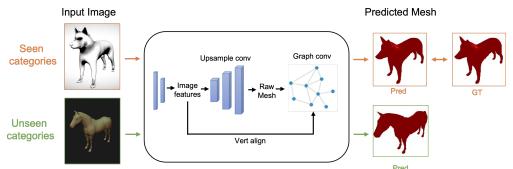


# A Generalized Mesh Prediction Framework for Arbitrary Objects

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# **Open Category Mesh Prediction**



We developed a mesh prediction framework capable of handling open category objects:

• Input: a 2D image from either Seen/Unseen categories; Output: predicted 3D mesh

### **Experiment Setup**

Dataset: Objaverse

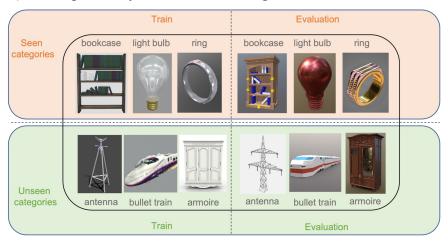
Dataset	# Objects	# Classes	Object Categories 77K architecture
YCB [5]	77	5	62K characters-creatures
BigBIRD [69]	125	-	26K cars-vehicles
KIT [35]	219	145	18K places-travel
IKEA [43]	219	11	56K cultural-heritage-history 16K people 12K food-drink
Pix3D [71]	395	9	9K fashion-style
GSO [19]	1K	17	4K sports-fitness 2K music
EGAD [51]	2K	-	1K news-politics
PhotoShape [53]	5K	1	52K furniture-home 27K animals-pets
ABO [12]	8K	63	28K nature-plants
3D-Future [22]	10K	34	E1K art abstract
ShapeNet [7]	51K	55	29K electronics-gadgets
Objaverse	818K	21K	47K science-technology 35K weapons-military

Dataset split: randomly choose 15 seen categories and 15 unseen categories

Train: 1) 2D images and 3D annotations of objects in Seen Categories

2) 2D images of objects in Unseen Categories **Evaluation:** 1) 2D images of objects in Seen Categories

2) 2D images of objects in Unseen Categories



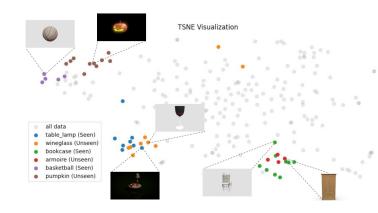
## **Experiments**

### **Quantitate Result**

Categories	F1 0.1	F1 0.3	F1 0.5	Chamfer Distance
Seen	85.9427	99.5634	99.9941	0.0102
Unseen	79.1717	99.0235	99.9849	0.0148

### **Correlation between 2D Representation Space and 3D**

We found that objects having similar 3D shapes are close in 2D t-SNE visualization.



#### **Visualization on Validation Set**

Seen categories









Unseen categories





Failed Case



Models and code are publicly available

bookcase