GARField: Group Anything with Radiance Fields

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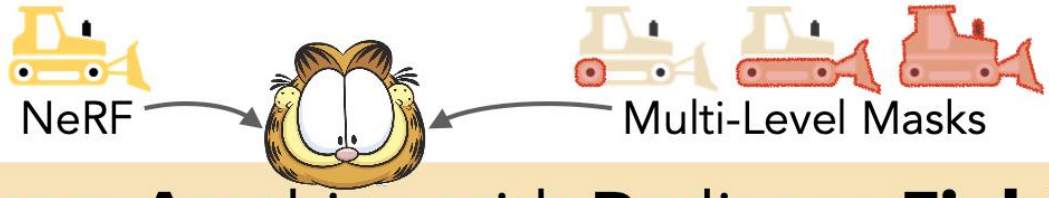
Citations: 2

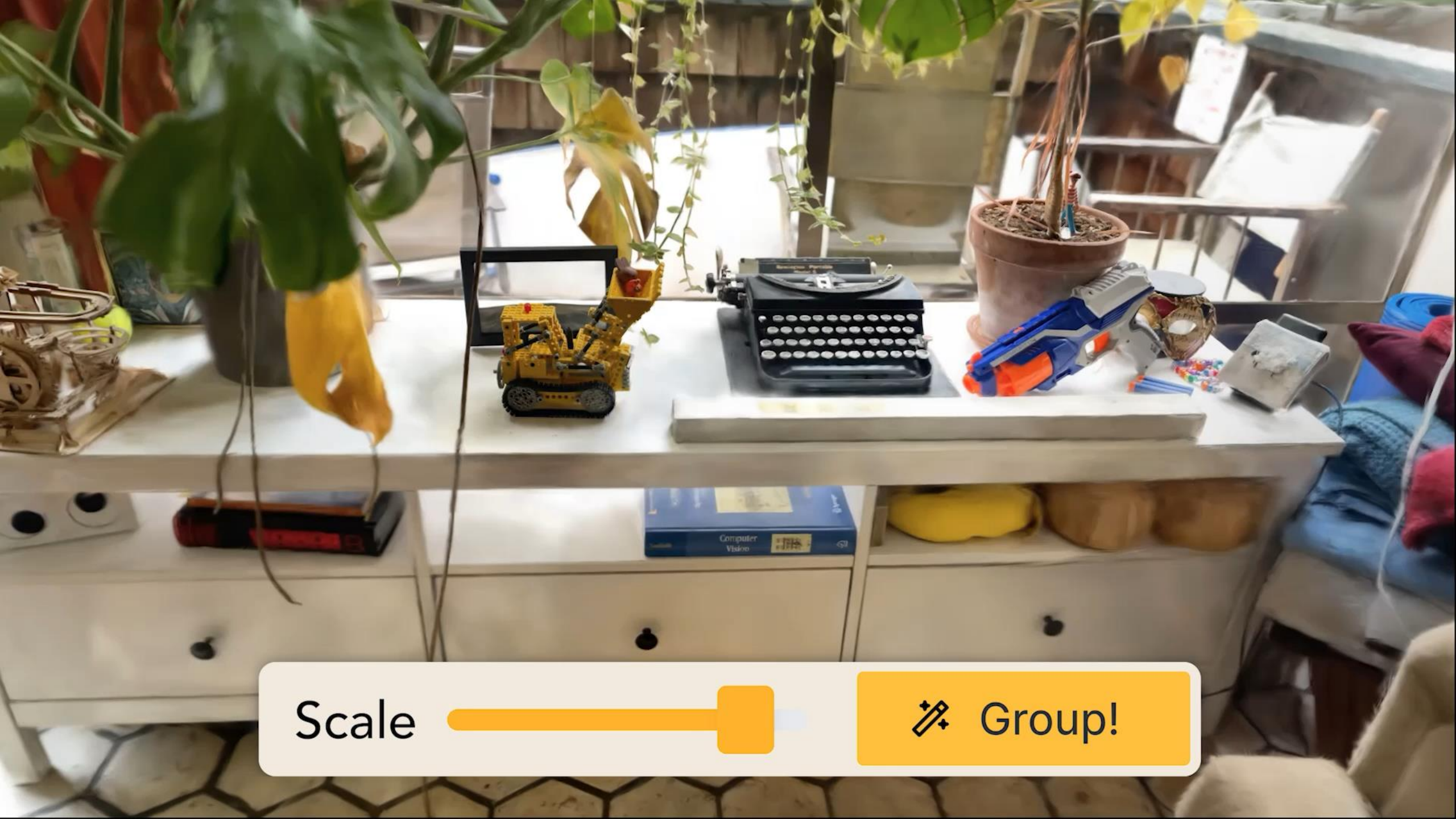
Source: https://www.garfield.studio/

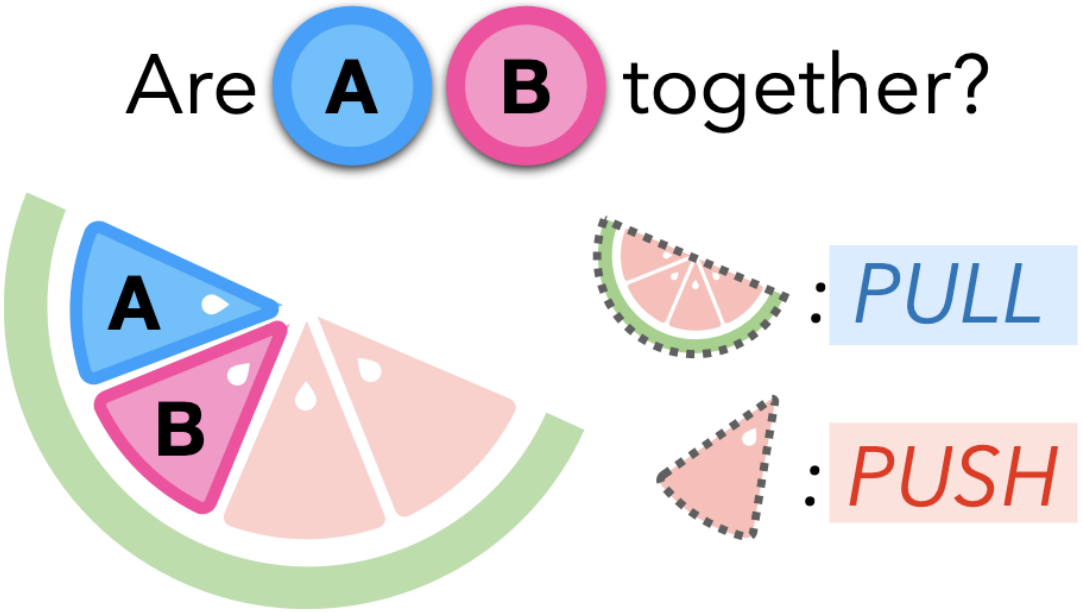


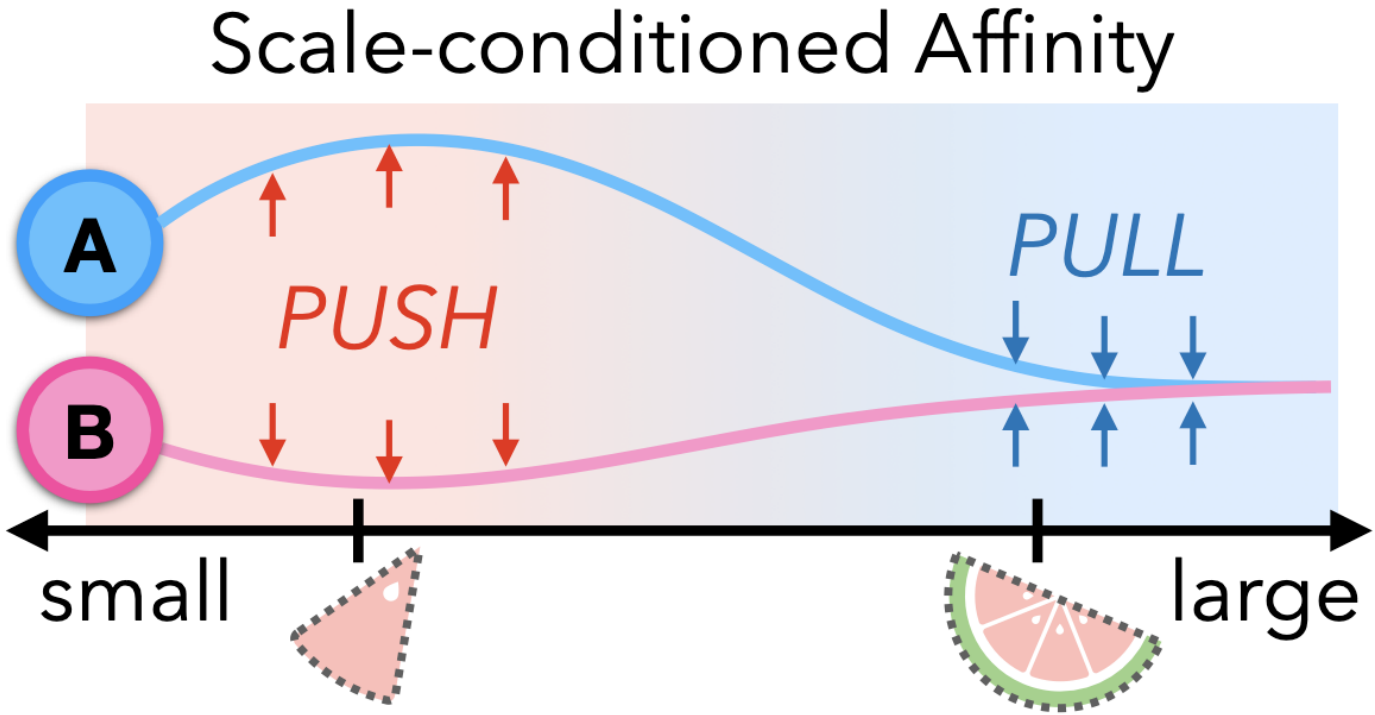
Group Anything with Radiance Fields

Hierarchical Asset Extraction

Multi-Scale Clustering


Computer
Vision
Scale
Group!





