

CoPA-SG: Dense Scene Graphs with Parametric and Proto-Relations

Supplementary Material

7. Directional Relations

Camera-independent relations are defined based on the pose of the associated object. Fig. 10 shows how the various directions are defined with respect to the object’s pose.

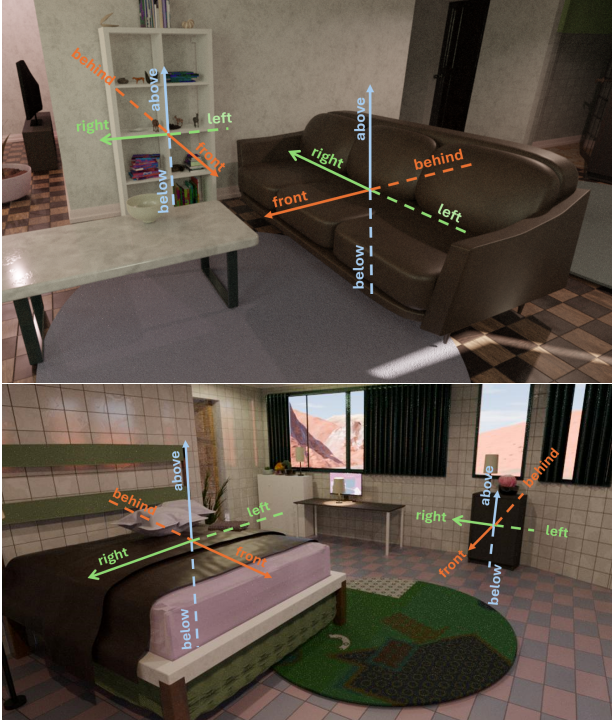


Figure 10. Test directions for camera-independent relations that depend on the object pose.

8. Infinigen Object Mapping

Since Infinigen [29] does not include a set of class labels for the various objects, we create a mapping from object instance name to class label. You can see the mapping in Tabs. 5 and 6. The “Directional” column specifies whether the respective object can serve as an object for a camera-independent directional relation.

Infinigen Name	Class Label	Directional
Balloon	balloon	No
BarChair	chair	Yes
Bathtub	bathtub	No
Bed	bed	Yes
BeverageFridge	fridge	Yes
Blanket	blanket	No
BlenderRock	rock	No
BookColumn	book	No
BookStack	book	No
Bottle	bottle	No
Bowl	bowl	No
BoxComforter	blanket	No
CeilingLight	light	No
CellShelf	shelf	Yes
Chair	chair	Yes
Chopsticks	cutlery	No
CoffeeTable	table	No
Comforter	blanket	No
Cup	cup	No
DeskLamp	light	No
Dishwasher	dishwasher	Yes
FloorLamp	light	No
Fork	cutlery	No
Fruit	fruit	No
GlassPanelDoor	door	No
Hardware	hardware	No
KitchenCabinet	shelf	Yes
Knife	cutlery	No
LargePlantContainer	plant	No
LargeShelf	shelf	Yes
LiteDoor	door	No
LouverDoor	door	No

Table 5. Mapping of Infinigen name to class label.

Infinigen Name	Class Label	Directional
Mattress	mattress	No
Microwave	microwave	Yes
Mirror	mirror	Yes
Monitor	screen	Yes
NatureShelfTrinkets	trinket	No
OfficeChair	chair	Yes
Oven	oven	Yes
Pan	pan	No
PanelDoor	door	No
Pillar	pillar	No
Pillow	pillow	No
PlantContainer	plant	No
Plate	plate	No
Pot	pot	No
Rug	rug	No
SideTable	table	No
SimpleBookcase	shelf	Yes
SimpleDesk	table	No
SingleCabinet	shelf	Yes
Sink	sink	Yes
Sofa	sofa	Yes
Spoon	cutlery	No
StandingSink	sink	Yes
TV	screen	Yes
TVStand	shelf	Yes
TableDining	table	No
Toilet	toilet	Yes
Towel	towel	No
Vase	vase	No
WallArt	art	Yes
Window	window	Yes
Wineglass	wineglass	No

Table 6. Mapping of Infinigen name to class label.

