

OLAF: A Plug-and-Play Framework for Enhanced Multi-object Multi-part Scene Parsing

Supplementary

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1. Incorporation of LDF on Different Architecture Types

1.1. U-Net

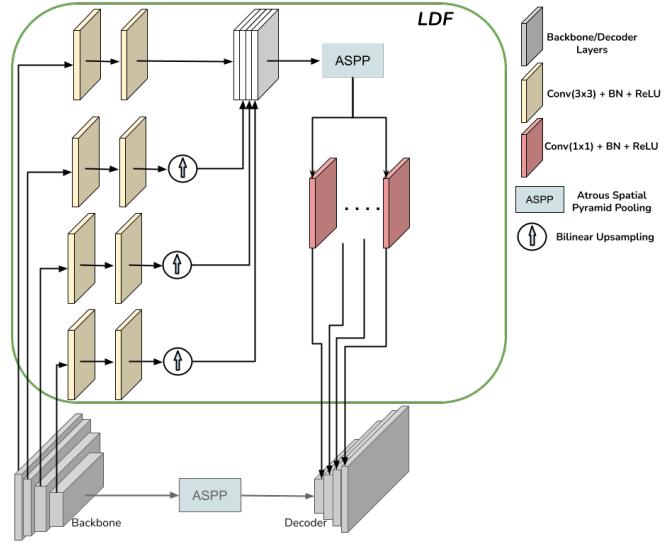


Figure 1. Incorporation of "LDF" in U-Net-like architectures

In U-Net-style architecture, LDF is embedded within each encoder layer, and its output is passed to the respective decoder layers (see Fig. 1).

1.2. Transformer

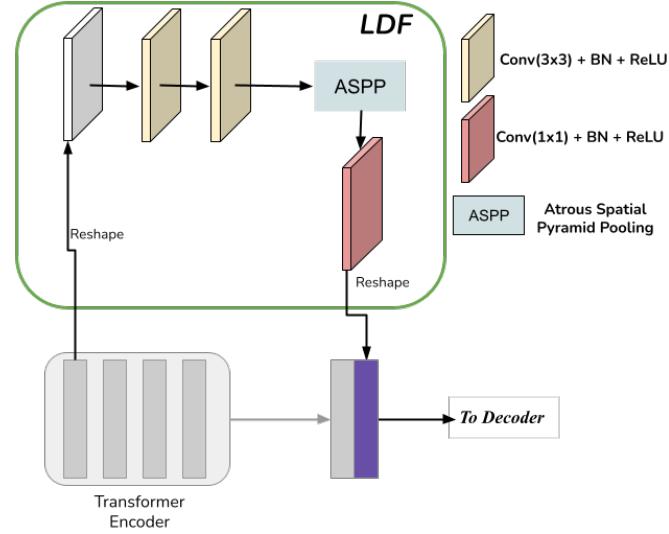


Figure 2. Incorporation of "LDF" in Transformer-like architectures

In Transformer-style architecture, we apply LDF solely to the first encoder block. Its output is directly merged with the encoder output and then passed to the decoder (see Fig. 2).

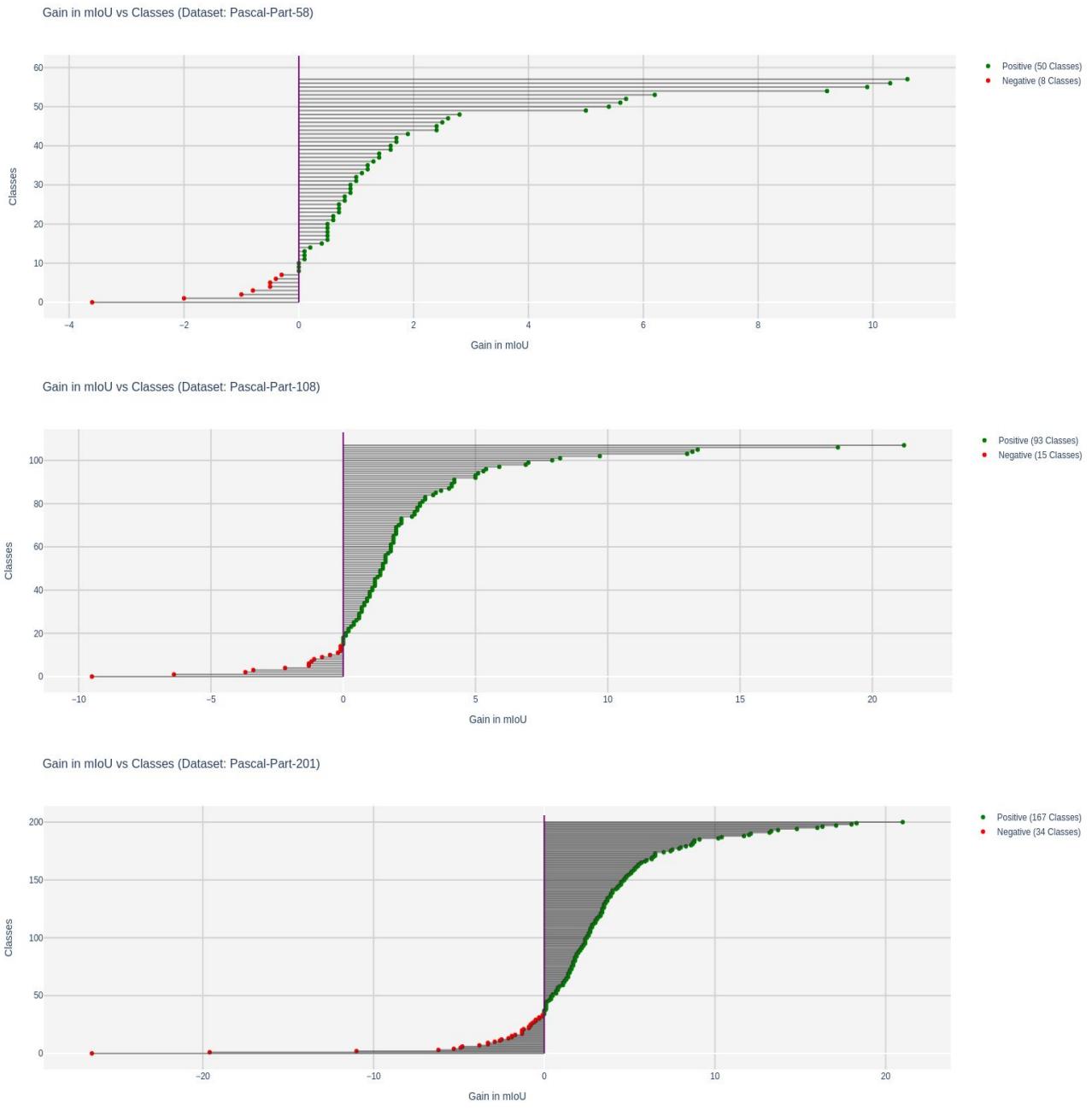


Figure 3. Gain in mIoU vs Classes across all Pascal-Part datasets. Choice of model is FLOAT (current SOTA across all Pascal-Part datasets)

2. Extraction of fg/bg and edge masks

We use pre-trained Deeplabv3+ to derive object segmentation masks, subsequently transformed into fg/bg masks (refer to **Sec 3.1** in the main paper). Additionally, for edge masks, we employ pretrained Holistically-Nested Edge Detection (HED) (refer to **Sec 3.1** in the main paper).

Note: Both networks (*Deeplabv3+ and HED*) remain frozen during OLA training.

3. Gain Analysis

In this section, we present the increase in mIoU in each class across all variants of Pascal-Part datasets. As depicted in Fig. 3, FLOAT paired with OLAF consistently enhances overall performance. Across all dataset variants, OLAF notably enhances the performance of **83% to 86%** of the classes. An intriguing finding reveals that in pascal-part-201, OLAF notably raises the mIoU by **over 10%** for 17 classes, and for some, the improvement is **over 20%**.

4. OLAF’s Robustness to Mask Noise

To examine the effect of mask noise on performance, we systematically add various amounts of random noise to the ground-truth masks during training and inference. From Figure 4, we see that performance does not degrade too drastically with increase in noise. We also see that the current quality of masks used in OLAF corresponds to 18.9% – 26.5% mask noise. Note that OLAF achieves significant performance gains (up to 4.0 mIoU) despite this level of segmentation and edge detection noise. More promisingly, the results in Figure 4 suggest that **better masks from future improvements in semantic edge detection and segmentation approaches by the research community would lead to even better results.**

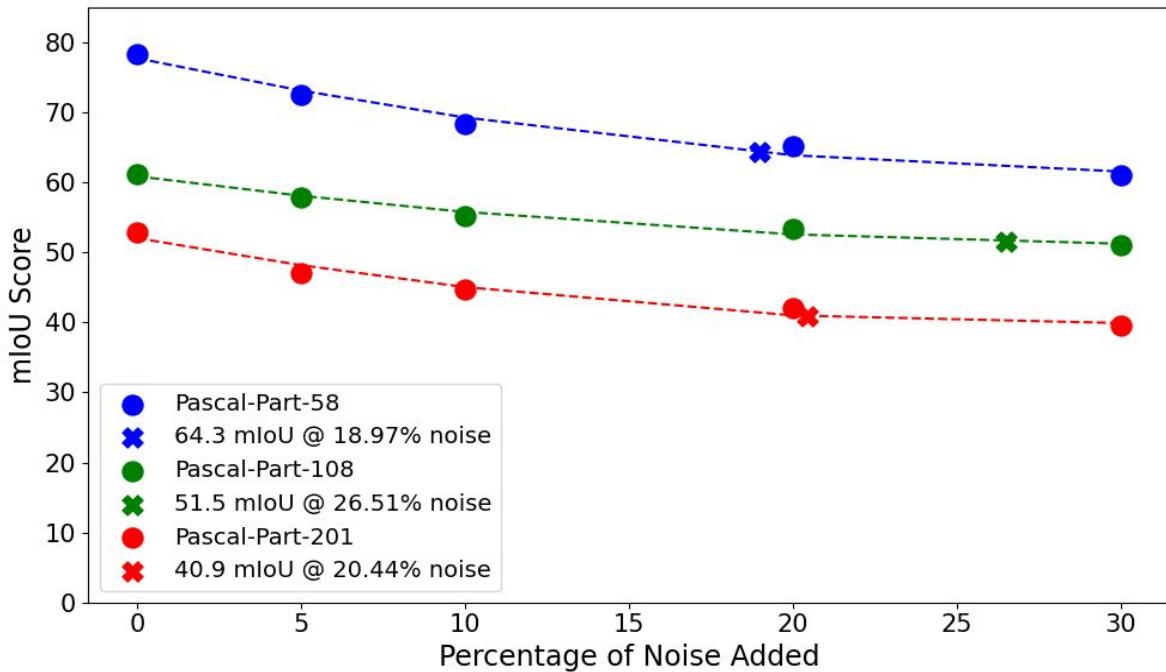


Figure 4. **Robustness of our approach to mask noise:** The plot depicts mIoU scores as a function of noise added to the ground-truth binary fg/bg and edge masks of different datasets. Noise levels of 0%, 5%, 10%, 20% and 30% were introduced by randomly flipping the corresponding percentage of pixel labels in the masks. Note that 0% noise level corresponds to using ground-truth masks during training and inference. OLAF achieves mIoU scores of 64.3 (part-58), 51.5 (part-108) and 40.9 (part-201), using HED edges which correspond to noise levels of 18.97, 26.51 and 20.44, respectively (represented by **x**'s in the figure).

5. Observations and Limitations

5.1. Observations

1. Models incorporated with our 3-step recipe (**OLAF**) produce better results.
2. OLAF improves segmentation of small/thin parts (**LDF**).
3. OLAF helps segmenting missing foreground areas (union of part/obj pixels) (**Foreground/background as auxiliary channel in input**).
4. OLAF helps in delineating boundaries between parts (**Edge as auxiliary channel in input**).