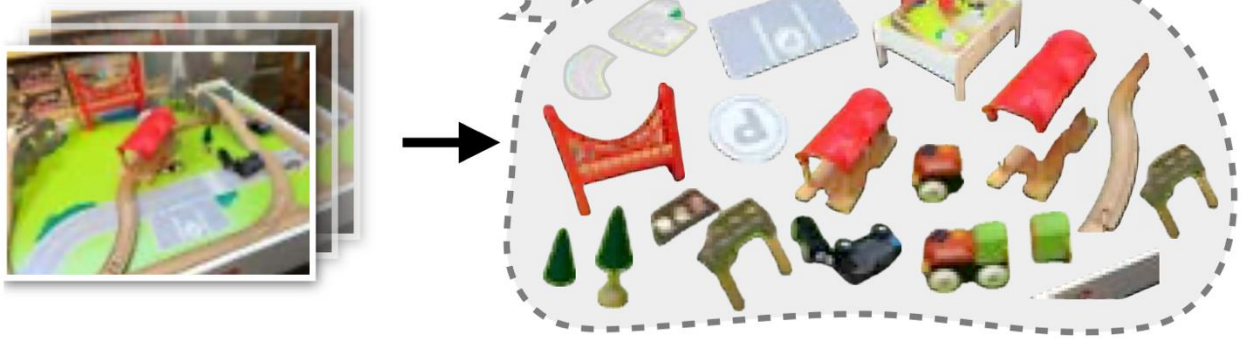
higher affinity @ large scale but low affinity @ a smaller scale

