Estudo Dentes

June 17, 2025

[1]: !pip install ultralytics

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Collecting ultralytics
  Downloading ultralytics-8.3.155-py3-none-any.whl.metadata (37 kB)
Requirement already satisfied: numpy>=1.23.0 in /usr/local/lib/python3.11/dist-
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Requirement already satisfied: torchvision>=0.9.0 in
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Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.11/dist-
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sympy==1.13.1->torch>=1.8.0->ultralytics) (1.3.0)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-
packages (from python-dateutil>=2.7->matplotlib>=3.3.0->ultralytics) (1.17.0)
Requirement already satisfied: MarkupSafe>=2.0 in
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WARNING: Retrying (Retry(total=4, connect=None, read=None,
redirect=None, status=None)) after connection broken by
'ProtocolError('Connection aborted.', RemoteDisconnected('Remote end closed
connection without response'))': /packages/ff/ff/847841bacfbefc97a00036e0fce5a0f
086b640756dc38caea5e1bb002655/nvidia_nvjitlink_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl
Downloading nvidia_nvjitlink_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl
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86.9 MB/s eta 0:00:00
Downloading ultralytics_thop-2.0.14-py3-none-any.whl (26 kB)
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Installing collected packages: nvidia-nvjitlink-cu12, nvidia-curand-cu12, nvidia-cufft-cu12, nvidia-cuda-runtime-cu12, nvidia-cuda-nvrtc-cu12, nvidiacuda-cupti-cu12, nvidia-cublas-cu12, nvidia-cusparse-cu12, nvidia-cudnn-cu12, nvidia-cusolver-cu12, ultralytics-thop, ultralytics Attempting uninstall: nvidia-nvjitlink-cu12 Found existing installation: nvidia-nvjitlink-cu12 12.5.82 Uninstalling nvidia-nvjitlink-cu12-12.5.82: Successfully uninstalled nvidia-nvjitlink-cu12-12.5.82 Attempting uninstall: nvidia-curand-cu12 Found existing installation: nvidia-curand-cu12 10.3.6.82 Uninstalling nvidia-curand-cu12-10.3.6.82: Successfully uninstalled nvidia-curand-cu12-10.3.6.82 Attempting uninstall: nvidia-cufft-cu12 Found existing installation: nvidia-cufft-cu12 11.2.3.61 Uninstalling nvidia-cufft-cu12-11.2.3.61: Successfully uninstalled nvidia-cufft-cu12-11.2.3.61 Attempting uninstall: nvidia-cuda-runtime-cu12 Found existing installation: nvidia-cuda-runtime-cu12 12.5.82 Uninstalling nvidia-cuda-runtime-cu12-12.5.82: Successfully uninstalled nvidia-cuda-runtime-cu12-12.5.82 Attempting uninstall: nvidia-cuda-nvrtc-cu12 Found existing installation: nvidia-cuda-nvrtc-cu12 12.5.82 Uninstalling nvidia-cuda-nvrtc-cu12-12.5.82: Successfully uninstalled nvidia-cuda-nvrtc-cu12-12.5.82 Attempting uninstall: nvidia-cuda-cupti-cu12 Found existing installation: nvidia-cuda-cupti-cu12 12.5.82 Uninstalling nvidia-cuda-cupti-cu12-12.5.82: Successfully uninstalled nvidia-cuda-cupti-cu12-12.5.82 Attempting uninstall: nvidia-cublas-cu12 Found existing installation: nvidia-cublas-cu12 12.5.3.2 Uninstalling nvidia-cublas-cu12-12.5.3.2: Successfully uninstalled nvidia-cublas-cu12-12.5.3.2 Attempting uninstall: nvidia-cusparse-cu12 Found existing installation: nvidia-cusparse-cu12 12.5.1.3 Uninstalling nvidia-cusparse-cu12-12.5.1.3: Successfully uninstalled nvidia-cusparse-cu12-12.5.1.3 Attempting uninstall: nvidia-cudnn-cu12 Found existing installation: nvidia-cudnn-cu12 9.3.0.75 Uninstalling nvidia-cudnn-cu12-9.3.0.75: Successfully uninstalled nvidia-cudnn-cu12-9.3.0.75 Attempting uninstall: nvidia-cusolver-cu12 Found existing installation: nvidia-cusolver-cu12 11.6.3.83 Uninstalling nvidia-cusolver-cu12-11.6.3.83: Successfully uninstalled nvidia-cusolver-cu12-11.6.3.83 Successfully installed nvidia-cublas-cu12-12.4.5.8 nvidia-cuda-cupticu12-12.4.127 nvidia-cuda-nvrtc-cu12-12.4.127 nvidia-cuda-runtime-cu12-12.4.127