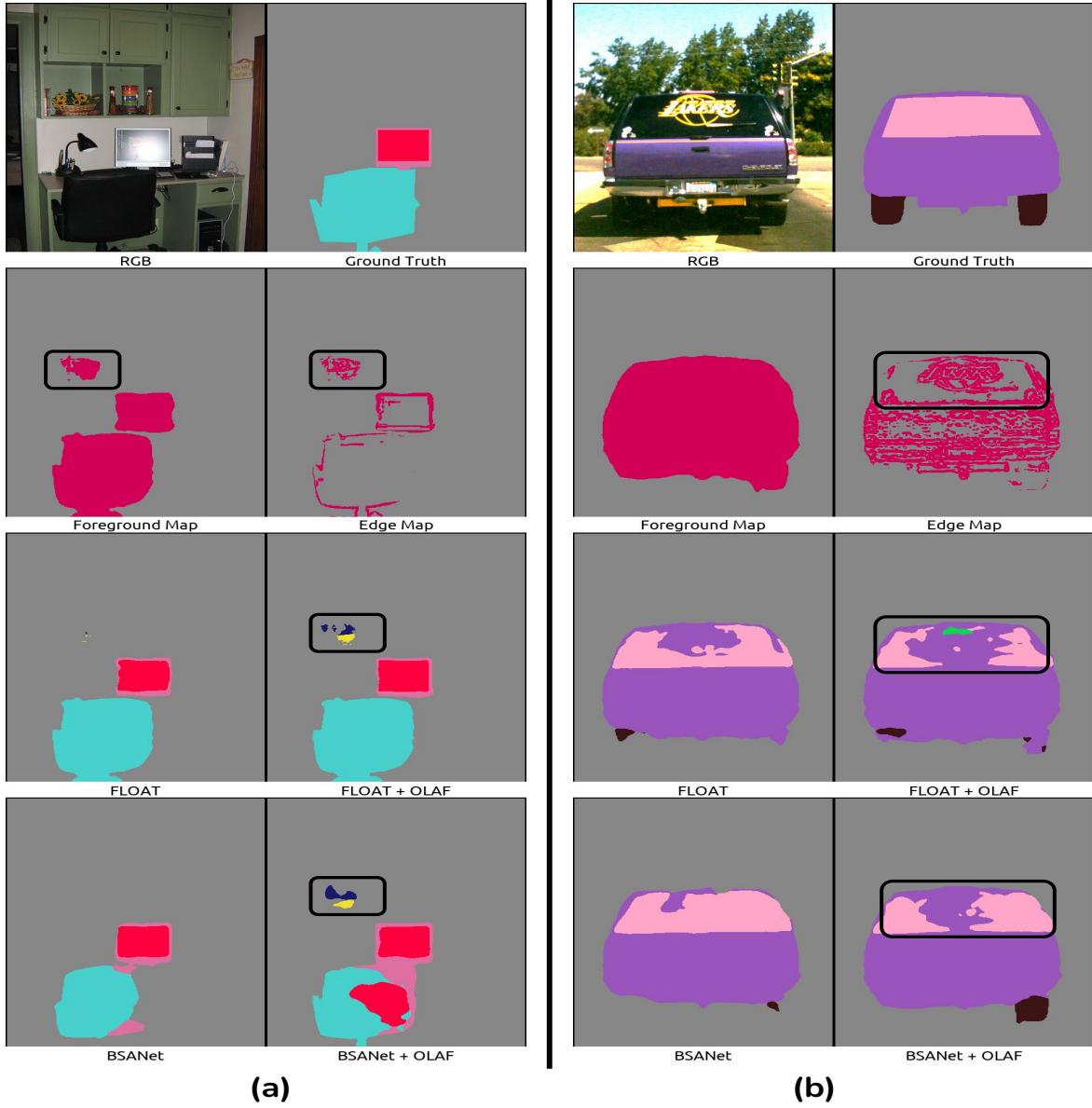


Figure 5. Results depicting the limitations of OLAF

5.2. Limitations

A limitation of OLAF stems from its dependence on the additional input channels. Poor-quality channel masks can affect segmentation results. As illustrated in Fig. 5(a), the noise present in fg/bg mask also propagates to the final results. A similar limitation can be seen in Fig. 5(b), where noisy edge mask affected the final results.

6. Illustration of OLAF's mechanism along with existing SOTA (FLOAT)

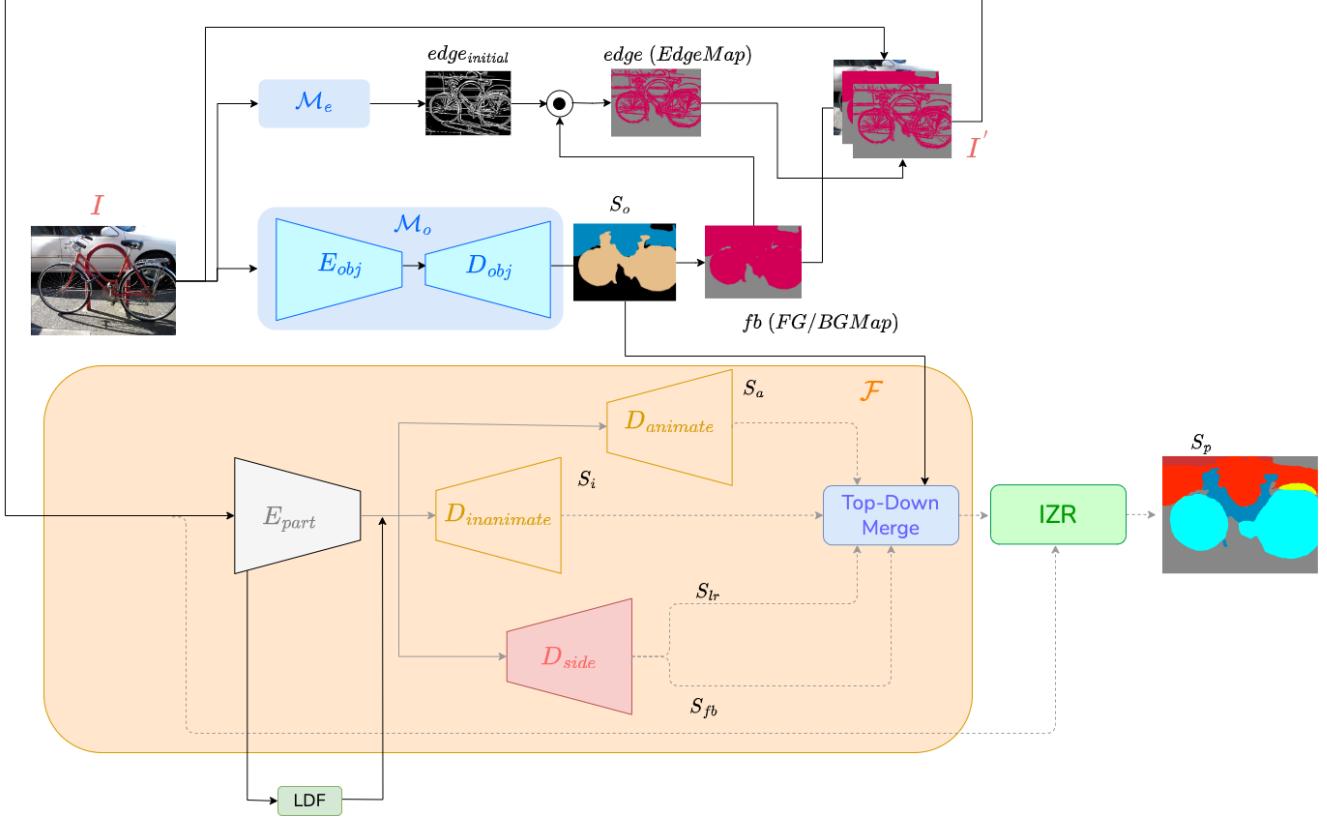


Figure 6. An illustration of OLAF's operations and how it interfaces with FLOAT [?] - the current SOTA architecture. FLOAT's core module is denoted as \mathcal{F} - see [?] for additional details. Refer to main paper for additional details on OLAF's modules and outputs. I is input 3-channel RGB image and I' is the augmented 5-channel input to FLOAT.

7. Edge Choices

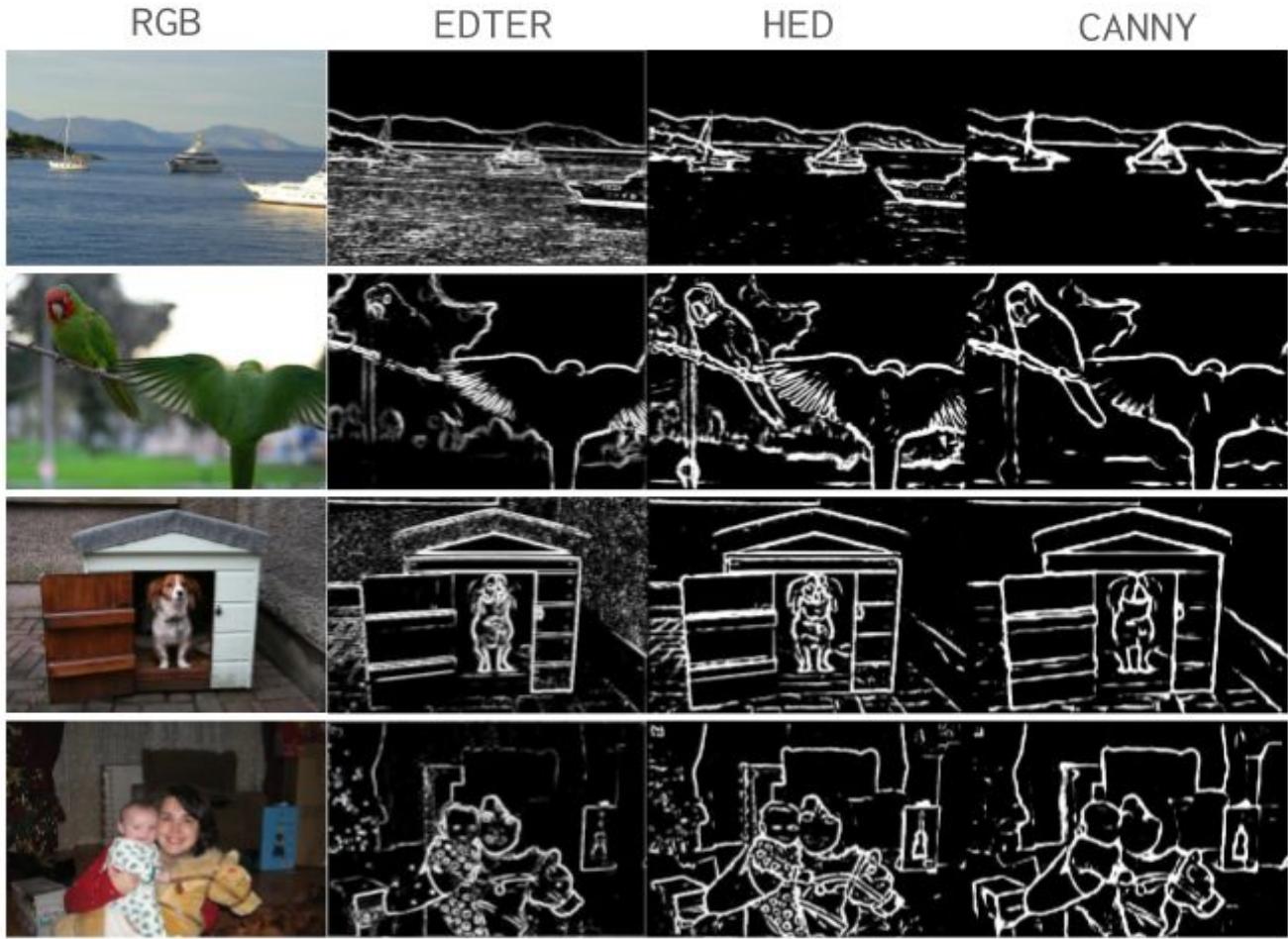


Figure 7. An illustration of various edge detection methods we have experimented with. Canny edge maps lack many semantically important edges, while EDTER maps tend to be overly dense. Holistically-Nested Edge Detection (HED) represents the optimal balance we discovered, achieving neither excessive density nor sparseness while preserving semantically meaningful cues.