2D Mask Generation

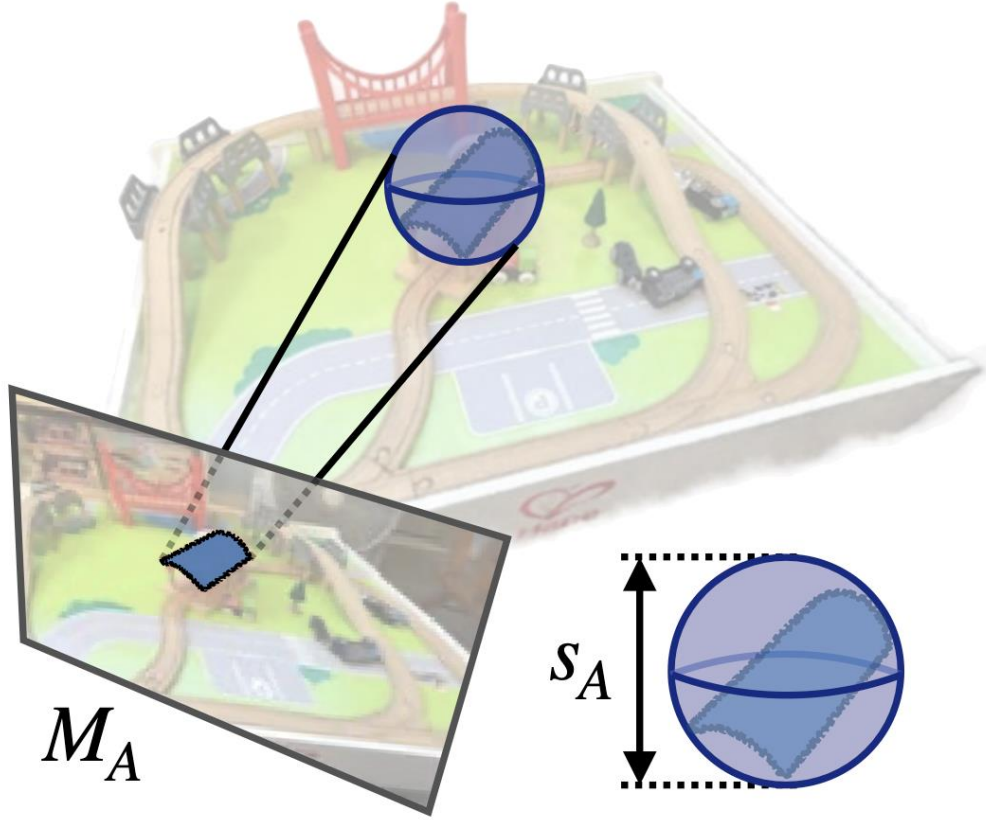
Group Preprocessing

Images

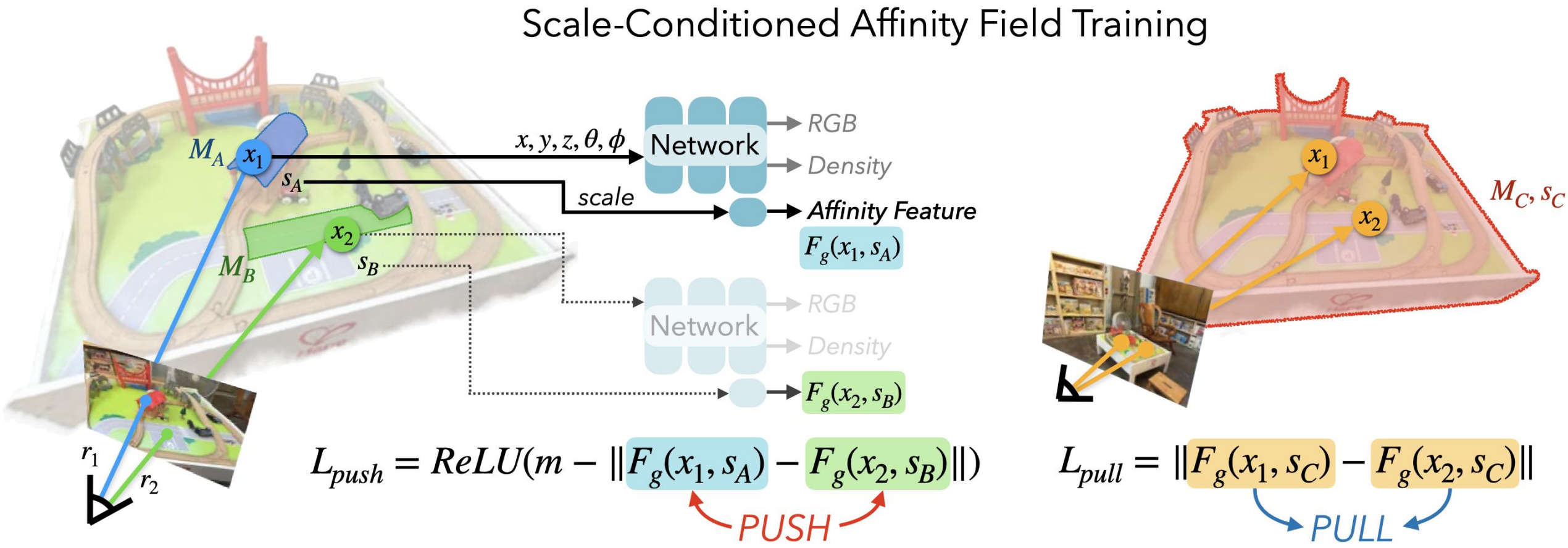
Set of SAM Masks

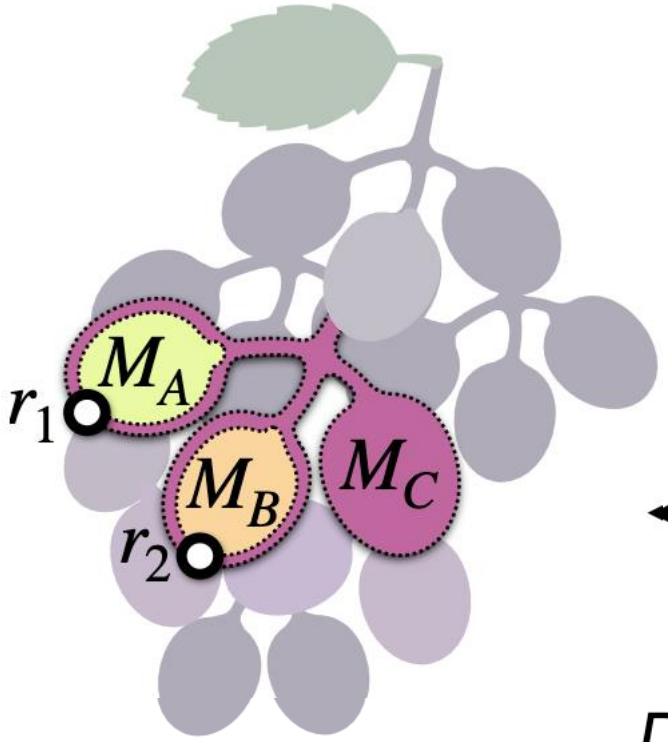


3D Mask Scale Generation

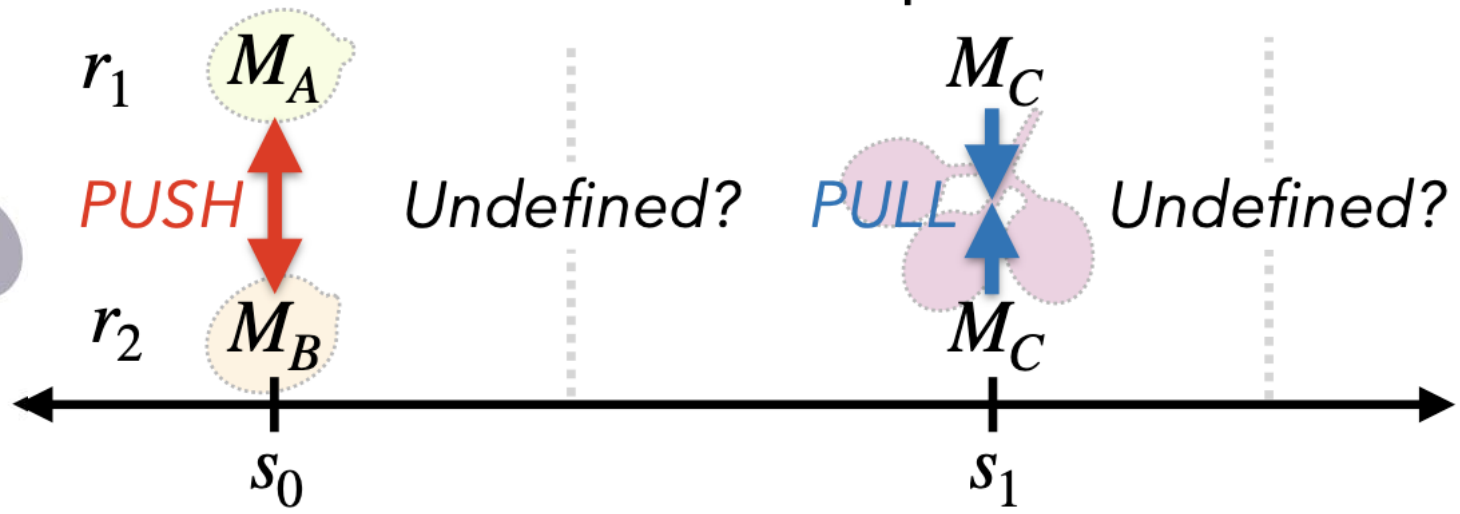


Scale-Conditioned Affinity Field

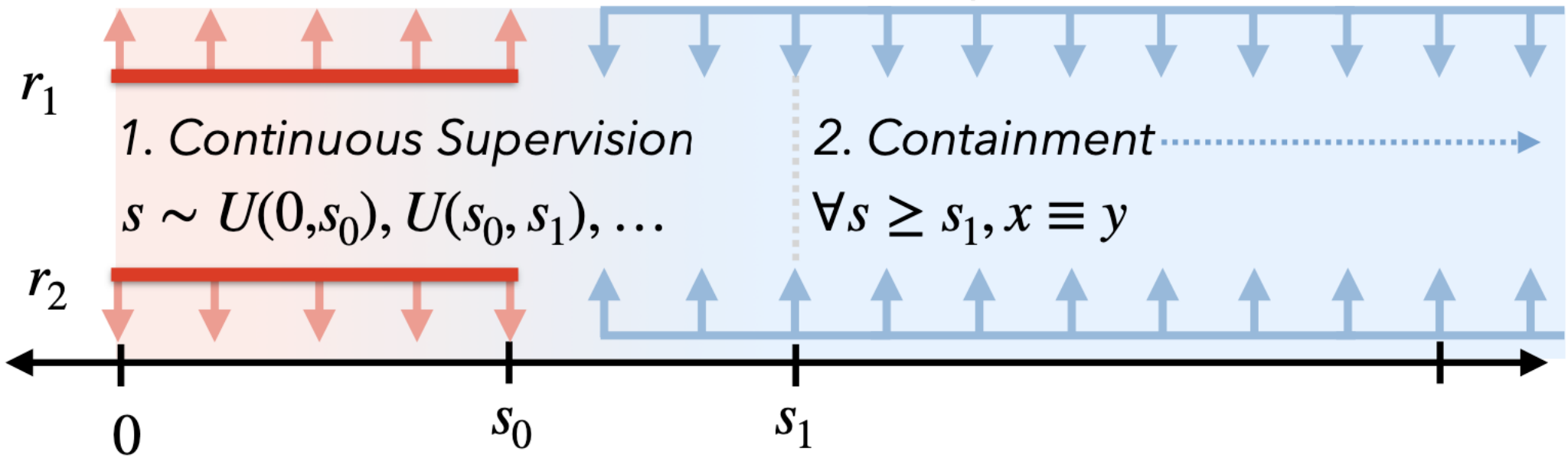




Naive Scale Supervision



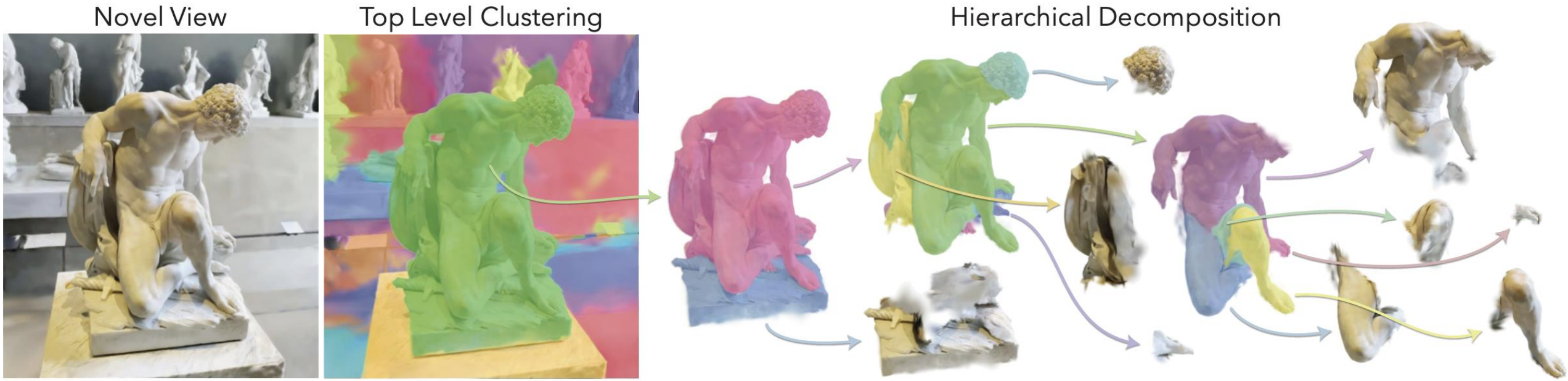
Densified Scale Supervision



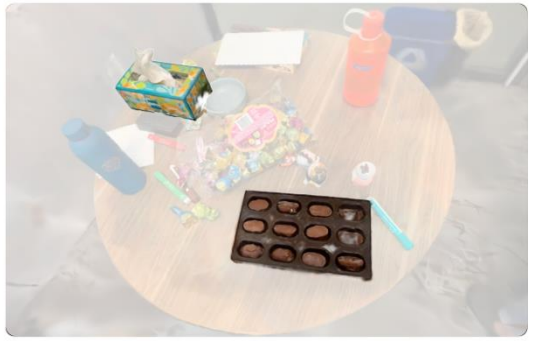
Interactive Selection

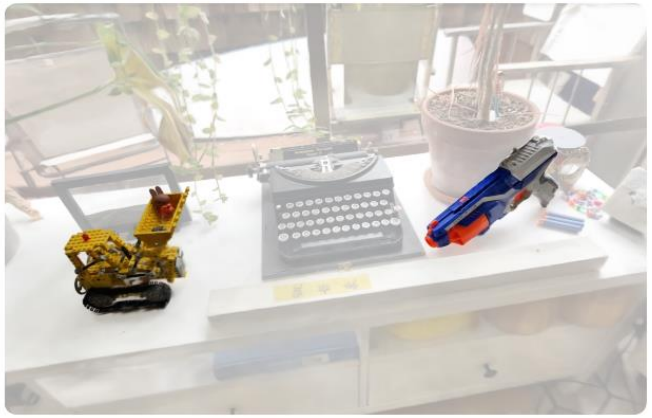
3D Consistent Asset Extraction

Hierarchical Decomposition







RGB SAM (2D) GARField

Affinity w/

GARField (-dense hierarchy)

