

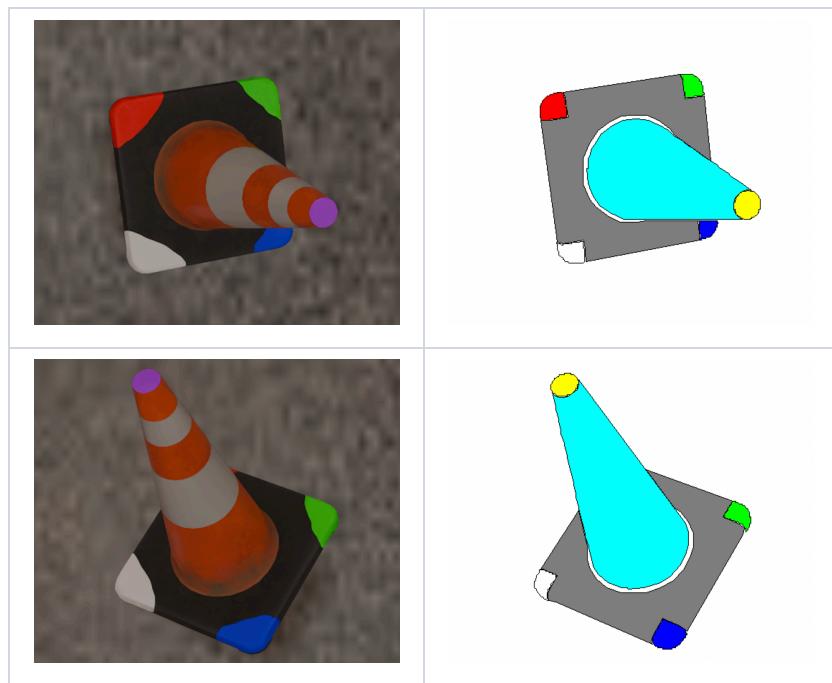
# 姿勢推定に向けたセグメンテーションモデル構築状況報告

コーンのセグメンテーション完了

## 0. 前回まで

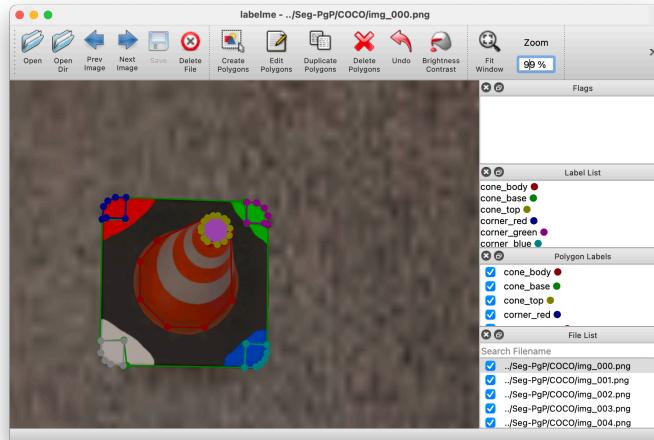
サイドスラスターを「コーン」に見立て、姿勢推進のためのセグメンテーションモデルの構築を開始。