8. Qualitative comparison on fg/bg mask

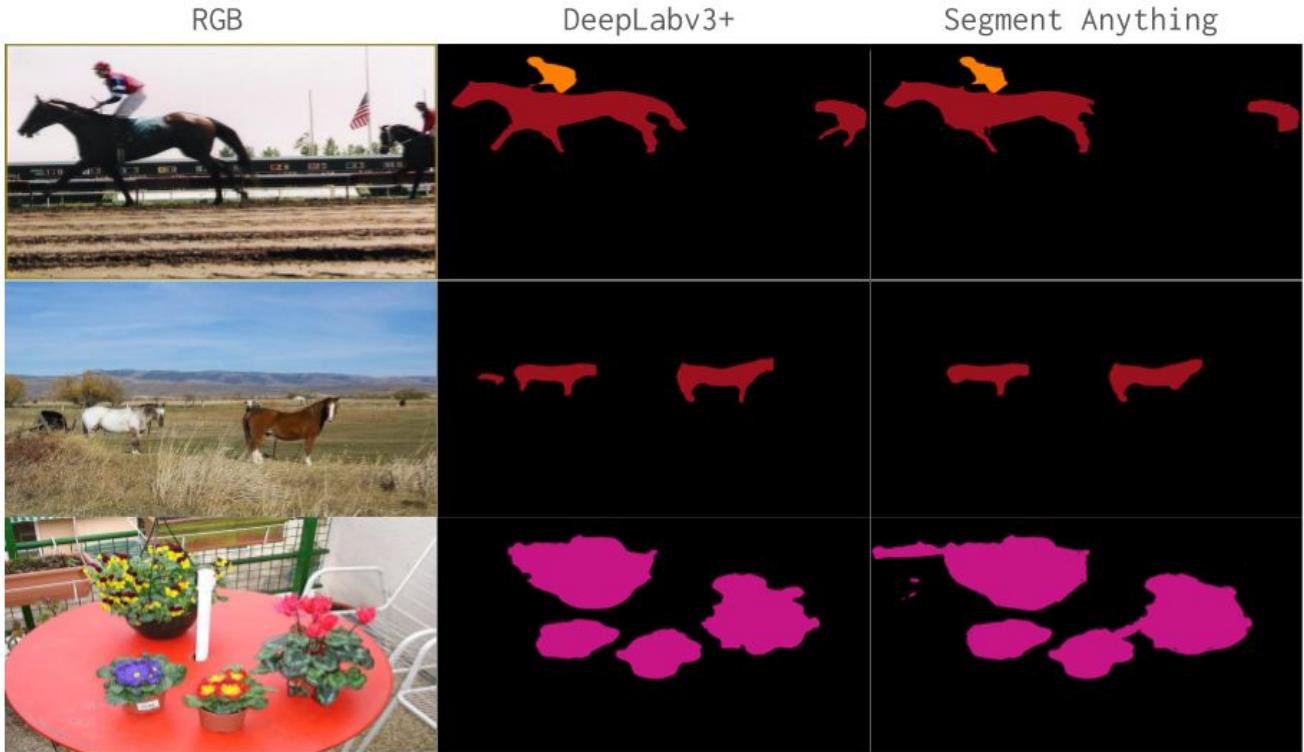


Figure 8. An illustration of scenarios where the Segment Anything model struggles, ultimately resulting in low-quality foreground/background masks. As depicted in the figure, SAM fails to accurately segment certain object categories, such as potted plants, and tends to overlook small parts such as the tails, legs, hand and other similar classes.