GARField

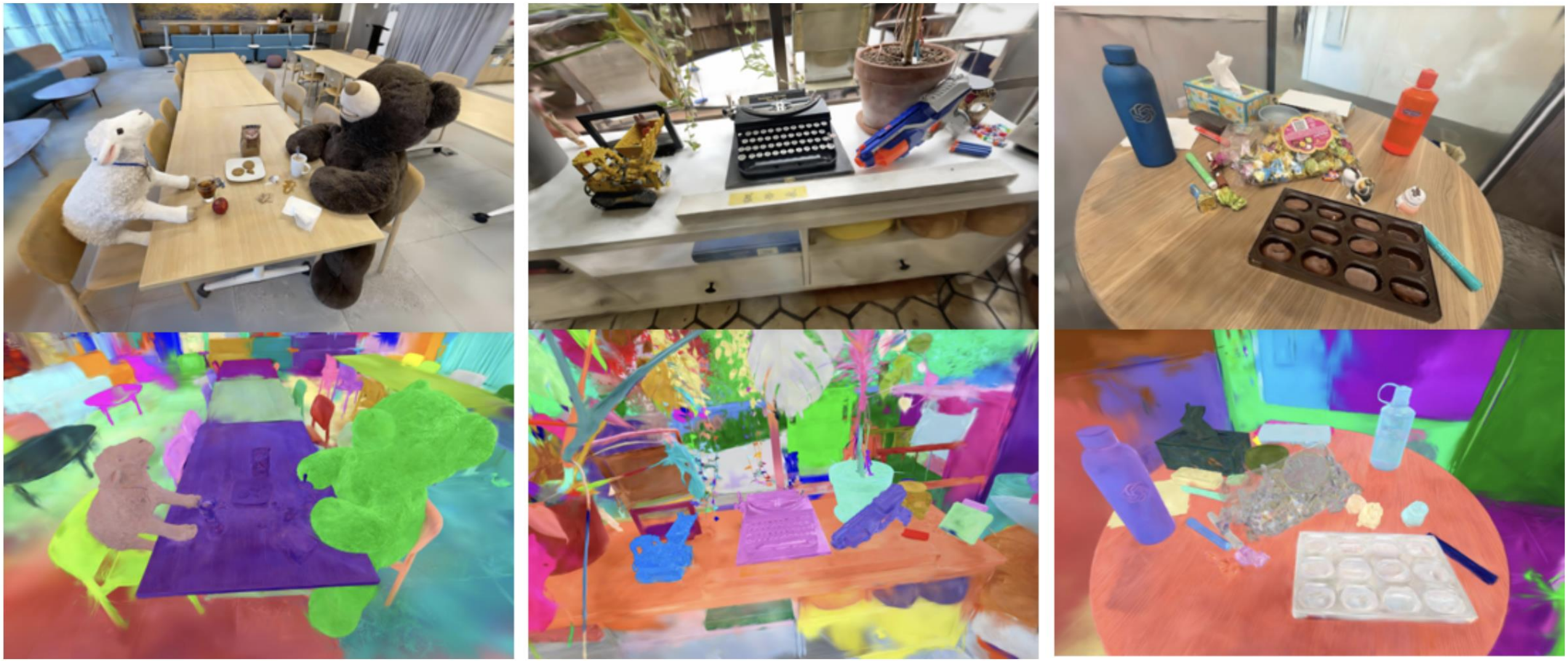
s 0.0 0.04 0.06 0.22 0.5

Scene	Fine		Medium		Coarse	
	SAM	Ours	SAM	Ours	SAM	Ours
teatime	81.6	**92.7**	97.3	**97.9**	-	-
bouquet	17.4	**76.0**	73.5	**81.6**	76.1	**85.4**
keyboard	65.3	**88.8**	73.6	**98.4**	-	-
ramen	53.3	**79.2**	74.7	**90.7**	92.6	**95.5**
living_room	85.3	**90.5**	74.2	**80.7**	88.6	**94.4**

Table 1. **3D Completeness.** We report mIOU of scene annotations for a single point with up to three levels of hierarchy. SAM struggles to produce view-consistent fine groups compared to GARField.

Scene	SAM [15]	Ours (-scale)	Ours (-dense)	Ours
ramen	74.9	64.1	74.1	**85.6**
teatime	64.9	67.7	66.1	**86.6**
keyboard	23.2	57.6	73.1	**77.9**
bouquet	34.4	49.8	72.9	**76.4**
living_room	59.6	49.7	62.1	**76.6**

Table 2. **Hierarchical Grouping Recall:** We report mIOU against human annotations of multi-scale groups of different objects.



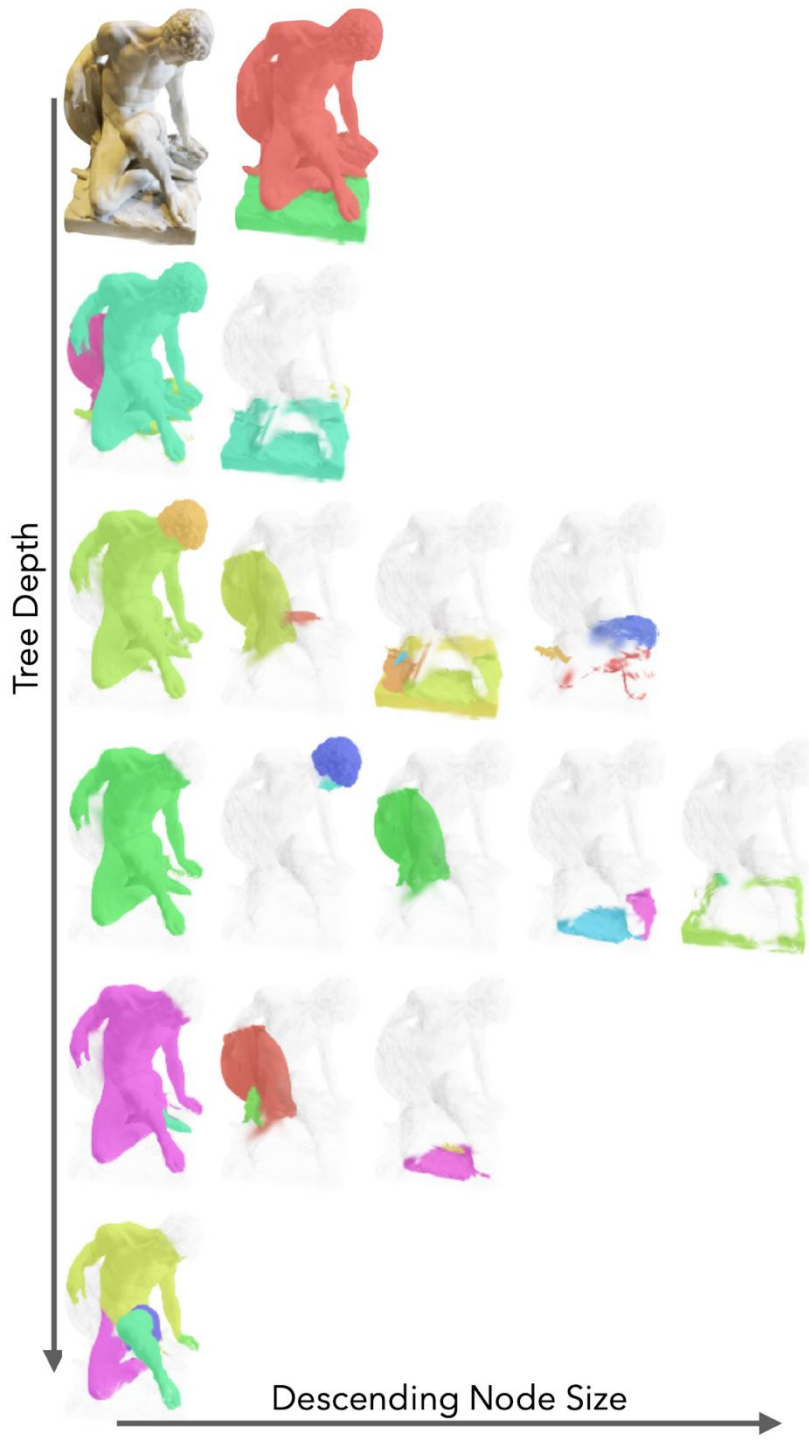
Limitations

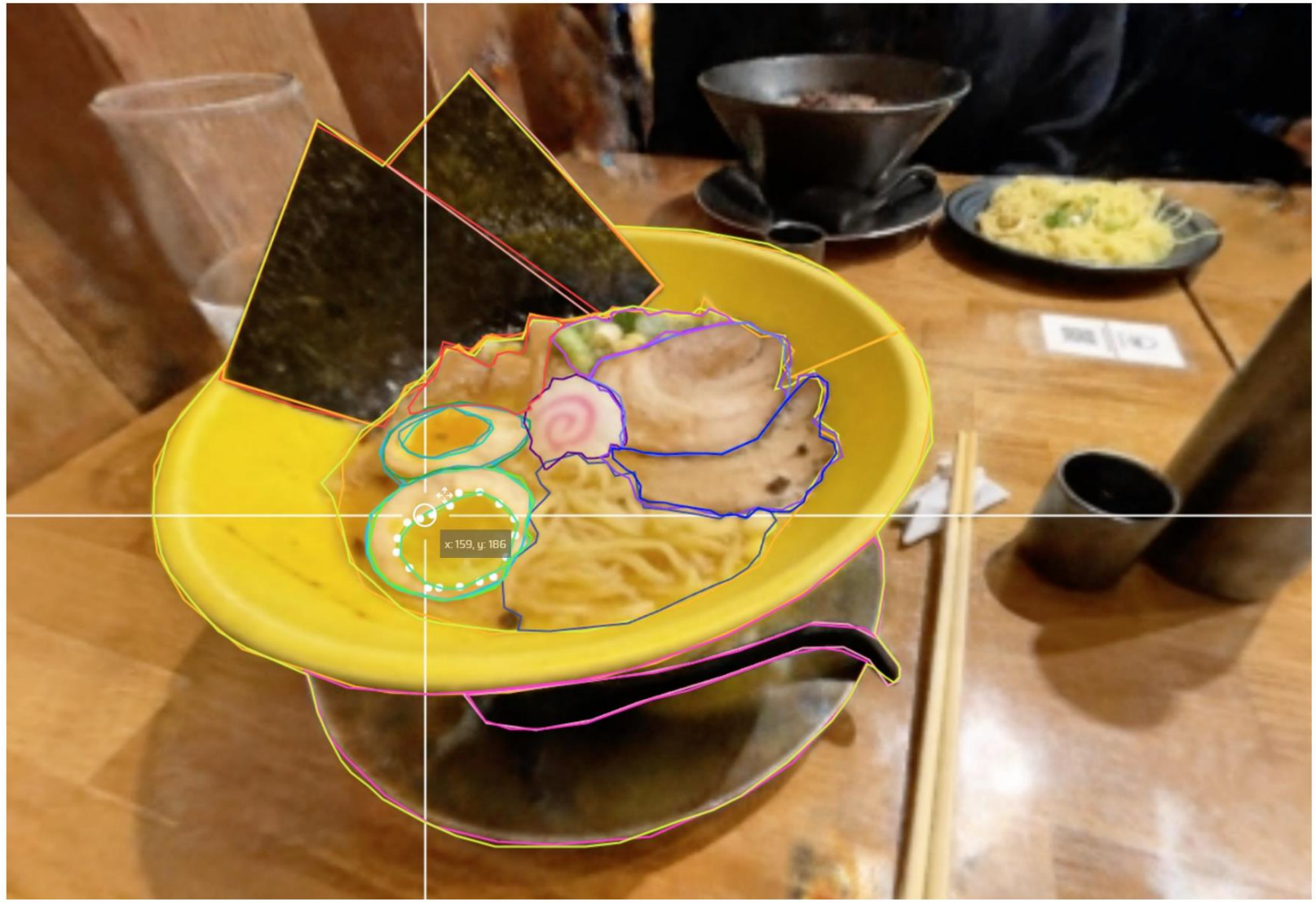
GARField → 2D Mask Generator → desired group not in mask → not in 3D