cu12-10.3.5.147 nvidia-cusolver-cu12-11.6.1.9 nvidia-cusparse-cu12-12.3.1.170

nvidia-cudnn-cu12-9.1.0.70 nvidia-cufft-cu12-11.2.1.3 nvidia-curand-

[2]: from ultralytics import YOLO Creating new Ultralytics Settings v0.0.6 file View Ultralytics Settings with 'yolo settings' or at '/root/.config/Ultralytics/settings.json' Update Settings with 'yolo settings key=value', i.e. 'yolo settings runs_dir=path/to/dir'. For help see https://docs.ultralytics.com/quickstart/#ultralytics-settings. [3]: model = YOLO("yolo12n.pt") # Versão do modelo YOLO Downloading https://github.com/ultralytics/assets/releases/download/v8.3.0/yolo12n.pt to 'yolo12n.pt'... | 5.34M/5.34M [00:00<00:00, 66.3MB/s] 100% [4]: !unzip dentex_yolo12n.zip Archive: dentex_yolo12n.zip creating: dentex yolo12n/ inflating: dentex_yolo12n/data.yaml creating: dentex_yolo12n/images/ creating: dentex_yolo12n/images/train/ inflating: dentex_yolo12n/images/train/train_0.png inflating: dentex_yolo12n/images/train/train_1.png inflating: dentex_yolo12n/images/train/train_10.png inflating: dentex_yolo12n/images/train/train_100.png inflating: dentex_yolo12n/images/train/train_101.png inflating: dentex_yolo12n/images/train/train_102.png inflating: dentex_yolo12n/images/train/train_103.png inflating: dentex_yolo12n/images/train/train_104.png inflating: dentex_yolo12n/images/train/train_105.png inflating: dentex_yolo12n/images/train/train_106.png inflating: dentex_yolo12n/images/train/train_107.png inflating: dentex_yolo12n/images/train/train_108.png inflating: dentex_yolo12n/images/train/train_109.png inflating: dentex_yolo12n/images/train/train_11.png inflating: dentex_yolo12n/images/train/train_110.png inflating: dentex_yolo12n/images/train/train_111.png inflating: dentex_yolo12n/images/train/train_112.png inflating: dentex_yolo12n/images/train/train_113.png inflating: dentex_yolo12n/images/train/train_114.png inflating: dentex_yolo12n/images/train/train_115.png inflating: dentex_yolo12n/images/train/train_116.png inflating: dentex_yolo12n/images/train/train_117.png

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inflating: dentex_yolo12n/images/val/train_568.png
inflating: dentex_yolo12n/images/val/train_569.png
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inflating: dentex yolo12n/images/val/train 577.png
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inflating: dentex_yolo12n/labels/train/train_333.txt
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```

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inflating: dentex_yolo12n/labels/train/train_514.txt
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```

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creating: dentex_yolo12n/labels/val/
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inflating: dentex_yolo12n/labels/val/train_606.txt
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```

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inflating: dentex_yolo12n/labels/val/train_614.txt
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```

```
inflating: dentex_yolo12n/labels/val/train_663.txt
      inflating: dentex_yolo12n/labels/val/train_664.txt
      inflating: dentex yolo12n/labels/val/train 665.txt
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      inflating: dentex yolo12n/labels/val/train 670.txt
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      inflating: dentex_yolo12n/labels/val/train_674.txt
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      inflating: dentex yolo12n/labels/val/train 683.txt
      inflating: dentex yolo12n/labels/val/train 684.txt
      inflating: dentex yolo12n/labels/val/train 685.txt
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      inflating: dentex_yolo12n/labels/val/train_697.txt
      inflating: dentex_yolo12n/labels/val/train_698.txt
      inflating: dentex yolo12n/labels/val/train 699.txt
      inflating: dentex yolo12n/labels/val/train 700.txt
      inflating: dentex yolo12n/labels/val/train 701.txt
      inflating: dentex yolo12n/labels/val/train 702.txt
      inflating: dentex_yolo12n/labels/val/train_703.txt
      inflating: dentex yolo12n/labels/val/train 704.txt
[5]: # Realizando treino
     results = model.train(
         data="/content/dentex yolo12n/data.yaml",
         epochs=80,
         imgsz=640,
         batch=16,
```

inflating: dentex_yolo12n/labels/val/train_662.txt

```
name='dentex_train'
)
```