9. Qualitative Results

9.1. Pascal-Part-58

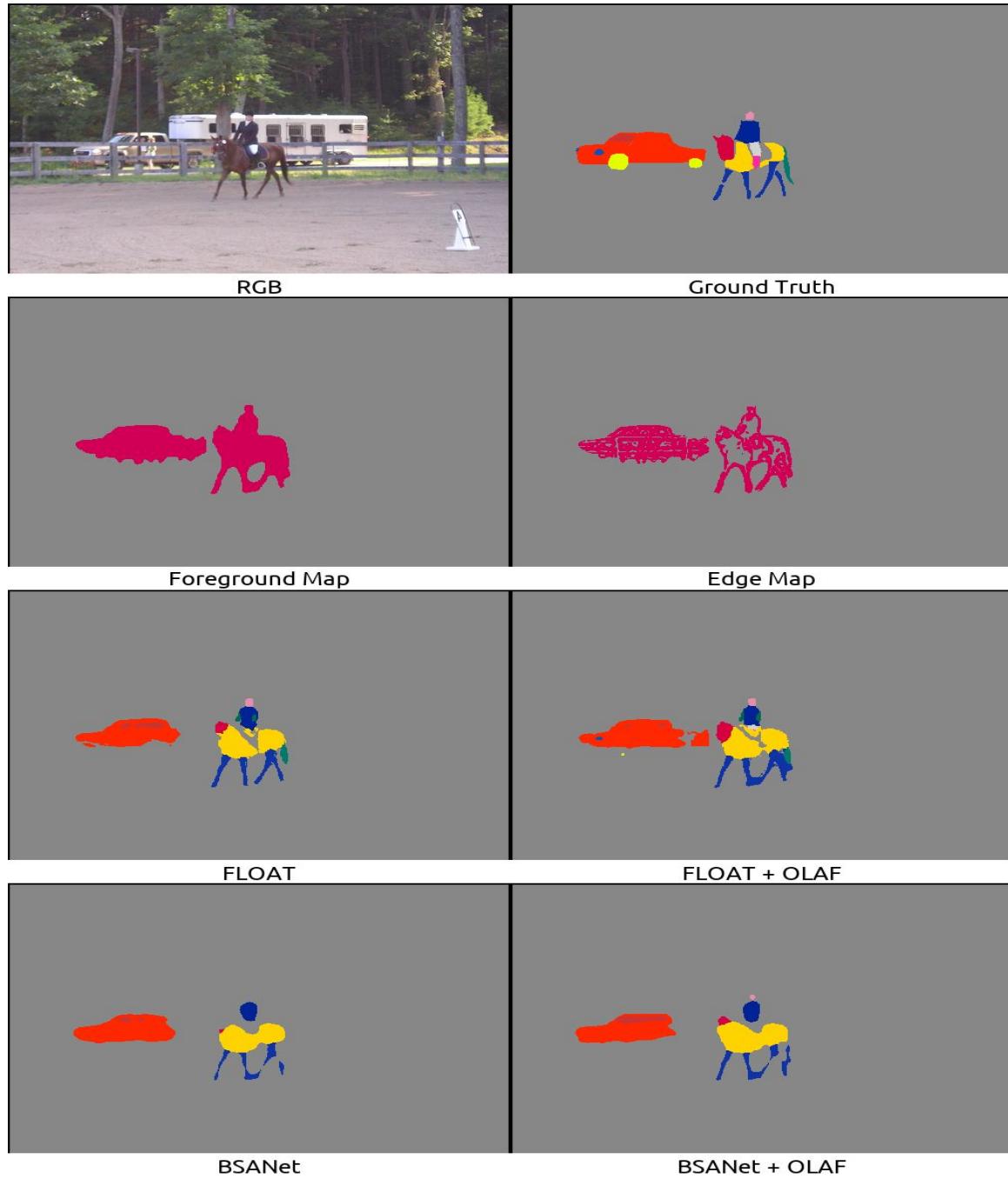


Figure 9

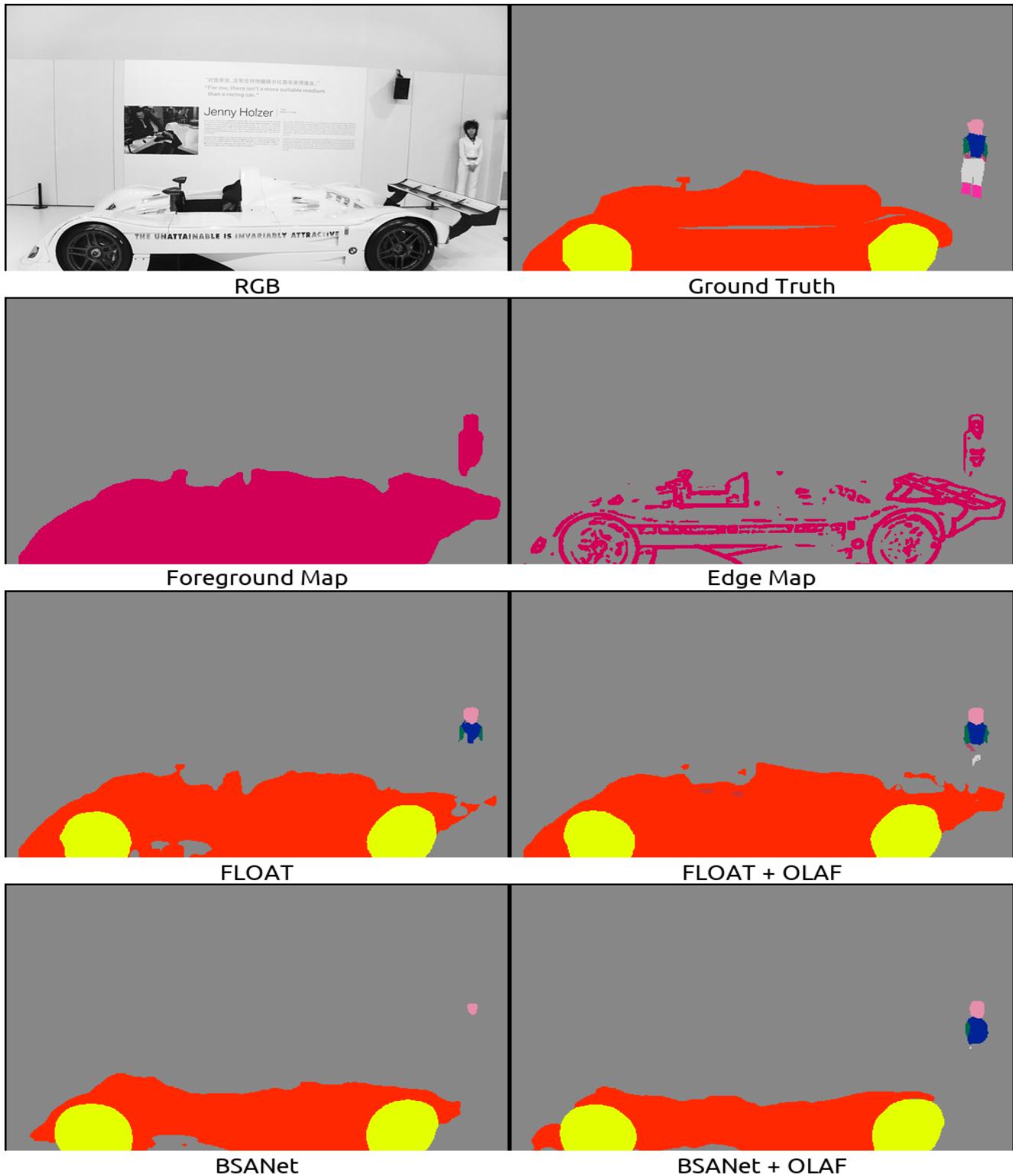


Figure 10



RGB



Ground Truth



Foreground Map



Edge Map

FLOAT



FLOAT + OLAF

BSANet



BSANet + OLAF

Figure 11



Figure 12

9.2. Pascal-Part-108



Figure 13

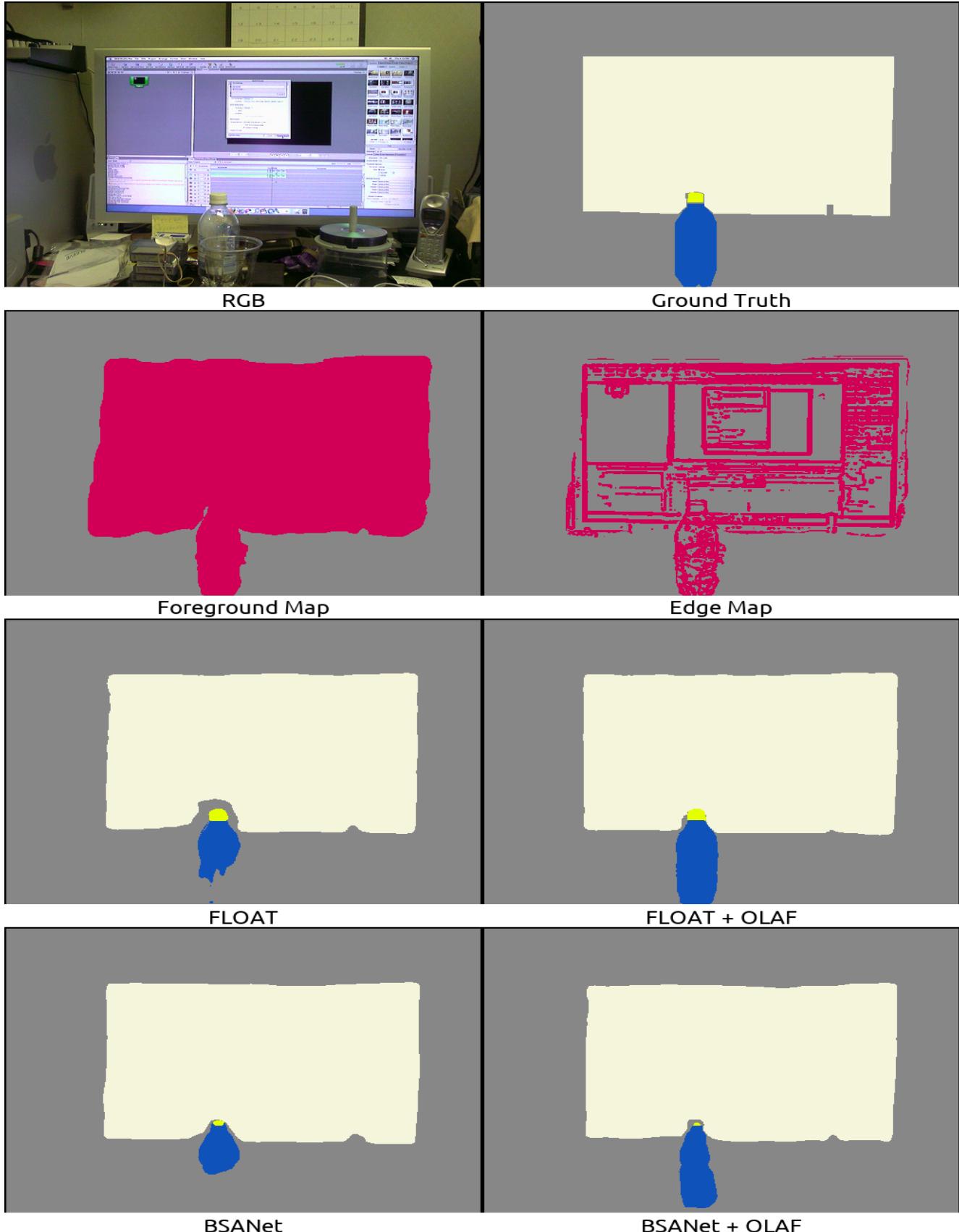


Figure 14

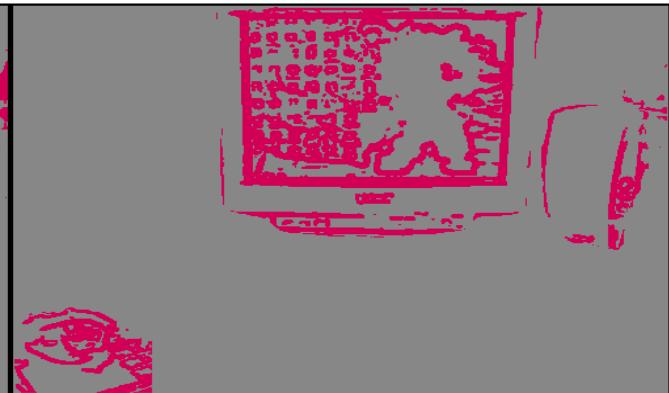


RGB

Ground Truth



Foreground Map



Edge Map



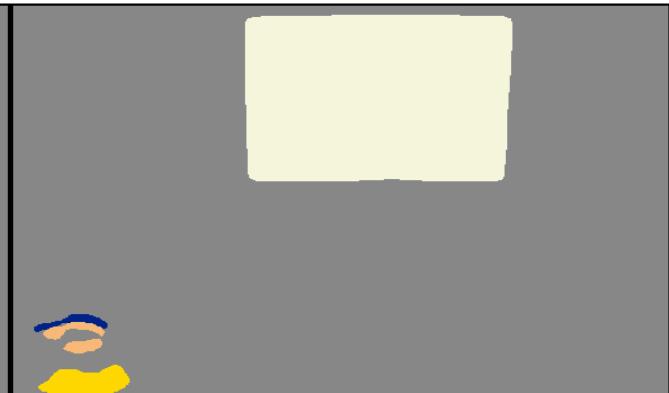
FLOAT



FLOAT + OLAF



BSANet



BSANet + OLAF

Figure 15



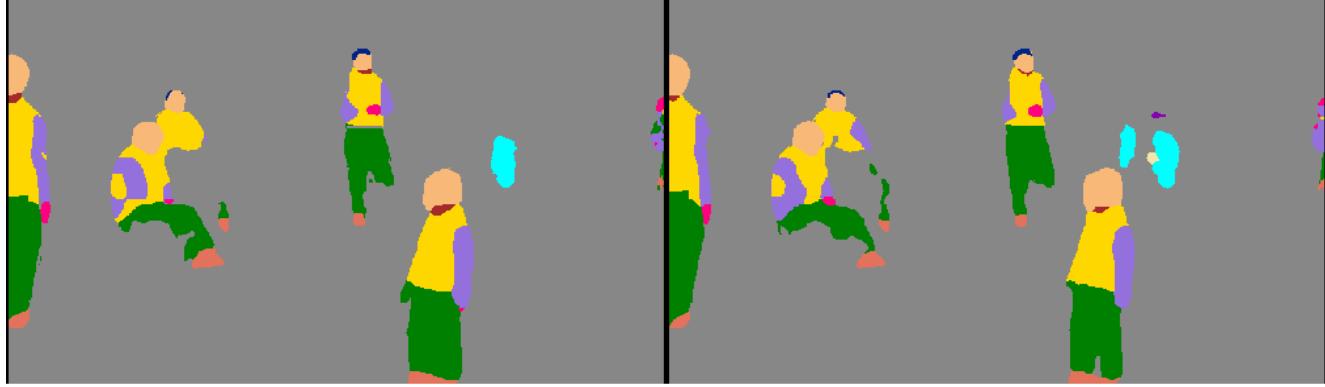
RGB

Ground Truth



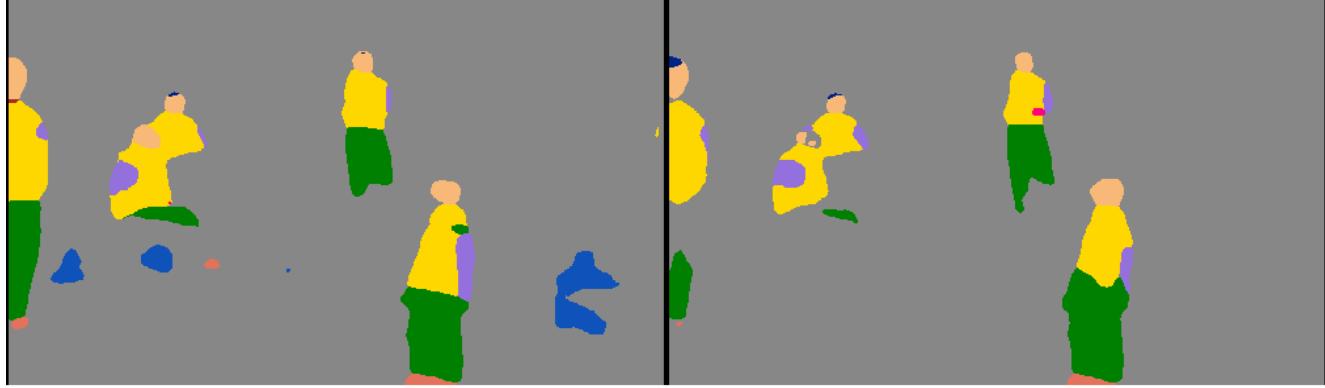
Foreground Map

Edge Map



FLOAT

FLOAT + OLAF



BSANet

BSANet + OLAF

Figure 16

9.3. Pascal-Part-201

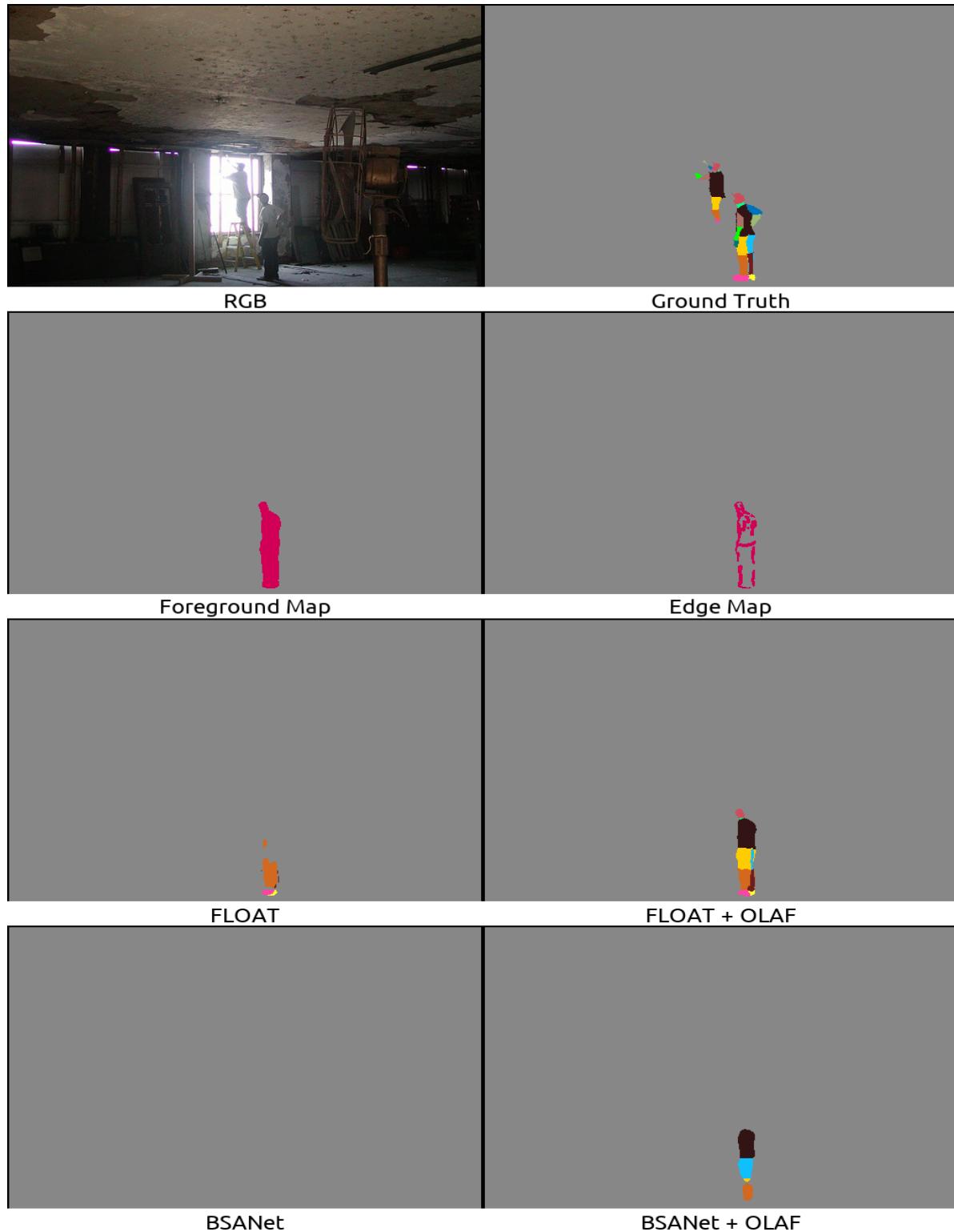


Figure 17

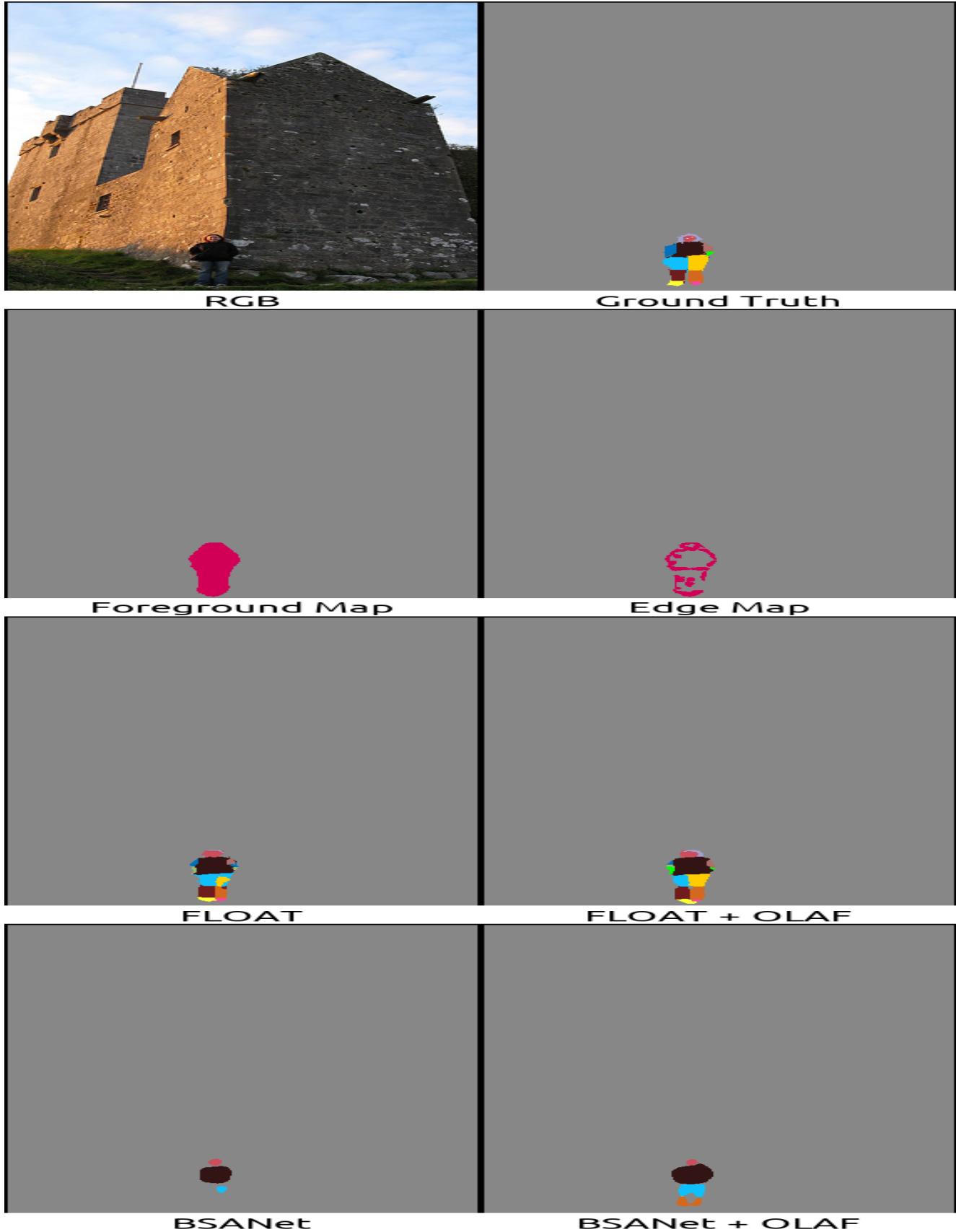


Figure 18

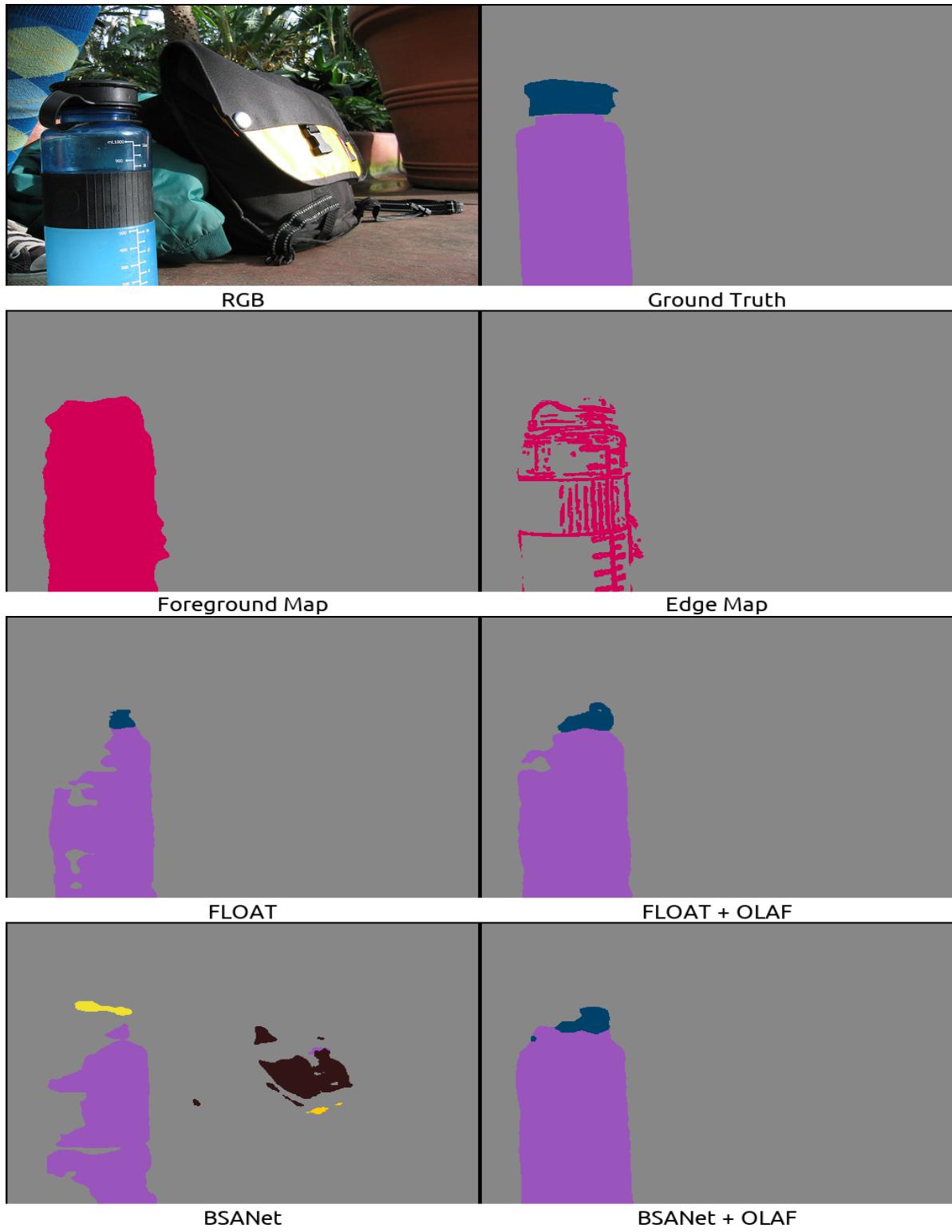


Figure 19

10. Quantitative Results

10.1. Pascal-Part-58 | mIoU

Category	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Background	90.1	93.6	91.6	92.1	92.7	93.3	92.9	93.6	93.1	94.3
Aeroplane Body	65.3	69.8	70.0	71.1	69.6	71.2	70.2	72.6	72.1	75.8
Aeroplane Engine	24.9	28.4	29.1	29.5	25.7	27.1	29.7	31.4	30.5	32.5
Aeroplane Wing	33.9	36.2	38.3	38.7	34.2	35.6	37.6	40.4	39.5	46.2
Aeroplane Stern	56.3	56.7	59.2	59.9	57.2	58.1	58.3	59.6	59.2	60.8
Aeroplane Wheel	43.8	57.7	53.2	53.9	46.8	48.1	45.7	56.0	55.5	55.1
Bicycle Wheel	77.8	78.3	78.0	79.1	81.3	81.4	81.2	81.6	81.2	82.9
Bicycle Body	48.4	53.1	53.4	54.4	51.5	52.9	53.0	55.6	55.1	58.2
Bird Head	64.6	72.7	74.0	74.7	71.1	72.2	73.7	74.7	74.4	75.2
Bird Wing	34.1	40.5	39.7	39.9	38.6	37.2	41.6	38.0	37.0	39.2
Bird Leg	28.9	33.7	34.8	34.9	28.7	29.3	30.1	32.5	31.5	33.9
Bird Torso	65.5	68.9	70.9	71.2	69.5	70.1	69.2	70.4	69.4	71.3
Boat	54.4	71.3	60.2	69.9	70.0	73.2	75.3	76.7	76.3	77.9
Bottle Cap	32.7	36.0	29.8	32.7	33.9	35.2	31.9	37.6	37.2	38.1
Bottle Body	68.8	76.3	68.6	74.8	77.6	78.4	73.8	79.2	78.3	80.3
Bus Window	72.7	75.6	74.8	76.7	75.4	76.3	76.7	78.6	78.2	79.1
Bus Wheel	55.3	58.3	57.1	59.2	58.1	59.6	61.0	61.0	60.1	65.2
Bus Body	74.8	77.6	78.3	79.3	79.9	81.8	80.3	82.0	81.3	84.1
Car Window	63.6	68.5	68.1	68.8	64.8	66.6	70.7	70.8	70.1	70.1
Car Wheel	64.8	69.9	68.5	70.2	70.3	71.2	73.7	74.2	73.3	76.9
Car Light	46.2	55.1	53.7	56.2	48.4	50.5	54.6	60.2	59.5	60.3
Car Plate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Car Body	72.1	77.2	77.0	77.3	77.6	78.8	79.0	79.9	79.5	80.9
Cat Head	80.2	81.4	83.7	84.2	83.8	83.9	85.7	85.3	84.9	86.8