学習データ 400枚のデータで学習。



## 目視確認＆修正

数回のデータ修正を目視確認を経て実施。



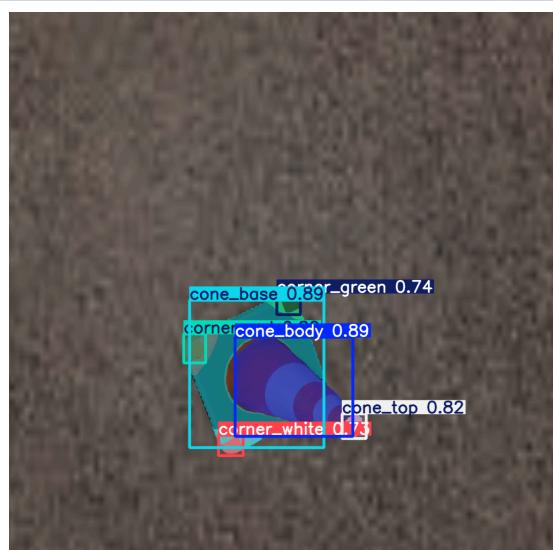
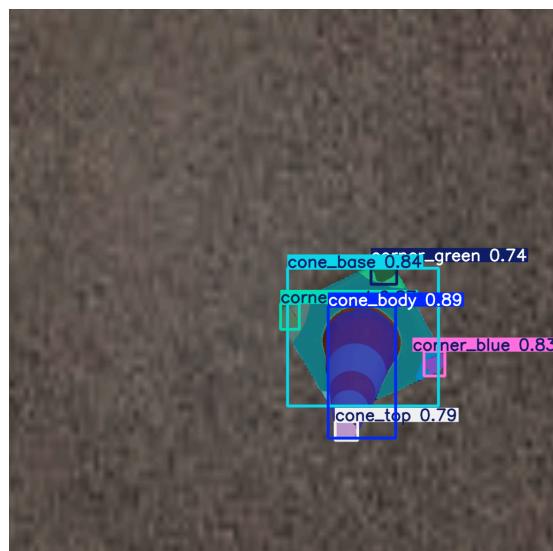
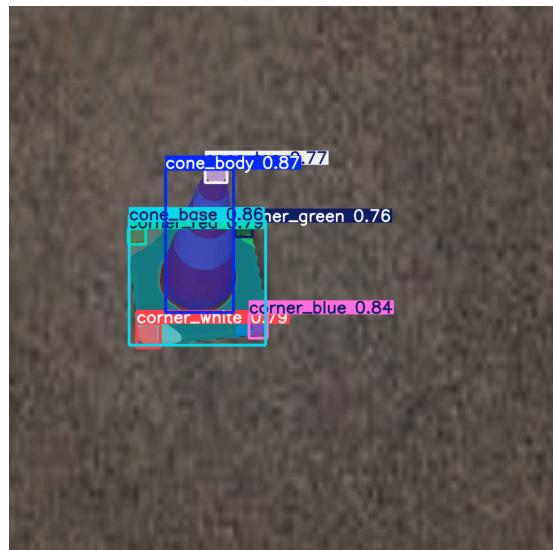
# 最終結果

...  
30/99 0G 0.03691 0.0203 0.03183 0.007395 76 1024: 100% |  
██████████| 40/40 [07:42<00:00, 11.56s/it]  
Class Images Instances Box(P R mAP50 mAP50-95) Mask(P R  
mAP50 mAP50-95): 100% |██████████|  
all 80 537 0.901 0.958 0.975 0.645 0.901 0.958  
0.972 0.766

項目	値
Box mAP50	0.975
Box mAP50-95	0.645
Mask mAP50	0.972
Mask mAP50-95	0.766
Precision	0.901
Recall	0.958
学習データ枚数	80 images
インスタンス数	537
エポック	30 / 100

# 推論結果

80枚を推論（コーンのセグメントを予測）した結果、概ね以下のように良好な結果：

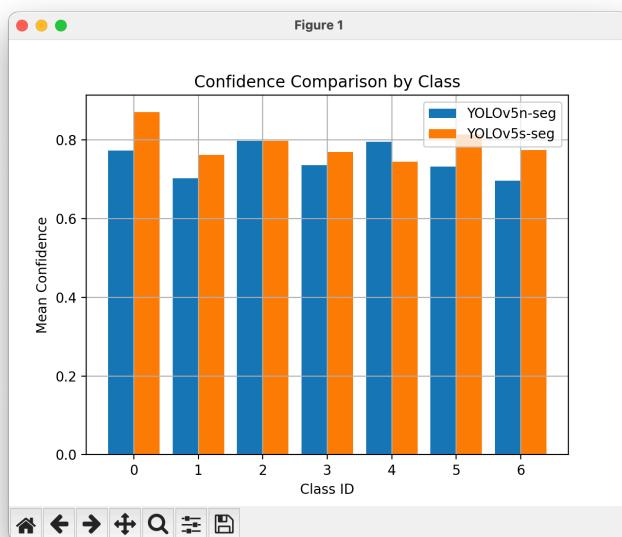


# YOLOv5s-seg

Raspberry Pi稼働

Model	size (pixels)	mAp <sup>box</sup> 50-95	mAp <sup>mask</sup> 50-95	Train time 300 epochs A100 (hours)	Speed ONNX CPU (ms)	Speed TRT A100 (ms)	params (M)	FLOPs @640 (B)
<a href="#">YOLOv5n-seg</a>	640	27.6	23.4	80:17	<b>62.7</b>	1.2	2.0	7.1
<a href="#">YOLOv5s-seg</a>	640	37.6	31.7	88:16	173.3	1.4	7.6	26.4
<a href="#">YOLOv5m-seg</a>	640	45.0	37.1	108:36	427.0	2.2	22.0	70.8
<a href="#">YOLOv5l-seg</a>	640	49.0	39.9	66:43 (2x)	857.4	2.9	47.9	147.7
<a href="#">YOLOv5x-seg</a>	640	<b>50.7</b>	<b>41.4</b>	62:56 (3x)	1579.2	4.5	<b>88.8</b>	265.7

```
class_id      conf_n      conf_s
0            0  0.773521  0.870380
1            1  0.703173  0.761920
2            2  0.797858  0.798302
3            3  0.735879  0.769904
4            4  0.795480  0.744254
5            5  0.732295  0.813823
6            6  0.697050  0.774604
```