Uneven viewpoints → artificial group boundaries

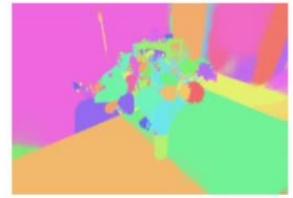
Multiple grouping within a single scale

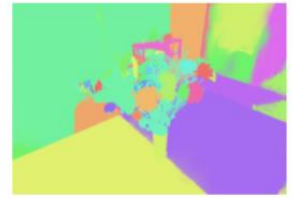
object parts of different sizes branch off the tree separately

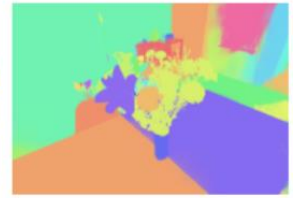

Tree Depth
Descending Node Size

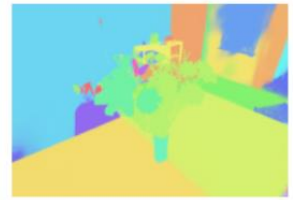

x: 159, y: 186

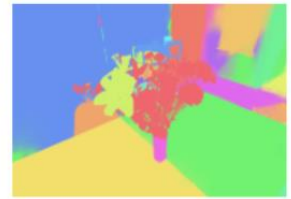
RGB (novel view)

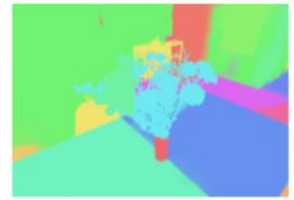


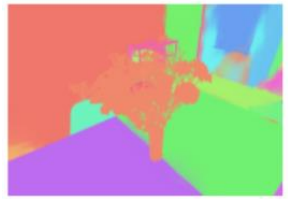


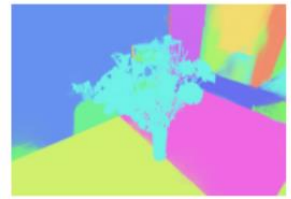


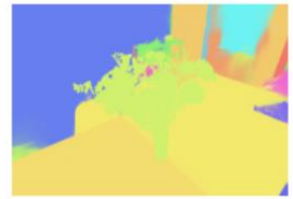


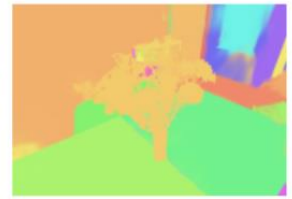


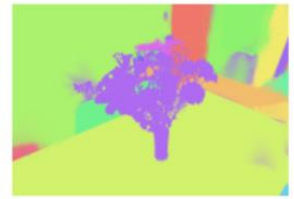


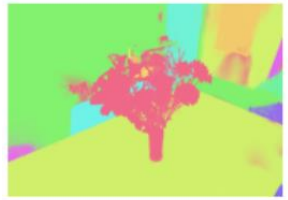


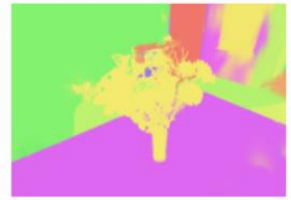


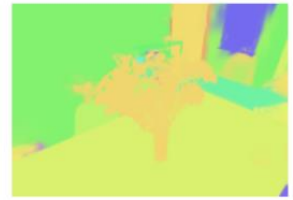


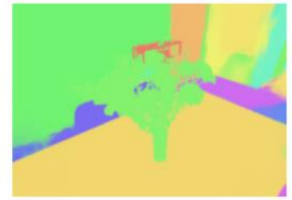


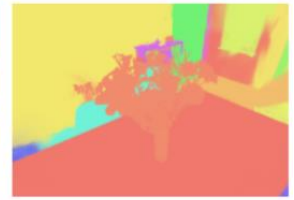


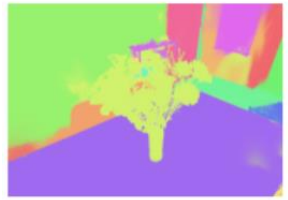


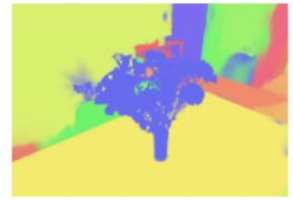


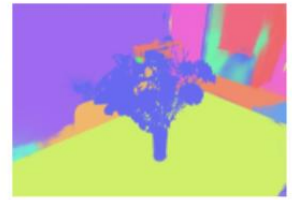


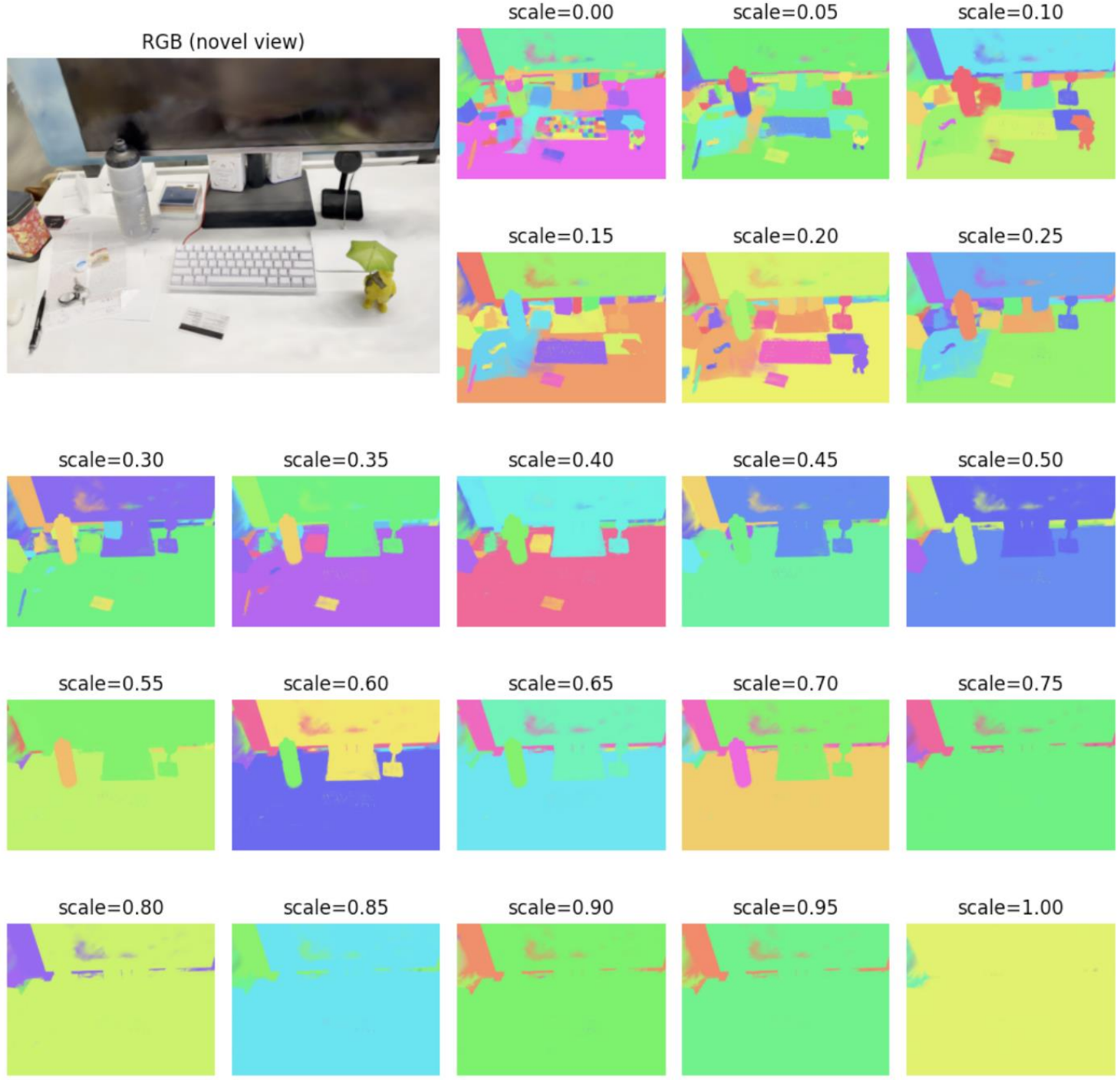








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RGB (novel view)

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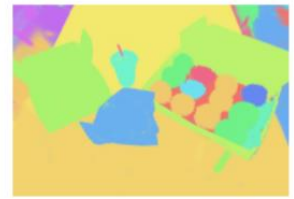

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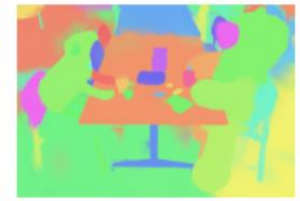
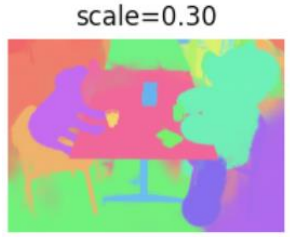
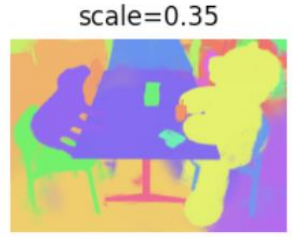
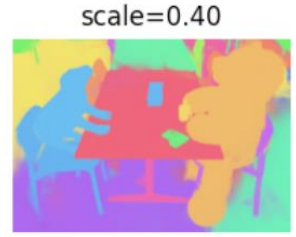
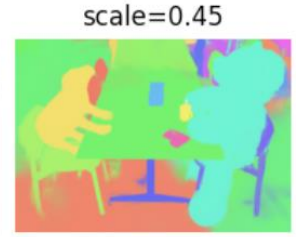
RGB (novel view)