9. Predicate Distribution in COPA-SG

We define a fixed split of COPA-SG into training, validation, and test. Fig. 11 shows the distribution of the contained predicate classes among the different data splits.

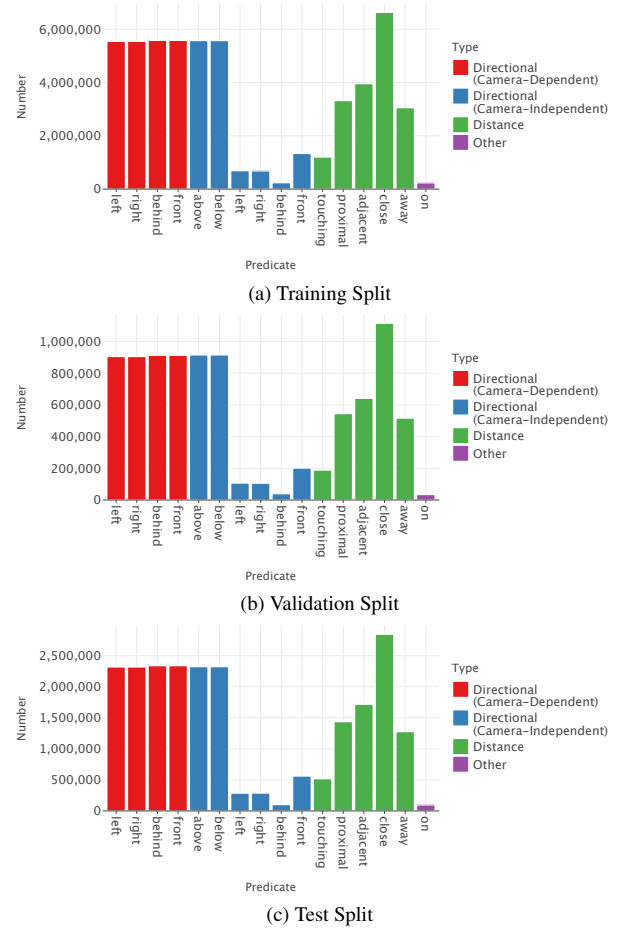


Figure 11. Predicate class distribution in the overall dataset. All distance based relations are stored internally as a single relation. This figure shows a discretized variant for clarity (proximal $\in (0, 0.3]$, adjacent $\in (0.3, 1]$, close $\in (1, 3]$, away $\in (3, \infty)$).

10. Using CoPA-SG for Pretraining

The rich annotations of CoPA-SG can also benefit model performance on other datasets. Our experiments show that simply pretraining on CoPA-SG significantly improves performance on the PSG dataset. We trained DSFormer on the PSG dataset with default pretraining and pretraining on CoPA-SG. As shown in Fig. 12, the latter notably improves the performance score.

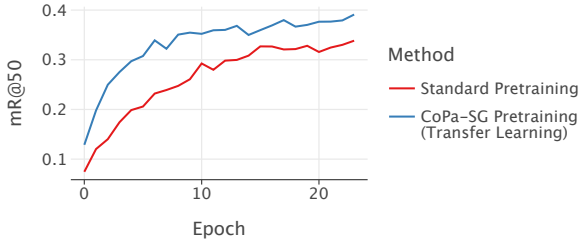


Figure 12. mR@50 scores during training with pretrained weights from CoPA-SG and without.

We attribute this to the fact that most relations, even if they are mostly semantic, have some spatial aspect. For example, if a person is walking on the street, knowledge about CoPA-SG’s *on* relation is helpful. Because of CoPA-SG’s comparatively large size, it can be used to pretrain more complex architectures. For the camera ready, we will run this experiment with all observed methods, include this analysis, and publish all pretrained weights. These weights can be used as a superior initialization for future work on other SG tasks, benefiting a larger part of the scene graph community.