Cat Leg	48.6	50.1	50.1	50.2	49.4	50.2	51.7	51.2	50.7	54.2
Cat Tail	41.2	43.0	48.8	46.2	46.0	45.2	45.5	46.3	45.8	49.2
Cat Torso	70.3	70.0	72.6	72.9	73.8	74.2	73.6	74.1	73.6	75.9
Chair	35.4	42.9	36.5	49.2	51.4	55.3	59.6	59.7	59.0	61.6
Cow Head	74.3	75.4	76.4	77.1	80.7	80.1	80.9	80.1	79.4	83.2
Cow Tail	0.0	0.0	7.9	10.2	8.1	14.2	18.3	23.3	22.6	25.8
Cow Leg	46.1	53.0	53.4	54.7	53.5	53.8	57.0	56.0	55.2	58.2
Cow Torso	67.9	72.5	73.5	73.9	77.1	76.5	76.7	77.4	76.2	79.2
Dining Table	43.0	52.2	43.7	49.2	51.3	56.2	58.2	58.3	57.4	60.2
Dog Head	78.7	79.3	82.5	82.7	85.0	85.2	84.3	84.8	84.6	86.4
Dog Leg	48.1	50.5	53.8	53.1	53.8	53.9	53.8	54.4	53.4	55.8
Dog Tail	27.1	30.5	31.3	32.5	31.4	32.0	37.3	35.3	34.5	38.2
Dog Torso	63.6	63.6	65.7	65.9	68.0	68.6	67.3	68.2	67.8	69.2
Horse Head	74.7	72.8	76.6	75.2	73.9	73.0	81.6	81.3	80.3	84.3
Horse Tail	47.0	48.4	51.0	50.6	50.4	50.9	52.2	51.7	51.6	57.9
Horse Leg	55.2	60.5	61.6	61.8	59.3	61.2	60.3	61.7	61.4	61.9
Horse Torso	71.3	76.2	74.9	76.4	73.9	75.2	77.2	78.1	77.6	78.8
Motorbike Wheel	72.9	71.9	71.6	72.2	73.5	74.4	76.3	76.9	76.6	76.3
Motorbike Body	64.1	69.7	71.5	71.8	74.3	75.2	75.0	76.2	75.8	76.9
Person Head	82.5	84.7	85.0	86.2	84.7	84.8	84.2	84.4	83.5	86.3
Person Torso	65.3	68.3	68.2	68.9	67.0	67.3	68.6	69.4	68.7	70.1
Person Lower Arm	46.9	50.6	52.0	52.1	48.6	48.9	51.8	52.3	51.5	50.3
Person Upper Arm	51.5	52.3	54.4	54.1	52.4	55.1	54.6	55.7	55.3	54.2
Person Lower Leg	38.6	41.7	43.5	43.4	40.2	41.2	42.4	42.9	42.5	43.2
Person Upper Leg	43.8	46.3	47.4	47.1	44.5	46.3	47.4	48.4	47.9	49.2
Potted Plant Pot	47.3	57.4	53.5	57.8	56.0	58.4	50.8	60.0	59.7	66.2
Potted Plant Plant	52.4	65.1	56.6	59.2	56.4	59.9	58.9	65.1	64.6	66.4
Sheep Head	60.9	64.3	65.4	68.3	70.8	71.1	70.6	72.2	71.8	72.9
Sheep Leg	8.6	20.0	11.7	16.2	14.3	17.2	24.4	26.9	26.1	28.3
Sheep Torso	68.3	70.8	71.6	72.4	75.6	75.3	76.0	76.7	76.0	77.8
Sofa	43.2	55.6	43.1	48.0	56.1	60.5	69.1	69.1	68.4	70.8
Train	76.6	85.7	82.2	85.7	85.0	85.1	86.0	87.6	87.2	88.9
TV Screen	69.5	80.6	73.1	77.3	77.0	78.4	72.0	81.9	81.5	85.3
TV Frame	44.4	57.7	49.8	54.6	54.1	54.3	47.3	57.9	57.1	59.2

10.2. Pascal-Part-58 | $mIoU_{small}$

Object	FLOAT	FLOAT+O
background	-	-
aeroplane	32.1	33.5
bicycle	30	33.2
bird	45.3	47.6
boat	19.4	21.2
bottle	41.7	45.9
bus	43.8	47.1
car	37.5	38.6
cat	42.1	45.3
chair	39.2	42.8
cow	25.3	28.2
diningtable	32.6	36.1
dog	29.5	32.7
horse	41.7	45.2
motorbike	29.3	32.9
person	41.3	43.2
pottedplant	54.6	55.9
sheep	52.8	55.5
sofa	49.5	53.8
train	21.1	24.4
tvmonitor	52.2	55.6