Ultralytics 8.3.155 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (Tesla T4, 15095MiB)

engine/trainer: agnostic_nms=False, amp=True, augment=False, auto_augment=randaugment, batch=16, bgr=0.0, box=7.5, cache=False, cfg=None, classes=None, close_mosaic=10, cls=0.5, conf=None, copy_paste=0.0, copy_paste_mode=flip, cos_lr=False, cutmix=0.0, data=/content/dentex yolo12n/data.yaml, degrees=0.0, deterministic=True, device=None, dfl=1.5, dnn=False, dropout=0.0, dynamic=False, embed=None, epochs=80, erasing=0.4, exist_ok=False, fliplr=0.5, flipud=0.0, format=torchscript, fraction=1.0, freeze=None, half=False, hsv_h=0.015, hsv_s=0.7, hsv_v=0.4, imgsz=640, int8=False, iou=0.7, keras=False, kobj=1.0, line_width=None, lr0=0.01, lrf=0.01, mask_ratio=4, max_det=300, mixup=0.0, mode=train, model=yolo12n.pt, momentum=0.937, mosaic=1.0, multi_scale=False, name=dentex train, nbs=64, nms=False, opset=None, optimize=False, optimizer=auto, overlap_mask=True, patience=100, perspective=0.0, plots=True, pose=12.0, pretrained=True, profile=False, project=None, rect=False, resume=False, retina_masks=False, save=True, save_conf=False, save_crop=False, save_dir=runs/detect/dentex_train, save_frames=False, save_json=False, save_period=-1, save_txt=False, scale=0.5, seed=0, shear=0.0, show=False, show_boxes=True, show_conf=True, show_labels=True, simplify=True, single_cls=False, source=None, split=val, stream_buffer=False, task=detect, time=None, tracker=botsort.yaml, translate=0.1, val=True, verbose=True, vid_stride=1, visualize=False, warmup_bias_lr=0.1, warmup_epochs=3.0, warmup_momentum=0.8, weight_decay=0.0005, workers=8, workspace=None Downloading https://ultralytics.com/assets/Arial.ttf to '/root/.config/Ultralytics/Arial.ttf'...

100% | 755k/755k [00:00<00:00, 12.9MB/s]

Overriding model.yaml nc=80 with nc=97

	from	n	params	module
arguments				
0	-1	1	464	ultralytics.nn.modules.conv.Conv
[3, 16, 3, 2]				·
1	-1	1	4672	ultralytics.nn.modules.conv.Conv
[16, 32, 3, 2]	_	_		a_o_a_j o_o_o
[10, 02, 0, 2]				
2			2210	1. 1
2	-1	1	6640	ultralytics.nn.modules.block.C3k2
[32, 64, 1, False,	0.25]			
3	-1	1	36992	ultralytics.nn.modules.conv.Conv
[64, 64, 3, 2]				•
4	-1	1	26080	ultralytics.nn.modules.block.C3k2
[64, 128, 1, False, 0.25]				
5	-1	1	147712	ultralytics.nn.modules.conv.Conv

```
[128, 128, 3, 2]
                              180864 ultralytics.nn.modules.block.A2C2f
                     -1 2
[128, 128, 2, True, 4]
                     -1 1
                              295424 ultralytics.nn.modules.conv.Conv
[128, 256, 3, 2]
                     -1 2
                              689408
                                      ultralytics.nn.modules.block.A2C2f
[256, 256, 2, True, 1]
                     -1 1
                                   0 torch.nn.modules.upsampling.Upsample
[None, 2, 'nearest']
10
                                   0 ultralytics.nn.modules.conv.Concat
                [-1, 6]
                        1
[1]
                               86912 ultralytics.nn.modules.block.A2C2f
11
                     -1 1
[384, 128, 1, False, -1]
                                   0 torch.nn.modules.upsampling.Upsample
12
                     -1 1
[None, 2, 'nearest']
13
                [-1, 4]
                                   0 ultralytics.nn.modules.conv.Concat
                         1
[1]
14
                     -1 1
                               24000 ultralytics.nn.modules.block.A2C2f
[256, 64, 1, False, -1]
15
                     -1
                               36992 ultralytics.nn.modules.conv.Conv
                        1
[64, 64, 3, 2]
16
               [-1, 11]
                                   0 ultralytics.nn.modules.conv.Concat
[1]
17
                     -1 1
                               74624 ultralytics.nn.modules.block.A2C2f
[192, 128, 1, False, -1]
18
                     -1 1
                              147712 ultralytics.nn.modules.conv.Conv
[128, 128, 3, 2]
19
                [-1, 8] 1
                                   0 ultralytics.nn.modules.conv.Concat
[1]
20
                     -1 1
                              378880 ultralytics.nn.modules.block.C3k2
[384, 256, 1, True]
           [14, 17, 20] 1
                              491398 ultralytics.nn.modules.head.Detect
[97, [64, 128, 256]]
YOLOv12n summary: 272 layers, 2,628,774 parameters, 2,628,758 gradients, 6.8
GFLOPs
Transferred 640/691 items from pretrained weights
Freezing layer 'model.21.dfl.conv.weight'
AMP: running Automatic Mixed Precision (AMP) checks...
Downloading
https://github.com/ultralytics/assets/releases/download/v8.3.0/yolo11n.pt to
'yolo11n.pt'...
          | 5.35M/5.35M [00:00<00:00, 61.4MB/s]
100%|
AMP: checks passed
```