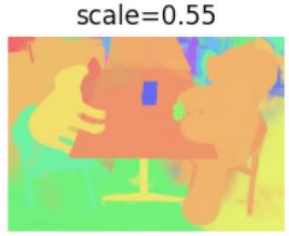


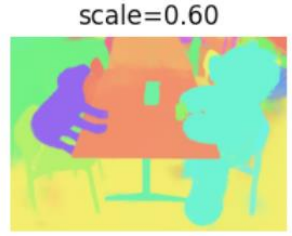


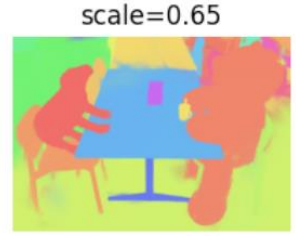


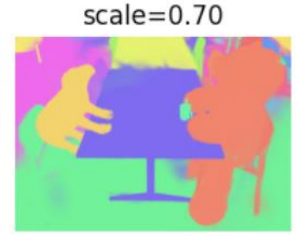


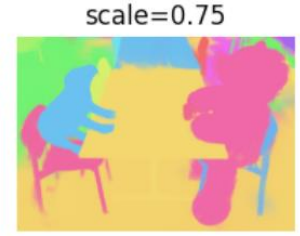


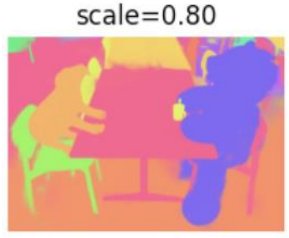


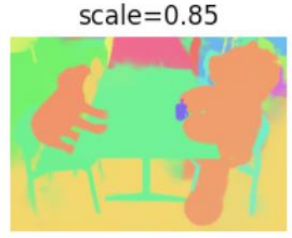


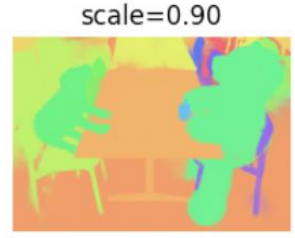


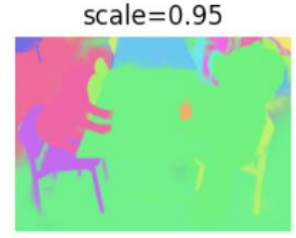


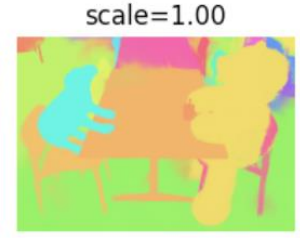












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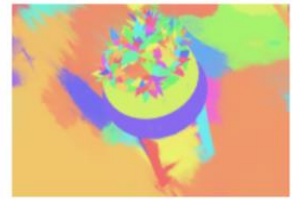

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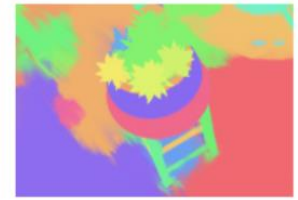

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scale=0.90

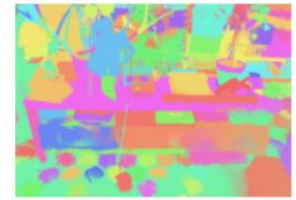
scale=0.95

scale=1.00

RGB (novel view)

scale=0.00

scale=0.05



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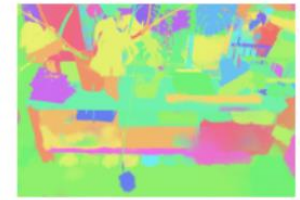

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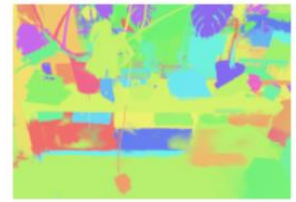

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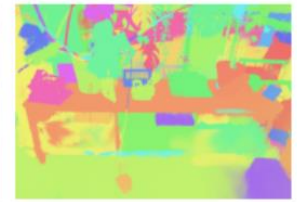

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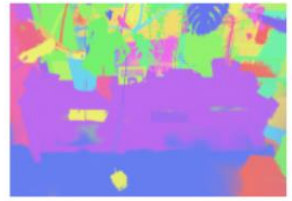
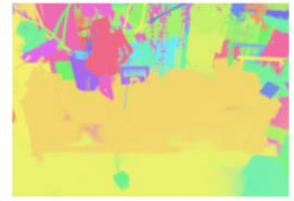
scale=0.30



scale=0.35

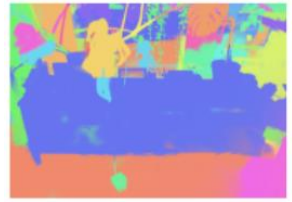


scale=0.40

scale=0.45

scale=0.50

scale=0.55



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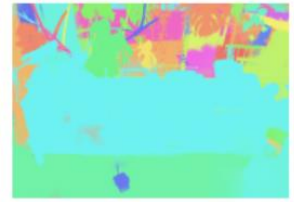
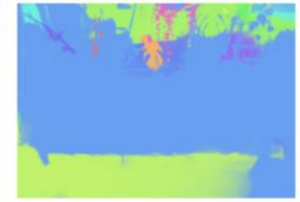