10.3. Pascal-Part-108 | mIoU

Category	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Background	90.2	93.8	91.8	92.3	92.7	93.1	92.9	93.6	92.1	94.5
Aeroplane Body	60.9	70.2	69.6	71.2	61.9	66.4	70.0	71.6	70.1	72.5
Aeroplane Engine	53.2	57.2	56.2	58.2	27.2	36.9	57.6	59.4	58.3	60.8
Aeroplane Wing	27.9	35.8	37.2	38.4	34.3	36.2	34.3	38.5	37.4	39.6
Aeroplane Stern	24.7	29.5	29.4	29.3	57.4	58.1	27.6	30.5	29.3	31.8
Aeroplane Wheel	40.9	56.9	51.0	52.2	51.5	52.2	45.5	45.6	44.5	46.6
Bicycle Wheel	76.4	78.0	77.1	78.4	80.2	80.8	81.2	81.7	80.2	82.7
Bicycle Saddle	34.1	42.2	38.3	40.2	38.0	40.2	36.9	42.2	40.6	43.7
Bicycle Handlebar	23.3	33.1	25.2	27.7	22.4	27.1	18.8	31.8	30.5	33.4
Bicycle Chainwheel	42.3	46.1	41.6	42.2	44.1	43.5	53.6	44.1	42.5	45.6
Bird Head	51.5	61.0	66.6	67.8	65.3	67.7	70.0	70.4	69.1	71.7
Bird Beak	40.4	49.6	51.3	51.7	44.3	46.5	56.0	52.3	50.5	53.6
Bird Torso	61.7	63.4	67.3	68.3	64.8	64.8	63.4	65.6	64.5	66.9
Bird Neck	27.5	34.9	34.5	35.2	28.4	29.7	34.3	35.9	34.6	37.4
Bird Wing	35.9	37.0	41.3	42.1	37.2	39.3	36.2	40.3	38.7	41.6
Bird Leg	23.5	26.3	30.8	30.9	23.8	25.1	25.5	29.6	28.4	30.9
Bird Foot	13.9	15.8	18.3	19.2	17.7	17.4	17.4	18.3	16.5	19.7
Bird Tail	28.1	35.8	35.7	35.9	32.5	33.6	33.6	35.6	34.6	36.4
Boat	53.7	71.8	60.7	68.2	69.2	72.2	74.8	76.7	75.7	77.6
Bottle Cap	30.4	34.8	31.0	35.2	33.4	36.3	37.6	37.1	35.3	38.2
Bottle Body	63.7	74.5	71.4	74.9	78.7	79.2	72.4	79.3	77.6	80.2
Bus Side	70.1	76.0	74.9	76.3	75.7	76.6	77.1	78.6	77.8	79.6
Bus Roof	7.5	10.7	6.3	8.2	13.5	14.2	17.1	15.8	14.9	17.4
Bus Mirror	2.1	7.9	8.0	10.2	6.6	7.9	0.0	13.4	12.3	14.8
Bus Plate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bus Door	40.1	42.4	47.4	44.4	38.1	40.2	40.6	41.9	40.9	43.4
Bus Wheel	53.8	58.0	56.6	59.1	56.7	58.4	59.8	61.6	60.1	62.6
Bus Headlight	25.6	37.3	31.0	34.3	30.4	36.0	44.7	49.7	48.8	50.5
Bus Window	71.8	76.6	74.7	75.1	74.6	76.9	75.7	77.7	76.4	78.8
Car Side	64.0	69.4	70.2	71.2	70.5	71.9	70.8	73.0	71.7	74.6
Car Roof	21.0	23.7	22.2	22.9	22.5	25.8	27.1	32.5	31.4	33.4
Car Plate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Car Door	40.1	43.0	42.1	43.2	42.3	43.0	46.8	43.4	42.4	44.8
Car Wheel	65.8	70.2	68.8	69.3	70.2	72.2	72.7	74.1	72.6	75.6
Car Headlight	42.9	48.0	53.8	55.5	46.4	46.9	52.5	58.4	57.2	59.8
Car Window	61.0	67.8	69.1	69.1	65.0	69.4	69.4	70.6	69.6	71.4
Cat Head	73.9	75.8	76.7	76.9	77.5	78.1	77.6	78.8	77.5	80.5
Cat Eye	58.8	66.9	64.8	66.1	62.8	67.7	67.8	70.7	69.6	71.7
Cat Ear	65.5	67.8	67.9	68.6	67.1	68.2	67.8	69.6	68.7	70.8
Cat Nose	39.1	43.8	46.6	46.9	46.3	46.9	44.7	47.8	46.1	49.4
Cat Torso	64.2	65.1	66.9	67.3	68.7	58.8	68.0	68.9	67.3	70.0
Cat Neck	22.8	23.6	22.4	24.2	24.4	25.6	26.2	28.3	26.6	29.0
Cat Leg	36.5	37.9	39.6	39.5	39.1	39.1	40.3	39.2	37.3	40.2
Cat Paw	40.6	39.5	42.0	42.3	41.7	41.4	43.2	41.9	40.4	43.5
Cat Tail	40.2	42.9	44.5	45.1	45.8	45.9	43.9	46.9	45.3	48.6
Chair	35.4	45.6	35.7	39.9	49.1	54.2	59.4	59.7	58.6	60.4
Cow Head	51.2	61.0	62.5	62.8	63.8	63.1	64.7	63.5	62.4	64.6
Cow Ear	51.2	58.3	57.8	58.6	60.0	60.5	60.9	62.0	60.7	63.3
Cow Muzzle	61.2	68.1	72.4	72.8	74.9	74.5	70.6	74.3	72.5	75.6
Cow Horn	28.8	33.3	45.5	45.2	44.0	45.7	34.9	38.4	37.6	39.2
Cow Torso	63.4	72.2	73.5	73.2	73.2	73.4	72.6	73.6	72.5	74.4
Cow Neck	9.5	16.8	15.9	18.8	20.3	23.3	26.8	29.5	28.4	30.5
Cow Leg	46.5	56.1	54.8	55.1	54.8	55.6	54.8	56.0	54.2	57.7
Cow Tail	6.5	2.6	3.1	8.8	13.6	16.8	22.9	31.1	29.8	32.6
Dining Table	33.0	52.7	45.6	48.3	50.6	53.3	58.0	58.2	56.3	59.7
Dog Head	60.5	60.8	64.7	64.2	64.0	63.5	63.3	63.3	61.7	64.5
Dog Eye	50.1	58.4	57.0	59.3	54.7	57.9	60.9	63.6	62.4	64.6
Dog Ear	52.0	55.0	57.8	57.9	56.8	56.9	57.4	58.0	56.7	59.7
Dog Nose	63.5	66.9	69.8	70.1	66.0	67.7	66.7	70.1	68.8	71.5
Dog Torso	58.4	58.4	62.3	62.8	63.2	63.1	62.2	63.7	62.2	64.7
Dog Neck	27.1	27.0	28.0	28.3	28.1	28.3	26.5	28.1	26.6	29.3
Dog Leg	39.2	41.9	43.2	44.1	43.7	43.9	43.1	44.2	42.5	45.5
Dog Paw	39.4	44.5	45.2	47.2	43.7	45.6	47.8	49.4	48.1	50.7
Dog Tail	24.7	31.2	35.0	35.1	30.8	32.2	31.0	36.0	34.3	37.4
Dog Muzzle	65.1	66.3	70.1	70.0	68.9	68.1	67.0	68.9	67.4	70.5

Category	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Horse Head	54.4	62.9	59.9	60.7	55.9	59.9	62.4	64.6	63.5	65.9
Horse Ear	49.7	58.7	56.8	58.1	52.2	55.7	59.2	61.1	59.7	62.5
Horse Muzzle	61.3	69.0	66.6	68.4	62.9	64.2	65.3	69.5	68.6	70.7
Horse Torso	56.7	63.3	61.1	62.6	60.7	61.1	63.1	64.8	63.7	66.5
Horse Neck	42.1	51.7	44.8	46.5	47.2	48.6	49.3	53.3	51.9	54.8
Horse Leg	54.1	60.5	59.3	60.1	56.4	57.3	58.0	60.0	58.8	61.8
Horse Tail	48.1	51.2	51.9	52.1	51.4	52.2	53.4	55.2	53.6	56.5
Horse Hoof	22.1	21.6	19.8	21.2	25.3	25.4	18.2	25.2	23.5	26.9
Motorbike Wheel	69.6	71.3	71.6	73.2	73.6	75.7	76.4	76.8	75.6	78.2
Motorbike Hbar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.5	1.4
Motorbike Saddle	0.0	0.0	0.0	0.0	0.8	0.5	0.1	0.0	0.0	0.0
Motorbike Hlight	25.8	28.1	21.3	29.0	28.5	31.1	35.0	42.9	41.7	44.1
Person Head	68.2	71.5	71.3	71.9	69.3	70.6	72.6	73.6	72.3	74.2
Person Eye	35.1	50.4	44.6	48.2	38.7	42.4	49.6	52.7	51.8	53.3
Person Ear	37.4	49.4	46.4	47.3	41.4	45.8	47.6	52.7	51.9	53.4
Person Nose	53.0	61.9	57.4	59.1	56.7	59.5	62.4	65.2	63.5	66.2
Person Mouth	48.9	56.7	53.1	55.2	51.3	55.2	58.4	61.2	59.4	62.3
Person Hair	70.8	72.1	73.2	74.3	71.8	71.1	70.9	71.6	70.1	72.4
Person Torso	63.4	66.2	66.3	66.9	65.2	66.3	66.1	67.5	66.6	68.5
Person Neck	49.7	52.6	53.1	53.4	51.2	52.7	54.5	54.4	53.5	55.2
Person Arm	54.7	58.7	58.4	59.5	57.4	58.6	58.3	59.5	58.6	60.6
Person Hand	43.0	48.3	50.1	50.2	44.1	45.8	47.8	49.3	47.1	50.7
Person Leg	50.8	52.2	53.8	53.9	53.0	53.9	53.6	55.5	54.6	56.3
Person Foot	29.8	33.1	33.0	31.1	31.3	30.7	31.8	31.9	29.4	33.3
Potted Plant Pot	41.6	58.6	52.3	55.2	56.0	58.2	50.1	59.8	58.8	61.2
Potted Plant Plant	42.9	62.6	56.1	58.3	56.6	60.8	47.7	66.4	65.3	67.3
Sheep Head	45.6	45.1	50.2	49.2	54.0	53.3	51.6	51.5	50.5	52.7
Sheep Ear	43.2	44.7	48.9	49.9	45.3	47.1	54.8	56.2	54.5	57.3
Sheep Muzzle	58.2	57.5	66.6	67.2	64.9	65.0	65.5	65.3	63.6	66.2
Sheep Horn	3.0	0.8	5.1	9.5	5.4	11.6	31.8	53.0	51.6	54.5
Sheep Torso	62.6	65.7	66.3	68.2	68.8	69.4	69.9	70.9	69.7	72.5
Sheep Neck	26.9	27.9	29.8	29.9	30.3	31.5	36.0	35.2	33.6	36.4
Sheep Leg	8.6	17.9	21.1	22.4	11.7	19.3	23.9	25.9	24.3	27.4
Sheep Tail	6.7	7.1	6.3	6.9	9.1	10.8	15.2	17.8	16.4	19.2
Sofa	39.2	56.6	43.0	45.2	53.9	58.2	68.9	69.1	67.5	70.1
Train Head	5.3	3.9	6.0	4.2	4.5	4.1	4.0	4.8	3.4	6.2
Train Head Side	61.9	60.9	60.8	61.2	60.8	61.4	66.6	64.4	62.2	65.4
Train Head Roof	23.0	25.3	19.9	20.1	21.1	20.7	26.5	20.1	18.4	21.5
Train Headlight	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Train Coach	28.6	35.8	35.7	36.6	31.4	32.8	36.4	37.0	35.1	38.8
Train Coach Side	15.6	16.6	18.4	19.2	14.9	14.2	15.5	16.1	14.4	17.7
Train Coach Roof	10.8	18.4	6.3	7.9	18.1	17.6	7.7	20.9	19.5	22.8
TV Screen	64.8	80.5	70.4	72.1	70.7	71.4	69.6	70.4	69.2	71.9

10.4. Pascal-Part-108 | $mIoU_{small}$

Object	FLOAT	FLOAT+O
background	-	-
aeroplane	29.1	32
bicycle	23.5	25.2
bird	40.4	41.1
boat	15.8	16.9
bottle	38.3	42.6
bus	39.6	41.8
car	34.8	36.9
cat	39.1	42.6
chair	39.2	42.4
cow	25.1	29.6
diningtable	30.7	34.3
dog	29.1	33.6
horse	40.1	42.7
motorbike	25.6	27.2
person	38.1	42.4
pottedplant	50.1	51.5
sheep	45.7	47.3
sofa	47.3	49.6
train	20.5	22.8
tvmonitor	50.1	53.2