(ping: 0.0 ± 0.0 ms, read: 1636.9 ± 981.8

train: Fast image access

MB/s, size: 3941.7 KB)

```
train: Scanning /content/dentex_yolo12n/labels/train... 542 images,
0 backgrounds, 0 corrupt: 100%
                                    | 542/542 [00:06<00:00, 82.38it/s]
train: /content/dentex_yolo12n/images/train/train_377.png: 1
duplicate labels removed
train: New cache created:
/content/dentex_yolo12n/labels/train.cache
albumentations: Blur(p=0.01, blur limit=(3, 7)), MedianBlur(p=0.01,
blur_limit=(3, 7)), ToGray(p=0.01, method='weighted_average',
num_output_channels=3), CLAHE(p=0.01, clip_limit=(1.0, 4.0), tile_grid_size=(8,
8))
                         (ping: 0.0\pm0.0 ms, read: 1767.9\pm1313.2
val: Fast image access
MB/s, size: 3425.3 KB)
val: Scanning /content/dentex_yolo12n/labels/val... 136 images, 0
backgrounds, 0 corrupt: 100%|
                                  | 136/136 [00:02<00:00, 64.94it/s]
val: New cache created: /content/dentex yolo12n/labels/val.cache
Plotting labels to runs/detect/dentex_train/labels.jpg...
optimizer: 'optimizer=auto' found, ignoring 'lr0=0.01' and
'momentum=0.937' and determining best 'optimizer', 'lr0' and 'momentum'
automatically...
optimizer: AdamW(lr=9.9e-05, momentum=0.9) with parameter groups
113 weight(decay=0.0), 120 weight(decay=0.0005), 119 bias(decay=0.0)
Image sizes 640 train, 640 val
Using 2 dataloader workers
Logging results to runs/detect/dentex_train
Starting training for 80 epochs...
      Epoch
                                    cls_loss
                                                dfl_loss Instances
               GPU_mem
                         box_loss
                                                                          Size
       1/80
                 3.56G
                            2.141
                                       6.021
                                                   1.677
                                                                           640:
                                                                150
          | 34/34 [00:47<00:00, 1.39s/it]
100%|
                 Class
                           Images Instances
                                                   Box(P
                                                                  R
                                                                         mAP50
mAP50-95): 100%|
                     | 5/5 [00:03<00:00, 1.65it/s]
                   all
                                         690
                                                       0
                                                                  0
                                                                             0
                              136
0
      Epoch
               GPU_mem
                         box_loss
                                    cls_loss
                                                dfl_loss Instances
                                                                          Size
       2/80
                 4.02G
                            1.523
                                        5.614
                                                   1.207
                                                                153
                                                                           640:
100%|
          | 34/34 [00:45<00:00, 1.33s/it]
                           Images Instances
                 Class
                                                   Box(P
                                                                  R
                                                                         mAP50
mAP50-95): 100%|
                     | 5/5 [00:03<00:00, 1.38it/s]
```

	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
400%			1.399		1.094	176	640:
100%	1 3		5<00:00, 1		Boy (D	R	mAP50
mAP50)-95): 10		5/5 [00:05<			11	MAFOO
						0.03	0 00247
0.001	115	all	100	000	0.00110	0.00	0.00217
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	4/80	4.04G	1.393	5.22	1.075	129	640:
100%	3		5<00:00, 1			_	
m / D 5 ()_05)· 10		Images 5/5 [00:03<			R	mAP50
IIIAF 50)-93). 10						
0.006	375	all	136	690	0.00447	0.118	0.0117
0.000	575						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	5/80	4.06G	1.361	5.005	1.061	124	640:
100%	3		6<00:00, 1			_	
m A D E ()_05)· 10		Images 5/5 [00:02<			R	mAP50
IIIAF 30)-95). 10						
0.009	333	all	136	690	0.00678	0.211	0.0157
0.003	755						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	6/80	4.08G	1.365	4.796	1.065	183	640:
100%	3		6<00:00, 1				
~ A DE () OE). 10	Class	Images 5/5 [00:03<		Box(P	R	mAP50
IIIAF 30)-95). 10						
0.014	16	all	136	690	0.353	0.147	0.0238
0.014	±0						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	7/80	4.09G	1.338	4.534	1.054	119	640:
100%	3	34/34 [00:4	6<00:00, 1	.35s/it]			

Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
all 0.0206	136	690	0.702	0.0699	0.0337
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
8/80 4.11G 100% 34/34 [00:			1.058	114	640:
	Images	Instances		R	mAP50
all 0.0263	136	690	0.756	0.0672	0.043
Epoch GPU_mem	how logg	ala loga	dfl logg	Ingtoneog	Size
9/80 4.12G	_	_	_		
100% 34/34 [00:	46<00:00, 1	.37s/it]			
Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
all 0.0285	136	690	0.709	0.0868	0.0446
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
10/80 4.14G 100% 34/34 [00:			1.047	151	640:
Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
	136	690	0.63	0.0918	0.0503
0.0318					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
11/80 4.15G 100% 34/34 [00:			1.048	120	640:
	Images	Instances		R	mAP50
all	136	690	0.662	0.101	0.0535
0.0345					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
12/80 4.17G			1.043	121	640:
100% 34/34 [00: Class	46<00:00, 1 Images		Box(P	R	mAP50
mAP50-95): 100%	5/5 [00:02<	:00:00, 2.1	[2it/s]		

		all	136	690	0.578	0.0979	0.0552
0.036	33						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
100%			1.287 17<00:00, 1		1.036	140	640:
mAP50)-95): 10		Images 5/5 [00:02<			R	mAP50
		all	136	690	0.576	0.104	0.0581
0.037	78						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
100%			1.256		1.037	116	640:
		Class	16<00:00, 1 Images	Instances		R	mAP50
mAP50)-95): 10		5/5 [00:02<				
0.038	33	all	136	690	0.557	0.107	0.0582
	-	_	box_loss	_	_		
100%			1.255 44<00:00, 1		1.056	112	640:
m / D5/)_05)· 10		Images 5/5 [00:03<			R	mAP50
IIIAI OC	, 30). 10		136			0.122	0.0628
0.040)8	4.1.1			0.020	***==	0.0020
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	•		1.234		1.031	105	640:
100%	3		45<00:00, 1 Images		Box(P	R	mAP50
mAP50)-95): 10	0%	5/5 [00:03<	00:00, 1.5	[2it/s]		
0.043	86	all	136	690	0.514	0.127	0.067
0.040	,						
	-	_	box_loss	_	_		Size
100%		4.24G 34/34 [00:4	1.222 44<00:00, 1		1.031	143	640:

Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
all 0.0429	136	690	0.517	0.117	0.0662
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
18/80 4.26G 100% 34/34 [00:4			1.034	133	640:
Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
	136			0.119	0.068
0.0456					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
19/80 4.27G 100% 34/34 [00:4			1.038	131	640:
	Images	Instances		R	mAP50
	136	690	0.466	0.142	0.0673
0.0437					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
20/80 4.29G 100% 34/34 [00:4	47<00:00, 1	.39s/it]	1.044		640:
Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
	136	690	0.437	0.133	0.07
0.0454					
Epoch GPU_mem			dfl_loss	Instances	Size
21/80 4.3G 100% 34/34 [00:4	1.204 46<00:00, 1		1.027	133	640:
Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
	136			0.121	0.0716
0.0458					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
22/80 4.32G 100% 34/34 [00:4			1.039	103	640:
	Images	Instances		R	mAP50

al	1 136	690	0.448	0.15	0.0728
0.0477					
Epoch GPU_me	m box_loss	cls_loss	dfl_loss	Instances	Size
23/80 4.33 100% 34/34 [00			1.021	190	640:
ClasmAP50-95): 100%	s Images			R	mAP50
	1 136			0.141	0.0737
0.0476					
Epoch GPU_me	m box_loss	cls_loss	dfl_loss	Instances	Size
24/80 4.35 100% 34/34 [00			1.037	120	640:
Clas mAP50-95): 100%	s Images 5/5 [00:03			R	mAP50
	1 136	690	0.426	0.15	0.0767
0.0493					
Epoch GPU_me	m box_loss	cls_loss	dfl_loss	Instances	Size
25/80 4.36 100% 34/34 [00			1.027	118	640:
Clas	s Images	Instances		R	mAP50
mAP50-95): 100%				0 140	0.0700
0.0477	1 136	690	0.444	0.148	0.0728
Epoch GPU_me	m box_loss	cls_loss	dfl_loss	Instances	Size
26/80 4.38	G 1.153	2.838	1.029	111	640:
100% 34/34 [00 Clas	0:46<00:00, s Images		Box(P	R	mAP50
mAP50-95): 100%	•				
al 0.0509	1 136	690	0.405	0.152	0.0761
0.0309					
Epoch GPU_me	_	_	_		Size
27/80 4.39 100% 34/34 [00			1.032	143	640:
Clas mAP50-95): 100%	s Images 5/5 [00:02			R	mAP50