YOLOv5s-seg

	from	n	params	module	arguments
0		-1 1	3520	models.common.Conv	[3, 32, 6, 2, 2]
1		-1 1	18560	models.common.Conv	[32, 64, 3, 2]
2		-1 1	18816	models.common.C3	[64, 64, 1]
3		-1 1	73984	models.common.Conv	[64, 128, 3, 2]
4		-1 2	115712	models.common.C3	[128, 128, 2]
5		-1 1	295424	models.common.Conv	[128, 256, 3, 2]
6		-1 3	625152	models.common.C3	[256, 256, 3]
7		-1 1	1180672	models.common.Conv	[256, 512, 3, 2]
8		-1 1	1182720	models.common.C3	[512, 512, 1]
9		-1 1	656896	models.common.SPPF	[512, 512, 5]
10		-1 1	131584	models.common.Conv	[512, 256, 1, 1]
11		-1 1	0	torch.nn.modules.upsampling.Upsample	[None, 2, 'nearest']
12		[-1, 6] 1	0	models.common.Concat	[1]
13		-1 1	361984	models.common.C3	[512, 256, 1, False]
14		-1 1	33024	models.common.Conv	[256, 128, 1, 1]
15		-1 1	0	torch.nn.modules.upsampling.Upsample	[None, 2, 'nearest']
16		[-1, 4] 1	0	models.common.Concat	[1]
17		-1 1	90880	models.common.C3	[256, 128, 1, False]
18		-1 1	147712	models.common.Conv	[128, 128, 3, 2]
19		[-1, 14] 1	0	models.common.Concat	[1]
20		-1 1	296448	models.common.C3	[256, 256, 1, False]
21		-1 1	590336	models.common.Conv	[256, 256, 3, 2]
22		[-1, 10] 1	0	models.common.Concat	[1]
23		-1 1	1182720	models.common.C3	[512, 512, 1, False]
24	[17, 20, 23]	1	418252	models.yolo.Segment	[7, [[10, 13, 16, 30,
33, 23], [30, 61, 62, 45, 59, 119], [116, 90, 156, 198, 373, 326]], 32, 128, [128, 256, 512]]					

...

## \*\*YOLOv5n-seg\*\*

...

	from	n	params	module	arguments
0		-1 1	1760	models.common.Conv	[3, 16, 6, 2, 2]
1		-1 1	4672	models.common.Conv	[16, 32, 3, 2]
2		-1 1	4800	models.common.C3	[32, 32, 1]
3		-1 1	18560	models.common.Conv	[32, 64, 3, 2]
4		-1 2	29184	models.common.C3	[64, 64, 2]
5		-1 1	73984	models.common.Conv	[64, 128, 3, 2]
6		-1 3	156928	models.common.C3	[128, 128, 3]
7		-1 1	295424	models.common.Conv	[128, 256, 3, 2]
8		-1 1	296448	models.common.C3	[256, 256, 1]
9		-1 1	164608	models.common.SPPF	[256, 256, 5]
10		-1 1	33024	models.common.Conv	[256, 128, 1, 1]
11		-1 1	0	torch.nn.modules.upsampling.Upsample	[None, 2, 'nearest']
12		[-1, 6] 1	0	models.common.Concat	[1]
13		-1 1	90880	models.common.C3	[256, 128, 1, False]
14		-1 1	8320	models.common.Conv	[128, 64, 1, 1]
15		-1 1	0	torch.nn.modules.upsampling.Upsample	[None, 2, 'nearest']
16		[-1, 4] 1	0	models.common.Concat	[1]
17		-1 1	22912	models.common.C3	[128, 64, 1, False]
18		-1 1	36992	models.common.Conv	[64, 64, 3, 2]
19		[-1, 14] 1	0	models.common.Concat	[1]
20		-1 1	74496	models.common.C3	[128, 128, 1, False]
21		-1 1	147712	models.common.Conv	[128, 128, 3, 2]
22		[-1, 10] 1	0	models.common.Concat	[1]
23		-1 1	296448	models.common.C3	[256, 256, 1, False]
24	[17, 20, 23]	1	135628	models.yolo.Segment	[7, [[10, 13, 16, 30,
33, 23], [30, 61, 62, 45, 59, 119], [116, 90, 156, 198, 373, 326]], 32, 64, [64, 128, 256]]					