10.5. Pascal-Part-201 | mIoU

Object	Part	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Background	nan	91.0	93.6	91.2	92.9	90.8	93.1	92.5	93.3	91.2	94.2
Aeroplane	Body	67.3	70.1	71.1	72.2	61.9	64.0	68.9	70.5	68.3	71.7
	Engine	27.0	27.3	30.0	30.3	19.3	21.6	28.5	28.0	25.3	29.0
	Left Wing	3.8	18.9	10.7	14.6	3.4	9.3	28.6	32.3	30.6	33.5
	Right Wing	19.6	22.2	20.3	23.7	11.5	15.9	25.6	30.9	29.6	32.2
	Stern	53.3	55.6	56.7	56.9	48.8	51.0	55.3	57.8	55.7	58.6
	Tail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Wheel	50.4	53.1	52.9	53.4	36.0	37.5	49.9	51.6	49.7	52.4
Bicycle	Back Wheel	63.8	65.6	63.6	66.7	56.0	60.1	67.9	70.1	68.8	71.4
	Chainwheel	41.2	44.5	44.9	45.6	34.2	36.9	42.0	46.5	44.6	47.5
	Body	44.6	46.1	44.9	46.8	40.9	44.8	47.3	49.7	47.3	50.9
	Front Wheel	68.4	71.4	70.9	72.9	61.7	65.7	72.9	74.4	72.7	75.3
	Handlebar	27.1	30.4	26.1	27.1	18.2	20.2	24.9	31.2	29.8	32.7
	Headlight	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Saddle	41.1	42.2	41.6	42.3	21.1	23.8	43.5	44.0	42.7	45.5
Bird	Beak	53.0	56.5	57.3	57.6	37.8	40.1	49.3	57.6	55.2	58.4
	Head	66.5	65.3	66.4	67.1	55.0	56.7	66.5	69.2	67.5	70.5
	Left Eye	26.2	30.6	27.6	32.7	17.1	23.2	57.8	58.6	56.8	59.6
	Left Foot	5.9	8.8	12.0	12.2	0.0	1.2	9.5	11.2	9.2	12.6
	Left Leg	5.1	9.1	9.3	10.6	0.3	2.6	15.9	14.6	12.6	15.3
	Left Wing	4.2	8.2	11.9	13.1	8.1	11.3	29.4	32.0	30.1	33.5
	Neck	34.0	32.5	35.8	34.7	31.8	31.7	34.4	32.7	30.7	33.3
	Right Eye	0.0	12.3	11.6	20.2	0.9	10.5	55.2	63.1	61.8	64.6
	Right Foot	0.0	2.7	1.2	3.8	0.0	4.6	7.4	8.2	6.7	9.6
	Right Leg	11.1	12.6	11.1	13.5	4.6	9.0	11.2	15.7	13.6	16.5
	Right Wing	18.7	19.2	16.3	19.9	17.8	22.4	20.3	23.0	21.8	24.6
	Tail	30.0	33.5	36.2	36.4	26.3	28.5	29.5	36.0	33.1	37.0
	Torso	60.6	61.9	65.3	66.6	61.2	63.5	61.2	64.8	62.1	65.2
Boat	nan	56.7	65.5	61.2	69.8	54.9	64.5	75.3	76.7	74.4	77.5
Bottle	Body	64.6	71.7	72.5	74.7	65.5	69.7	67.6	76.3	74.3	77.4
	Cap	28.1	30.3	30.9	31.8	21.4	24.3	35.1	31.8	29.1	32.4
Bus	Back Plate	0.0	4.1	0.0	0.0	0.0	0.0	13.0	13.0	11.3	14.5
	Back Side	49.0	40.2	44.1	33.7	47.2	37.8	43.5	23.9	21.2	25.0
	Door	40.9	45.6	46.1	47.2	31.0	33.1	38.2	45.7	43.1	46.2
	Front Plate	26.3	33.8	42.2	46.1	0.0	5.9	45.3	53.3	51.6	54.4
	Front Side	68.9	67.1	66.9	67.2	60.9	62.2	48.6	49.0	47.6	50.5
	Headlight	32.6	33.5	34.8	38.5	5.9	11.6	38.8	49.2	46.1	50.1
	Left Mirror	0.0	1.3	0.8	12.3	0.0	13.5	7.5	23.8	21.8	24.5
	Left Side	21.4	24.9	25.1	27.9	23.2	27.0	34.6	34.0	32.8	35.6
	Right Mirror	0.0	14.6	12.5	14.6	0.0	4.1	9.7	27.7	25.1	28.3
	Right Side	33.9	31.7	31.5	33.7	24.2	27.4	30.0	32.4	30.1	33.8
	Roof	0.0	3.4	8.0	9.4	1.0	3.4	13.5	12.2	10.1	13.2
	Wheel	57.1	57.2	56.2	57.8	48.8	51.4	59.3	60.4	58.2	61.8
	Window	73.5	75.9	74.8	76.8	66.6	69.6	76.5	78.6	76.0	79.3
Car	Back Plate	25.6	26.0	26.9	31.2	5.5	11.8	39.2	47.8	45.6	48.5
	Back Side	45.0	42.1	44.5	44.5	37.0	38.0	44.6	39.7	37.7	40.3
	Door	41.4	43.5	44.1	46.6	37.2	41.7	43.6	46.6	44.4	47.3
	Front Plate	43.0	44.2	38.1	39.1	4.7	6.7	48.6	52.0	50.7	53.6
	Front Side	66.0	65.7	65.6	66.3	60.1	62.8	56.1	56.2	54.3	57.3
	Headlight	54.4	54.3	51.5	52.7	37.4	39.6	54.3	57.1	55.5	58.7
	Left Mirror	12.6	15.6	14.0	16.5	0.1	3.6	21.0	34.7	32.1	35.3
	Left Side	20.5	21.8	20.5	23.8	17.1	21.4	28.7	32.2	30.4	33.8
	Right Mirror	0.3	9.6	7.1	11.2	0.0	5.1	17.8	31.1	29.1	32.3
	Right Side	16.7	17.2	18.7	19.9	14.3	17.5	29.0	32.9	31.4	34.6
	Roof	17.4	22.1	27.8	27.0	11.7	11.9	22.5	27.6	25.0	28.2
	Wheel	68.3	70.5	69.2	71.6	63.7	67.1	72.4	72.5	70.2	73.7
	Window	65.4	66.9	67.1	67.4	55.4	56.7	68.4	69.7	67.1	70.3

Object	Part	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Cat	Head	75.4	76.8	76.4	77.2	72.1	73.9	77.8	78.2	76.4	79.6
	Left Back Leg	9.7	10.4	9.9	10.9	6.7	8.7	11.6	15.6	13.5	16.7
	Left Back Paw	9.3	11.6	10.8	14.4	4.0	9.6	10.7	19.8	17.1	20.3
	Left Ear	12.6	15.1	22.3	26.6	21.7	28.0	59.7	61.5	59.3	62.5
	Left Eye	7.9	9.7	11.6	17.9	8.5	16.8	59.2	66.6	64.0	67.2
	Left Front Leg	11.5	14.5	15.0	20.2	15.8	23.0	25.3	28.7	26.2	29.4
	Left Front Paw	15.3	16.2	16.7	17.5	13.6	15.4	19.0	24.6	21.2	25.1
	Neck	21.5	22.3	18.5	20.4	19.6	23.5	23.3	23.2	20.9	24.1
	Nose	39.7	42.8	46.3	46.8	32.9	35.4	43.1	46.4	44.0	47.2
	Right Back Leg	1.5	6.4	10.1	14.7	4.9	11.5	16.0	17.5	15.3	18.8
	Right Back Paw	0.2	2.6	7.5	9.3	0.6	3.4	16.1	19.0	17.5	20.7
	Right Ear	33.2	36.9	28.6	34.1	26.4	32.9	59.7	61.5	59.2	62.4
	Right Eye	34.0	32.1	33.8	36.2	23.4	26.8	62.8	68.7	66.0	69.2
	Right Front Leg	16.2	16.3	12.1	16.6	12.0	17.5	26.5	29.0	27.4	30.6
	Right Front Paw	17.6	18.8	12.1	15.7	12.1	17.7	21.9	28.4	26.6	29.8
	Tail	40.6	41.2	45.4	46.3	35.3	38.2	43.0	47.7	45.2	48.4
	Torso	65.6	65.7	66.7	67.1	64.9	67.3	67.6	68.0	66.1	69.3
Chair	nan	35.6	42.1	35.4	39.8	35.5	41.9	59.6	59.7	57.3	60.5
Cow	Head	60.1	61.2	60.6	61.4	54.7	56.5	61.1	63.7	61.0	64.2
	Left Back Lower Leg	0.8	2.4	3.3	6.6	0.5	5.8	15.3	18.4	16.2	19.4
	Left Back Upper Leg	13.5	14.5	16.2	17.7	14.0	16.5	19.6	25.9	24.3	27.5
	Left Ear	1.9	13.7	24.2	28.9	8.2	13.9	53.0	57.8	55.3	58.5
	Left Eye	0.0	0.0	0.0	0.0	0.0	0.0	41.1	40.2	38.5	41.7
	Left Front Lower Leg	15.9	16.8	14.5	18.2	10.7	16.4	25.4	26.7	24.2	27.4
	Left Front Upper Leg	14.4	18.2	18.6	22.4	9.6	15.4	33.2	39.7	37.5	40.6
	Left Horn	0.0	5.9	13.3	18.6	0.0	6.3	28.3	33.2	31.4	34.6
	Muzzle	71.0	70.3	72.1	71.1	64.7	65.7	70.4	72.4	70.7	73.7
	Neck	5.7	9.1	15.1	16.7	9.0	11.6	21.9	19.8	17.0	20.2
	Right Back Lower Leg	16.3	17.6	18.4	18.9	1.7	4.2	17.4	19.8	17.5	20.6
	Right Back Upper Leg	5.6	9.4	12.9	14.3	5.1	8.5	22.9	27.9	25.2	29.1
	Right Ear	27.4	26.0	28.8	37.2	24.0	34.4	56.5	60.4	58.6	61.4
	Right Eye	1.9	8.5	11.0	16.2	0.0	6.2	38.5	37.2	34.4	38.1
	Right Front Lower Leg	2.6	7.2	9.5	12.5	0.5	5.5	25.1	28.4	26.7	29.8
	Right Front Upper Leg	19.2	20.1	21.8	23.8	14.4	18.4	32.7	37.2	35.1	38.3
	Right Horn	0.0	9.6	30.7	30.2	2.4	2.9	24.1	24.8	22.3	25.5
	Tail	5.6	7.6	12.2	16.1	0.0	4.9	17.8	31.0	28.8	32.0
	Torso	70.0	71.2	73.0	73.7	64.6	67.3	70.8	73.9	72.5	75.7
Dining Table	nan	38.6	46.9	43.6	49.2	40.3	47.9	58.2	58.3	56.6	59.6
Dog	Head	61.7	62.4	63.4	63.9	58.9	61.4	62.7	62.8	60.1	63.3
	Left Back Leg	5.0	8.2	8.6	11.6	3.2	8.2	17.1	23.1	21.4	24.6
	Left Back Paw	6.8	8.5	6.7	11.3	0.9	7.5	12.6	17.0	15.3	18.5
	Left Ear	22.1	22.7	19.5	25.4	18.9	26.8	56.6	55.4	53.6	56.7
	Left Eye	21.0	25.1	21.4	26.7	12.4	19.7	54.9	59.1	57.0	60.2
	Left Front Leg	9.4	18.8	18.6	22.1	13.5	19.0	32.3	34.4	32.5	35.7
	Left Front Paw	8.2	13.3	16.6	18.9	16.0	19.3	30.2	33.7	31.0	34.2
	Muzzle	67.7	69.2	70.3	70.1	63.2	65.0	64.9	66.1	64.3	67.7
	Neck	27.5	26.5	27.4	29.2	21.7	24.5	25.6	24.9	23.0	26.2
	Nose	64.0	67.2	69.2	68.5	55.9	57.2	66.0	67.4	65.2	68.7
	Right Back Leg	18.0	18.1	12.3	15.8	12.8	18.3	24.4	26.6	24.1	27.3
	Right Back Paw	2.5	4.4	5.5	9.2	0.5	6.2	18.1	19.2	17.3	20.7
	Right Ear	20.6	26.7	23.5	28.3	26.3	33.1	53.0	52.1	50.0	53.2
	Right Eye	20.7	21.7	17.5	22.9	17.3	23.7	59.8	62.2	60.2	63.7
	Right Front Leg	20.6	21.4	14.1	18.1	17.3	22.3	33.4	35.3	33.3	36.8
	Right Front Paw	23.5	22.8	18.7	20.6	17.4	20.3	31.8	34.1	32.3	35.5
	Tail	31.8	32.1	35.5	36.4	27.5	30.4	33.5	39.2	37.6	40.8
	Torso	60.3	60.4	62.3	62.9	58.8	60.4	62.0	62.9	61.0	64.2

