<sup>nd</sup> View)







# Shape Anchors



# Power of Big Data