	8	all 13	6 690	0.426	0.139	0.0736
0.0485						
E	Epoch GPU_r	nem box_los	s cls_loss	dfl_loss	Instances	Size
	34/34 [1.15 00:45<00:00,	1.35s/it]			640:
mAP50-9		ass Image 5/5 [00:0			R	mAP50
mm 00 3		all 13			0 148	0 0742
0.0487	`	10	0 000	0.120	0.110	0.0712
	-	nem box_los				
		1.14 00:45<00:00,			138	640:
	Cla	ass Image	s Instances	Box(P	R	mAP50
mAP50-9	5): 100%	5/5 [00:0	2<00:00, 1.	89it/s]		
0.0503	8	all 13	6 690	0.435	0.14	0.0761
0.0303						
E	Epoch GPU_r	nem box_los	s cls_loss	dfl_loss	Instances	Size
		14G 1.15			182	640:
100%1		00:47<00:00, ass Image			R	mAP50
mAP50-9	5): 100%	5/5 [00:0	2<00:00, 1.	96it/s]		
0 0544	8	all 13	6 690	0.406	0.153	0.0783
0.0511						
E	Spoch GPU_r	nem box_los	s cls_loss	dfl_loss	Instances	Size
		16G 1.10		1.016	131	640:
100%		00:46<00:00, ass Image		Box(P	R	mAP50
mAP50-9		5/5 [00:0				
	8	all 13	6 690	0.428	0.148	0.0816
0.054						
E	Spoch GPU_r	nem box_los	s cls_loss	dfl_loss	Instances	Size
		17G 1.14			138	640:
100%		00:45<00:00, ass Image			R	mAP50
mAP50-9		5/5 [00:0			10	

0.054	14	all	136	690	0.381	0.157	0.0836
	Epoch	GPU mem	box_loss	cls loss	dfl loss	Instances	Size
100% I	33/80	4.48G	1.115 14<00:00, 1	2.726	_	159	
		Class	Images 5/5 [00:03<	Instances		R	mAP50
0.052	29	all	136	690	0.416	0.16	0.0794
0.002		CDII	h	-1- 1	161 1	T.,	Q:
	_		box_loss				
100%			1.111 45<00:00, 1		1.01	76	640:
		Class	Images 5/5 [00:02<	Instances		R	mAP50
0.052	26	all	136	690	0.383	0.149	0.0788
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
100%			1.133 46<00:00, 1			141	640:
		Class	Images 5/5 [00:02<	Instances	Box(P	R	mAP50
		all	136	690	0.391	0.163	0.0814
0.053	3						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
4000/1			1.12		1.005	129	640:
100%	3		15<00:00, 1 Images		Box (P	R.	mAP50
mAP50	95): 100		5/5 [00:02<				
		all	136	690	0.385	0.147	0.0819
0.054	12						
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
			1.109		1.015	157	640:
100%	3		16<00:00, 1 Images		Roy (D	R	mAP50
mAP50	95): 100		5/5 [00:02<			n	MAFOU
		all	136	690	0.409	0.157	0.0852
0.055	54						

Epocl	n GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	4.56G 34/34 [00:	47<00:00,	1.40s/it]			
mAP50-95):	Class 100%	Images 5/5 [00:02			R	mAP50
0.0577	all	136	690	0.415	0.161	0.0886
Epocl	n GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	4.57G 34/34 [00:			1.01	130	640:
		Images	Instances		R	mAP50
0.0561		136			0.168	0.0862
Epocl	n GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	4.59G 34/34 [00:			1.008	152	640:
		Images	Instances		R	mAP50
0.0574	all	136	690	0.377	0.152	0.0873
Epocl	n GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
	4.61G 34/34 [00:			1.017	105	640:
mAP50-95):	Class	Images 5/5 [00:02			R	mAP50
0.0597	all	136	690	0.384	0.164	0.0899
Epocl	n GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
42/80	4.62G	1.099	2.551	1.007		640:
100%	34/34 [00: Class			Box(P	R	mAP50
mAP50-95):	100%					
0.0588	all	136	690	0.354	0.151	0.0908

Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
43/80 4.63G 100% 34/34 [00:	45<00:00, 1	34s/it]			
Class mAP50-95): 100%	Images 5/5 [00:03<			R	mAP50
all 0.0621	136	690	0.435	0.162	0.0954
0.0021					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
44/80 4.65G 100% 34/34 [00:	45<00:00, 1	.33s/it]			640:
Class mAP50-95): 100%	Images 5/5 [00:03<			R	mAP50
all 0.0583	136	690	0.4	0.149	0.0893
Emach CDH mam	h]	-1- 1	467 7	T	Q:
Epoch GPU_mem	_	_	_		
45/80 4.67G 100% 34/34 [00:			0.9959	190	640:
	Images	Instances		R	mAP50
all	136	690	0.431	0.153	0.0904
0.0593					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
46/80 4.68G 100% 34/34 [00:			1.001	141	640:
	Images		Box(P	R	mAP50
mAP50-95): 100%	5/5 [00:04<	(00:00, 1.0)7it/s]		
all 0.0592	136	690	0.372	0.171	0.0905
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
47/80 4.7G	1.065	2.477	0.9991	94	640:
100% 34/34 [00: Class	Images	Instances	Box(P	R	mAP50
mAP50-95): 100%	5/5 [00:03<	(00:00, 1.6	S2it/s]		
all 0.0616	136	690	0.404	0.172	0.0944

Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
48/80 100% 34/	/34 [00:5	56<00:00, 1				640:
mAP50-95): 100%		_			R	mAP50
0.0625	all	136	690	0.374	0.172	0.0974
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
49/80 100% 34/			2.47	1.002	134	640:
mAP50-95): 100%	Class	Images	Instances		R	mAP50
0.0593					0.165	0.0911
-	_	_	_	_	Instances	
50/80 100% 34/			2.456 L.36s/it]	0.9898	147	640:
	Class	Images	Instances		R	mAP50
0.0627	all	136	690	0.438	0.148	0.0954
0.0027						
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
51/80 100% 34/	/34 [00:4	17<00:00, 1				640:
mAP50-95): 100%		_	Instances (00:00, 1.8		R	mAP50
0.0614	all	136	690	0.382	0.166	0.094
Enash	CDII a	h 1	-1- 1	J£1 1	Twateres	Q:
-	_	_	_	_	Instances	
52/80 100% 34/	4.77G /34 [00:4			1.002	160	640:
mAP50-95): 100%		_	Instances		R	mAP50
	all	136	690	0.429	0.151	0.0976
0.0635						
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size

53/80 4.79G 1.035 2.4 100% 34/34 [00:46<00:00, 1.38s/it	
Class Images Instance mAP50-95): 100% 5/5 [00:02<00:00,	ces Box(P R mAP50 1.83it/s]
all 136 6	690 0.46 0.17 0.0933
Epoch GPU_mem box_loss cls_lo	oss dfl_loss Instances Size
54/80 4.8G 1.043 2.3 100% 34/34 [00:45<00:00, 1.35s/it	
Class Images Instance mAP50-95): 100% 5/5 [00:03<00:00,	ces Box(P R mAP50 1.61it/s]
all 136 6	690 0.397 0.152 0.0929
Epoch GPU_mem box_loss cls_1c	oss dfl_loss Instances Size
55/80 4.82G 1.039 2.4	
100% 34/34 [00:44<00:00, 1.32s/it Class Images Instance MAP50-95): 100% 5/5 [00:03<00:00,	ces Box(P R mAP50
	0.168 0.0933
0.0606	
Epoch GPU_mem box_loss cls_lo	oss dfl_loss Instances Size
56/80 4.83G 1.023 2.3 100% 34/34 [00:46<00:00, 1.35s/it]
Class Images Instance mAP50-95): 100% 5/5 [00:03<00:00,	ces Box(P R mAP50 1.61it/s]
all 136 6	690 0.421 0.172 0.0954
Epoch GPU_mem box_loss cls_lo	oss dfl_loss Instances Size
57/80 4.85G 1.04 2.3	
100% 34/34 [00:44<00:00, 1.31s/it Class Images Instance MAP50-95): 100% 5/5 [00:02<00:00,	ces Box(P R mAP50
·	690 0.384 0.162 0.0912
0.0587	
Epoch GPU_mem box_loss cls_1c	oss dfl_loss Instances Size
58/80 4.86G 1.044 2.3 100% 34/34 [00:46<00:00, 1.36s/it	363 0.9942 193 640:]