Object	Part	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Horse	Head	58.0	58.7	58.2	59.3	49.0	51.1	63.5	62.7	60.4	63.6
	Left Back Hoof	0.0	0.0	1.7	2.9	0.0	3.2	8.2	10.9	9.4	12.6
	Left Back Lower Leg	4.4	6.2	8.0	10.7	1.6	6.3	19.6	22.3	20.6	23.8
	Left Back Upper Leg	0.4	7.5	10.0	17.2	13.0	22.2	24.0	36.0	34.4	37.6
	Left Ear	7.0	15.2	13.5	19.1	8.7	15.3	50.1	47.5	45.1	48.3
	Left Eye	0.0	0.0	0.0	0.0	0.0	0.0	39.8	37.3	35.5	38.7
	Left Front Hoof	0.0	3.2	3.9	4.8	0.0	2.9	2.1	8.5	6.1	9.3
	Left Front Lower Leg	15.5	19.6	20.1	22.6	10.9	14.4	23.3	26.3	24.5	27.7
	Left Front Upper Leg	14.2	23.1	24.9	26.3	14.3	16.7	30.1	34.8	32.3	35.5
	Muzzle	65.0	65.8	66.4	67.1	56.0	58.7	69.7	69.4	67.6	70.8
	Neck	50.8	50.9	48.9	50.9	38.9	42.9	51.5	53.9	52.6	55.8
	Right Back Hoof	0.0	1.2	2.6	2.9	0.0	2.3	7.7	12.8	10.1	13.3
	Right Back Lower Leg	16.1	18.7	19.6	20.8	5.8	9.0	21.2	22.6	20.0	23.2
	Right Ear	29.3	29.1	25.7	29.5	26.8	32.6	49.7	51.6	49.5	52.7
	Right Eye	17.2	17.9	19.4	20.1	0.8	2.5	52.1	25.6	23.3	26.8
	Right Front Hoof	0.0	1.3	2.2	2.6	0.0	2.4	2.9	4.1	2.1	5.3
	Right Front Lower Leg	4.1	8.2	9.6	11.3	4.6	7.3	21.7	25.2	23.6	26.8
	Tail	47.9	48.7	49.9	50.7	39.0	41.8	49.6	53.4	51.1	54.3
	Torso	61.3	62.1	61.7	63.8	56.4	60.5	65.1	66.8	64.2	67.4
Motorbike	Back Wheel	60.7	64.5	63.9	65.6	52.3	55.0	63.7	67.1	65.5	68.7
	Body	67.8	68.0	70.7	71.4	64.5	67.2	70.8	72.6	70.0	73.2
	Front Wheel	68.9	71.3	72.2	73.2	62.9	65.9	71.9	75.6	73.2	76.4
	Handlebar	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Headlight	30.7	32.1	17.8	22.9	9.6	15.7	34.7	38.7	36.4	39.6
	Saddle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Person	Hair	73.8	73.9	74.0	74.2	68.3	69.5	72.7	72.4	70.0	73.2
	Head	70.0	70.2	70.8	71.1	63.9	66.2	71.2	71.7	69.2	72.4
	Left Ear	19.5	19.7	16.6	19.3	6.2	9.9	45.1	50.6	48.0	51.2
	Left Eye	4.5	16.3	12.9	17.5	3.1	9.7	42.7	47.0	45.5	48.7
	Left Eyebrow	0.0	0.0	3.6	9.8	0.1	8.3	17.1	29.2	27.1	30.3
	Left Foot	18.4	19.3	16.2	18.4	11.7	14.9	17.8	19.4	17.2	20.4
	Left Hand	8.4	13.5	15.7	18.6	10.0	14.9	33.7	36.7	34.4	37.6
	Left Lower Arm	19.6	20.6	18.2	22.7	10.9	16.4	37.4	40.9	39.1	42.3
	Left Lower Leg	16.2	19.4	18.6	20.2	16.6	20.2	23.5	27.2	25.5	28.7
	Left Upper Arm	21.0	21.8	19.0	22.8	16.1	21.9	47.2	51.1	49.6	52.8
	Left Upper Leg	15.9	16.2	10.7	18.5	13.0	21.8	30.8	35.6	33.2	36.4
	Mouth	52.2	54.6	53.6	57.1	30.2	35.7	57.9	61.3	59.5	62.7
	Neck	51.3	50.5	52.2	53.3	42.6	45.7	52.9	52.4	50.7	53.9
	Nose	59.2	60.2	58.2	59.6	40.2	42.6	61.1	64.7	62.0	65.2
	Right Ear	16.3	18.8	19.8	27.0	9.8	18.0	47.8	53.3	51.2	54.4
	Right Eye	22.8	21.3	17.9	19.2	12.8	15.1	47.3	51.6	49.3	52.5
	Right Eyebrow	0.0	1.4	3.6	7.6	0.4	5.4	12.2	28.2	26.4	29.6
	Right Foot	9.3	12.6	12.4	14.9	6.1	9.6	18.4	19.1	17.1	20.3
	Right Hand	28.7	30.4	24.0	32.8	22.9	33.7	36.0	38.0	36.7	39.9
	Right Lower Arm	17.9	22.9	19.6	26.3	18.5	26.2	37.2	40.4	38.1	41.3
	Right Lower Leg	15.6	17.0	16.6	19.4	9.3	14.1	24.8	27.1	25.3	28.5
	Right Upper Arm	22.0	24.1	21.4	25.1	22.1	26.8	45.9	49.9	48.1	51.3
	Right Upper Leg	19.7	23.5	23.8	25.0	19.7	22.9	32.9	35.5	33.4	36.6
	Torso	64.2	64.6	65.3	66.2	58.7	61.6	65.3	67.0	65.1	68.3
Potted Plant	Plant	51.6	55.7	56.2	60.2	48.2	53.2	54.5	63.2	61.3	64.5
	Pot	50.0	56.4	53.3	58.7	40.0	46.4	49.9	58.7	56.0	59.2
Sheep	Head	49.2	50.2	45.1	49.3	42.5	47.7	47.6	53.0	51.6	54.8
	Left Back Lower Leg	2.3	2.6	3.6	3.7	0.3	1.4	7.7	3.9	1.9	5.1
	Left Back Upper Leg	0.0	0.0	0.0	0.0	0.0	2.0	9.7	8.9	7.0	10.2
	Left Ear	18.3	30.7	27.2	33.6	3.4	11.8	51.9	50.0	48.2	51.4
	Left Eye	0.0	0.0	0.0	12.1	0.0	14.1	37.6	42.8	40.1	43.3
	Left Front Lower Leg	0.0	0.0	0.0	7.5	0.0	8.5	15.7	17.6	15.4	18.6
	Left Front Upper Leg	0.0	0.0	0.0	5.8	0.0	6.8	14.4	15.8	13.2	16.4
	Left Horn	0.0	4.8	0.7	6.2	0.0	6.5	26.1	47.1	45.4	48.6
	Muzzle	59.8	60.4	61.1	62.4	58.6	60.9	66.0	66.1	64.5	67.7
	Neck	24.9	25.3	23.1	27.3	17.1	22.3	32.0	33.1	31.3	34.5
	Right Back Lower Leg	0.0	1.2	1.3	2.4	0.0	2.1	4.9	9.5	7.6	10.8
	Right Back Upper Leg	0.2	0.9	1.6	4.6	0.0	4.0	7.1	7.3	5.2	8.4
	Right Ear	15.5	16.5	12.9	18.5	24.1	31.7	49.5	44.2	42.3	45.5
	Right Eye	8.5	12.8	15.8	17.2	1.2	3.6	37.0	38.6	36.5	39.7
	Right Front Lower Leg	0.4	1.6	0.0	5.4	0.0	6.4	12.7	15.5	13.1	16.3
	Right Front Upper Leg	2.3	4.2	0.0	6.1	2.2	9.3	16.3	13.4	11.5	14.7
	Right Horn	0.0	5.6	8.4	16.8	0.0	10.4	25.0	43.3	41.0	44.2

Object	Part	deeplabv3	deeplabv3+O	BSANet	BSANet+O	GMNet	GMNet+O	FLOAT	FLOAT+O	FLOAT [†]	FLOAT [†] +O
Sofa		42.1	46.8	40.4	49.9	43.3	54.8	69.0	69.1	67.2	70.4
Train	Coach Back Side	0.0	1.7	3.8	1.1	5.9	4.2	11.1	0.1	0.0	0.3
	Coach Front Side	0.0	0.1	0.0	0.6	0.0	0.5	0.5	0.8	0.0	1.9
	Coach Left Side	5.9	6.1	6.5	7.2	5.9	7.6	6.1	4.2	2.4	5.6
	Coach Right Side	3.4	7.2	10.2	11.3	4.8	7.9	9.1	2.9	1.4	4.6
	Coach Roof	0.0	5.3	9.1	15.7	1.3	9.9	0.0	17.1	15.5	18.7
	Coach	30.7	33.7	35.2	35.7	36.6	39.1	28.0	36.8	32.6	37.8
	Head	4.3	4.8	9.0	9.4	5.7	8.1	4.4	5.9	4.1	7.3
	Head Back Side	0.0	0.2	0.0	0.2	0.0	2.2	1.3	0.0	0.0	0.0
	Head Front Side	71.0	71.1	72.6	71.1	62.2	62.7	34.5	41.5	39.2	42.4
	Head Left Side	19.3	20.5	16.0	18.8	22.8	27.6	27.2	22.4	20.5	23.7
	Head Right Side	14.3	20.5	19.8	20.5	18.4	21.1	22.2	18.9	17.1	20.3
	Head Roof	18.7	23.7	25.2	26.4	0.9	3.1	22.2	22.9	21.5	24.7
	Headlight	23.1	29.3	24.1	29.2	5.1	12.2	29.5	39.7	37.1	40.3
TV Monitor	Frame	46.8	50.2	47.2	52.3	40.3	47.4	44.7	56.4	54.5	57.7
	Screen	68.5	80.1	71.5	79.2	63.9	73.6	67.4	82.2	80.1	83.3

10.6. Pascal-Part-201 | $mIoU_{small}$

Object	FLOAT	FLOAT+O
background	-	-
aeroplane	28.3	29.3
bicycle	20.6	26.6
bird	40.1	44.1
boat	15.7	18.7
bottle	36.2	39.2
bus	38.4	41.4
car	32.8	37.8
cat	37.3	42.3
chair	38.5	41.5
cow	22.6	25.6
diningtable	30.1	35.1
dog	28.1	33.1
horse	39.4	40.4
motorbike	24.2	30.2
person	37.2	38.2
pottedplant	47.4	50.4
sheep	43.2	46.2
sofa	45.2	46.2
train	16.3	17.3
tvmonitor	47.3	51.3

10.7. PartImageNet | mIoU

Class Id	Deeplabv3+	Deeplabv3++O	Segformer	Segformer+O
0	5.0	3.0	7.0	14.1
1	41.7	42.3	44.2	45.7
2	39.0	40.5	41.2	43.7
3	27.2	33.3	32.1	43.1
4	59.7	57.1	56.3	62.4
5	56.1	50.8	50.3	60.7
6	45.1	38.4	44.2	49.1
7	39.5	36.8	35.1	49.8
8	55.2	45.3	40.2	56.9
9	65.6	62.1	65.2	67.1
10	69.4	68.5	64.7	70.3
11	54.2	55.9	54.8	56.2
12	48.7	57.2	55.7	58.5
13	72.4	78.4	77.5	79.2
14	72.3	79.4	76.9	77.1
15	53.4	62.2	60.1	64.6
16	53.8	62.9	60.8	63.7
17	59.4	64.9	65.9	66.0
18	65.5	74.6	76.1	77.4
19	89.6	93.3	90.5	94.2
20	73.7	69.2	65.6	77.2
21	71.9	74.0	75.8	78.9
22	62.8	63.8	64.2	65.8
23	54.2	61.5	63.4	64.6
24	95.2	96.9	96.1	96.2
25	78.2	87.4	87.9	90.3
26	22.6	39.0	35.8	43.2

Class Id	Deeplabv3+	Deeplabv3++O	Segformer	Segformer+O
27	53.2	71.0	71.4	72.6
28	41.6	53.7	53.9	55.2
29	29.0	59.2	49.9	61.2
30	78.5	89.0	81.9	90.1
31	91.0	92.9	90.2	92.7
32	92.6	95.7	90.8	94.3
33	42.5	44.5	45.2	48.3
34	57.7	67.1	64.6	65.2
35	32.3	42.9	40.2	45.1
36	31.0	25.4	25.1	38.9
37	48.4	40.8	40.9	50.6
38	52.5	60.7	62.1	64.8
39	78.9	90.1	79.3	90.3
40	98.1	98.8	98.1	98.2