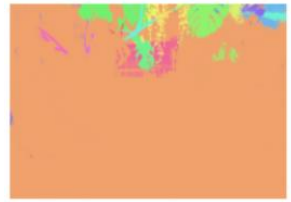
scale=0.65

scale=0.70

scale=0.75



scale=0.80

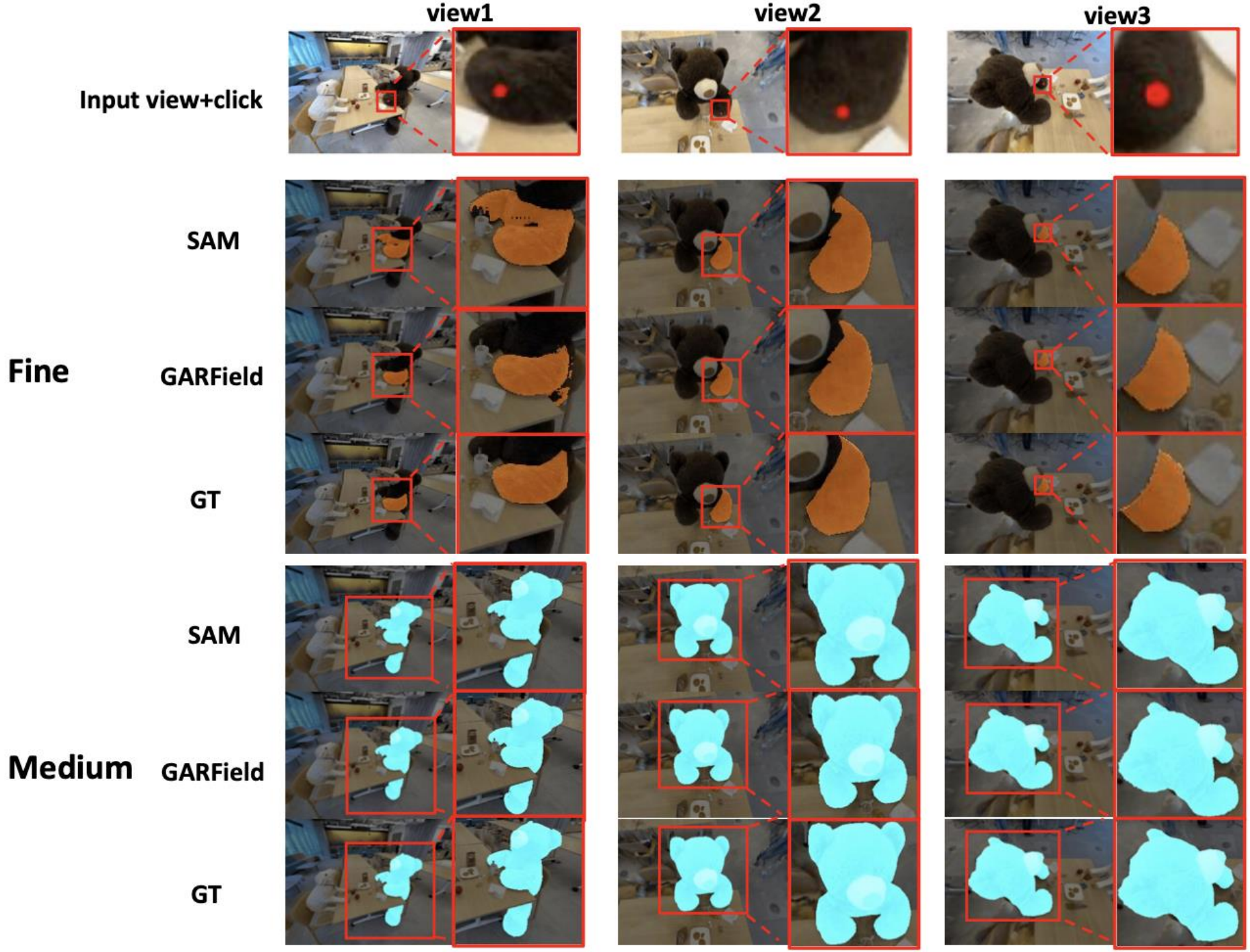


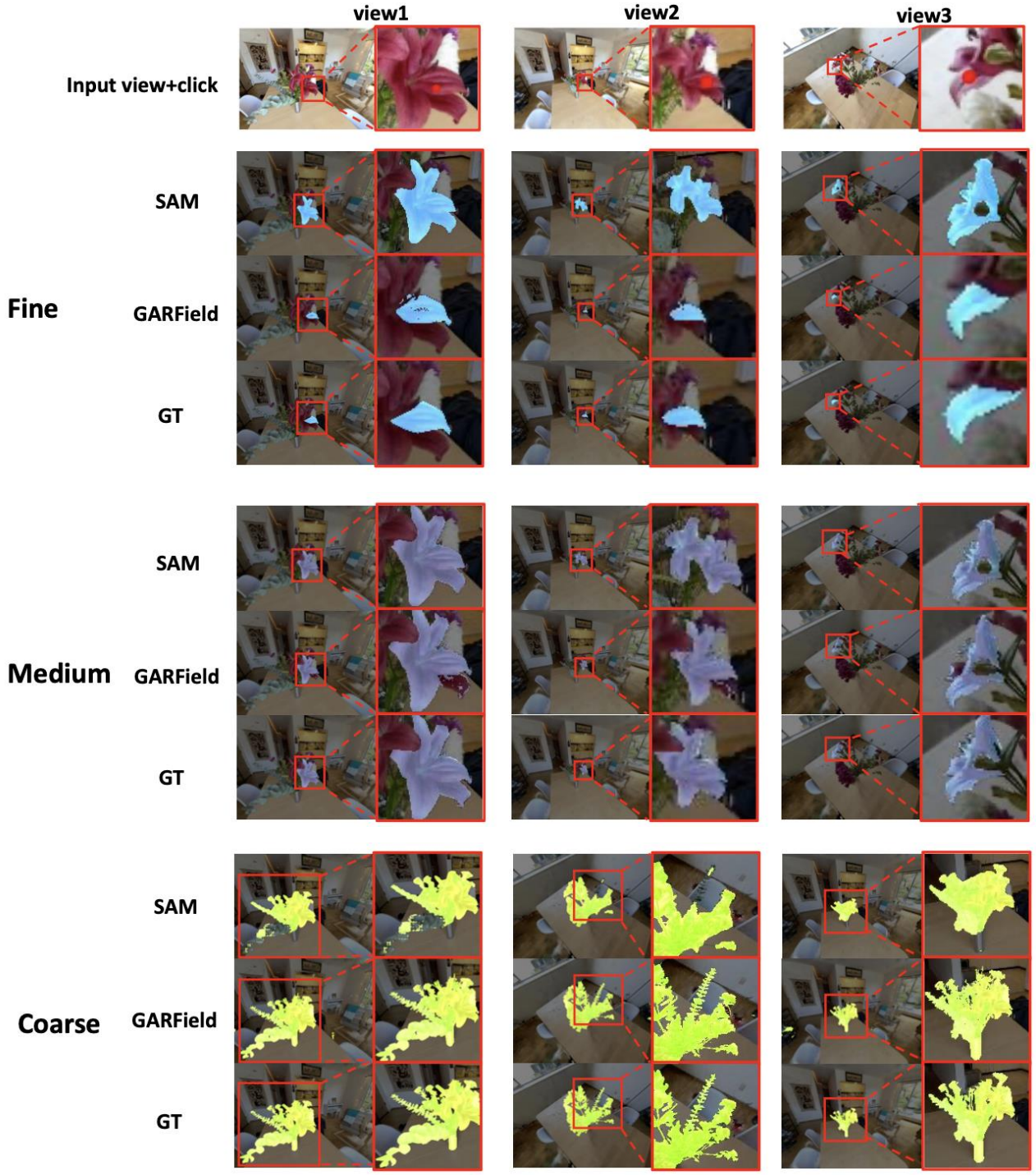
scale=0.85

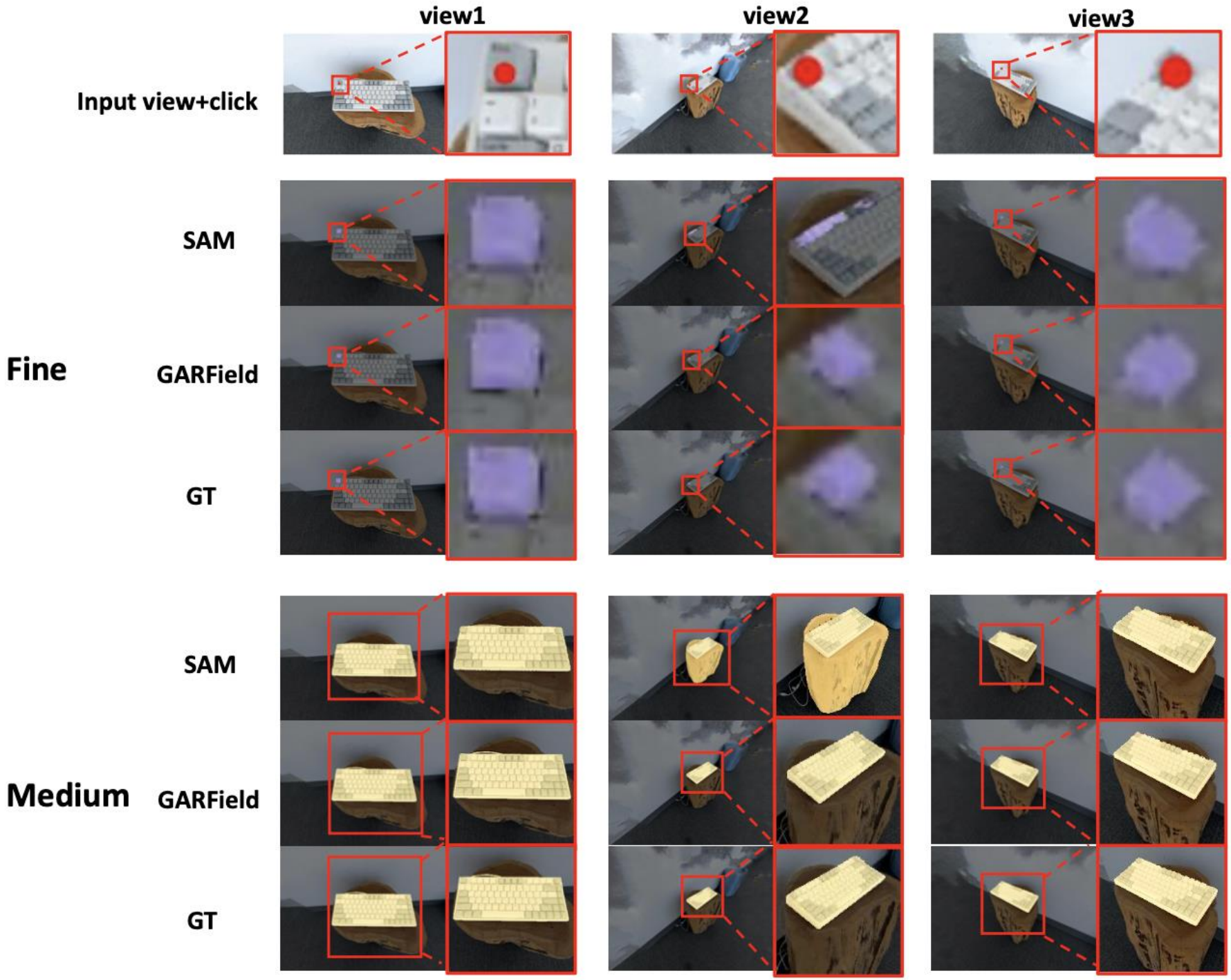
scale=0.90

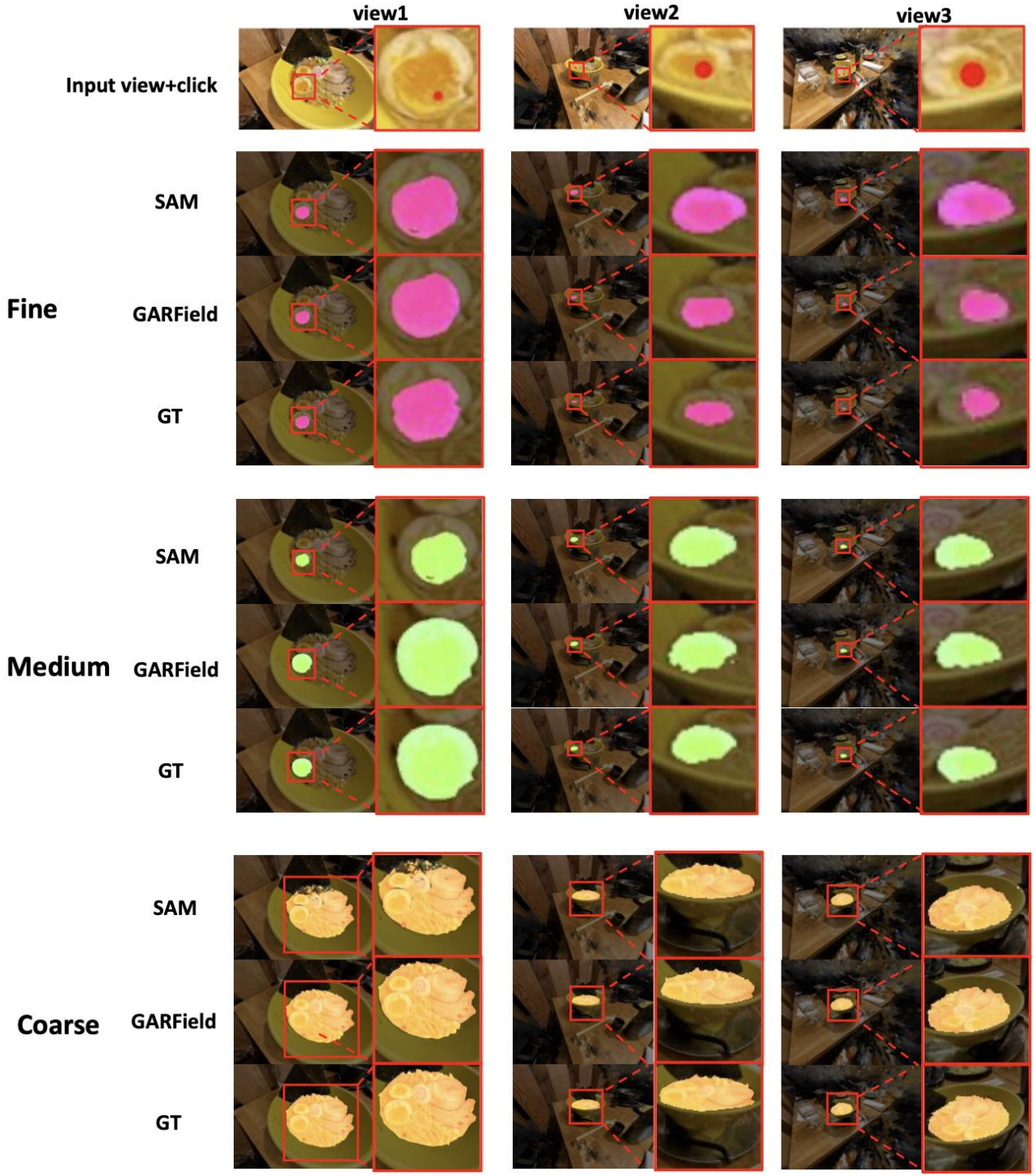
scale=0.95

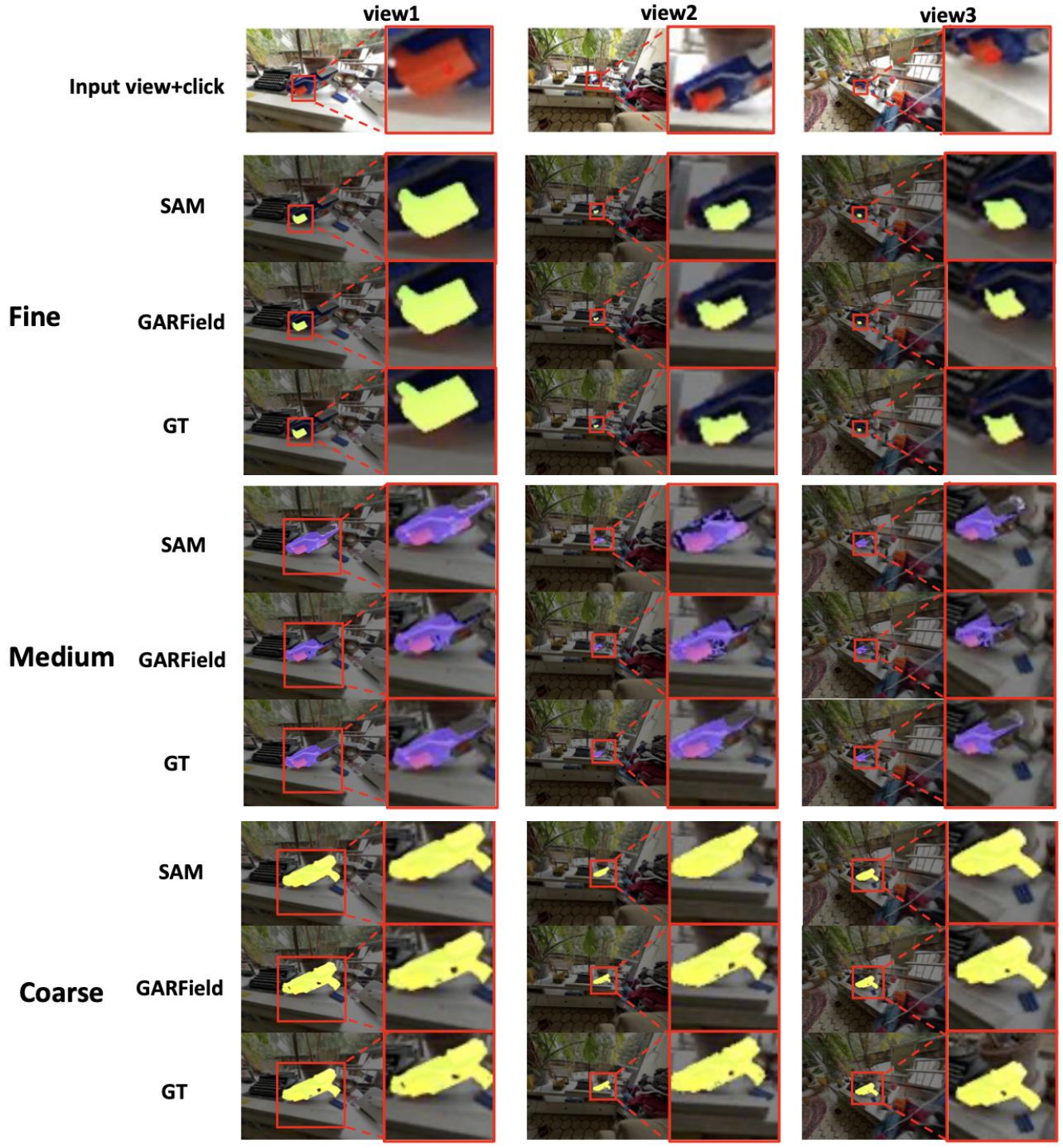
scale=1.00

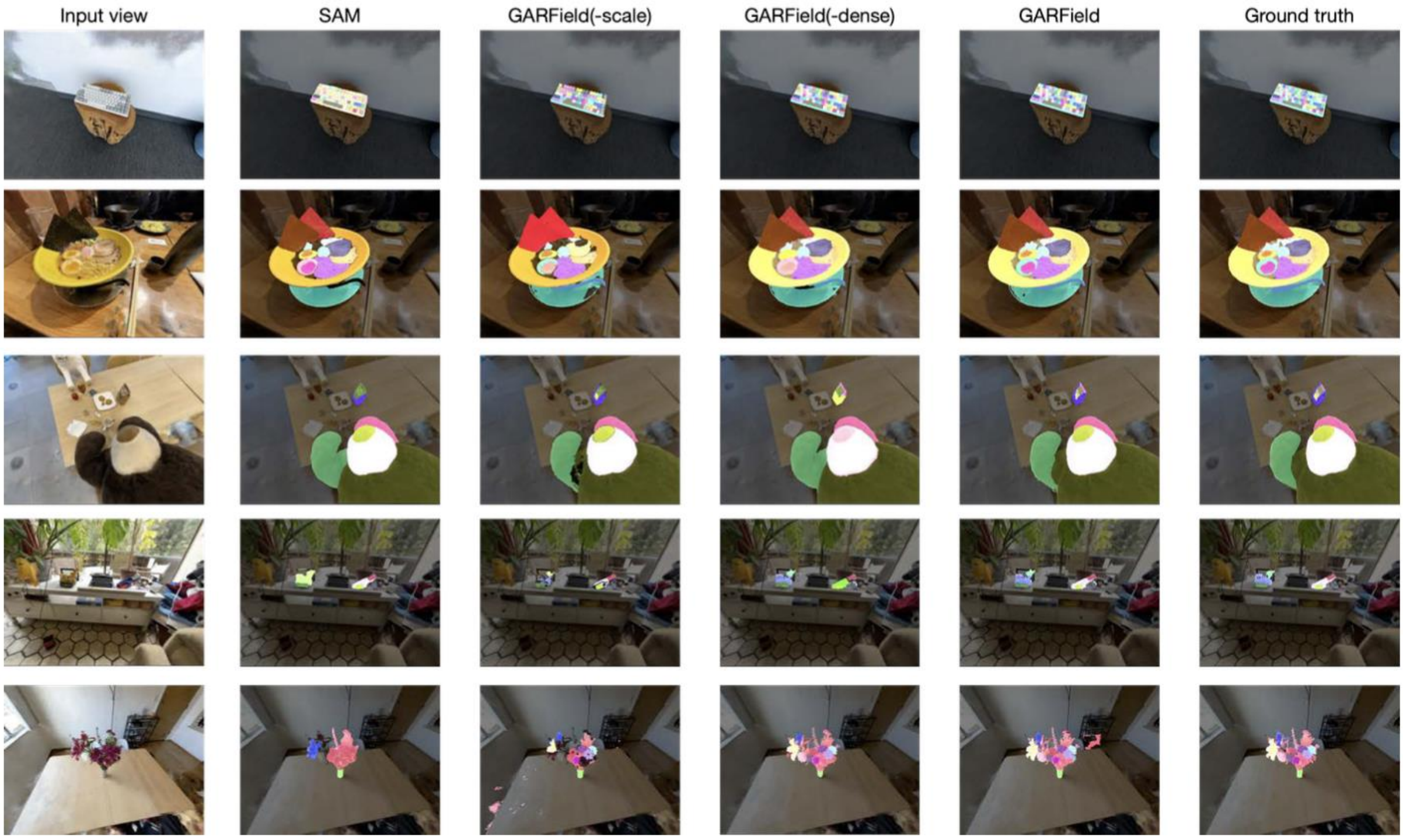

view1
view2
view3
Input view+click
Fine
SAM
GARField
GT
Medium
SAM
GARField
GT


view1
view2
view3
Input view+click
Fine
SAM
GARField
GT
Medium
SAM
GARField
GT
Coarse
SAM
GARField
GT


view1
view2
view3
Input view+click
Fine
SAM
GARField
GT
Medium
SAM
GARField
GT


view1
view2
view3
Input view+click
Fine
SAM
GARField
GT
Medium
SAM
GARField
GT
Coarse
SAM
GARField
GT


view1
view2
view3
Input view+click
Fine
SAM
GARField
GT
Medium
SAM
GARField
GT
Coarse
SAM
GARField
GT


Input view
SAM
GARField(-scale)
GARField(-dense)
GARField
Ground truth

Q&A

Source: https://www.garfield.studio/