What effect does object representation have on prediction?

- Three difficulty settings:
  - Novel view: new view of model that is in training set
  - Novel model: new model from a category that is in training set
  - Novel category: new model from a category that is not in the training set

- Tasks:
  - 3D shape from single depth
  - 3D shape from real-world RGB images

Experiments

- Object representation
  - Coordinate system: Viewer-centered and object-centered.
  - Shape: Voxels and surfaces.

- Same procedure applied in all cases.

- Evaluation metrics:
  - Voxel intersection-over-union, surface distance, silhouette IoU, depth error.
  - Surface distance tends to correspond better to qualitative judgments of accuracy when there are thin structures.

Results

Table: Evaluation metrics for shape representation and coordinate system.

Findings:

- Viewer-centered coordinates is advantageous for novel objects, while object-centered representations are better for more familiar objects.

- Surface-based methods outperform voxel representations for objects from novel classes and produce higher resolution outputs.

References