Class Images In mAP50-95): 100% 5/5 [00:02<00		R	mAP50
all 136 0.0595	690 0.454	0.165	0.0934
Epoch GPU_mem box_loss o	cls_loss dfl_loss	Instances	Size
59/80 4.88G 1.008 100% 34/34 [00:47<00:00, 1.40		165	640:
Class Images In mAP50-95): 100% 5/5 [00:02<00		R	mAP50
all 136 0.059	690 0.343	0.171	0.0921
Epoch GPU_mem box_loss o	cls_loss dfl_loss	Instances	Size
60/80 4.89G 1.042 100% 34/34 [00:46<00:00, 1.38		175	640:
Class Images Ir mAP50-95): 100% 5/5 [00:02<00	stances Box(P	R	mAP50
	690 0.443	0.149	0.094
0.0616			
Epoch GPU_mem box_loss o	cls_loss dfl_loss	Instances	Size
61/80 4.91G 1.017 100% 34/34 [00:45<00:00, 1.38	ōs/it]		640:
Class Images Ir mAP50-95): 100% 5/5 [00:02<00		R	mAP50
all 136 0.0619	690 0.397	0.17	0.0947
Epoch GPU_mem box_loss o	cls_loss dfl_loss	Instances	Size
62/80 4.92G 1.036 100% 34/34 [00:46<00:00, 1.38		110	640:
Class Images Ir mAP50-95): 100% 5/5 [00:02<00	stances Box(P	R	mAP50
all 136	690 0.401	0.16	0.0973
0.0636			
Epoch GPU_mem box_loss o	cls_loss dfl_loss	Instances	Size
63/80 4.94G 1.021 100% 34/34 [00:45<00:00, 1.34	4s/it]		640:
Class Images In mAP50-95): 100% 5/5 [00:03<00		R	mAP50

0.0645	all	136	690	0.422	0.164	0.0995
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
64/80 100% 3				0.9799	114	640:
mAP50-95): 10	Class	Images	Instances		R	mAP50
mai 00 00). 10					0.169	0.0958
0.0617						
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
65/80 100% 3				0.984	132	640:
	Class	Images	Instances		R	mAP50
0.005	all	136	690	0.409	0.16	0.1
0.065						
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
66/80 100% 3				0.9811	131	640:
mAP50-95): 10	Class	Images	Instances		R	mAP50
	all	136	690	0.414	0.17	0.1
0.0643						
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
67/80 100% 3				0.972	152	640:
100% -				Box(P	R	mAP50
mAP50-95): 10	00%	5/5 [00:02	<00:00, 1.9	91it/s]		
0.0625	all	136	690	0.401	0.164	0.0969
Enoch	CDII mom	how logg	ela loga	dfl logg	Instances	Size
_				0.9845		
100% 3				0.9045	151	040.
mAP50-95): 10		•		Box(P	R	mAP50
шкі ОО <i>ЭО</i>). Т					0.162	0.0999
0.0644	all	100	030	0.420	0.102	0.0000

Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
69/80 100% 3		1.02 45<00:00, 1		0.9776	161	640:
mAP50-95): 10	Class	•	Instances	Box(P Git/s]	R	mAP50
0.0633	all	136	690	0.398	0.167	0.0978
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
70/80 100% 3		1.022 15<00:00, 1	2.31 1.34s/it]	0.9812	103	640:
mAP50-95): 10	Class	Images	Instances		R	mAP50
	all		690	0.436	0.162	0.0989
0.064						
Closing dataler albumentation blur_limit=(3	s: Blur(p= , 7)), ToG	0.01, blur_ ray(p=0.01,	method='we	ighted_aver	age',	
num_output_ch	annels=3),	CLAHE (P=0.	OI, CIIP_III	mit=(1.0, 4	.0), tile_g	rid_size=(8,
8))			cls_loss		·	
8)) Epoch 71/80	GPU_mem	box_loss	cls_loss		·	
8)) Epoch	GPU_mem 5.06G 34/34 [00:4 Class	box_loss 1.016 49<00:00, 1 Images	cls_loss 2.586 1.45s/it] Instances	dfl_loss 1.012 Box(P	Instances	Size
8)) Epoch 71/80 100% 3	GPU_mem 5.06G 34/34 [00:4 Class	box_loss 1.016 49<00:00, 1 Images	cls_loss 2.586 1.45s/it] Instances	dfl_loss 1.012 Box(P	Instances	Size 640: mAP50
8)) Epoch 71/80 100% 3 mAP50-95): 100 0.0577	GPU_mem 5.06G 34/34 [00:4 Class 0% all	box_loss 1.016 49<00:00, 1 Images 5/5 [00:02< 136	cls_loss 2.586 1.45s/it] Instances <00:00, 1.8	dfl_loss 1.012 Box(P 3it/s] 0.369	Instances 102 R 0.177	Size 640: mAP50 0.0907
Epoch 71/80 100% 3 mAP50-95): 10 0.0577 Epoch 72/80	GPU_mem 5.06G 34/34 [00:4 Class 0% all GPU_mem 5.07G	box_loss 1.016 19<00:00, 1 Images 5/5 [00:02< 136 box_loss 1.002	cls_loss	dfl_loss 1.012 Box(P 3it/s] 0.369 dfl_loss	Instances 102 R 0.177	Size 640: mAP50 0.0907
Epoch 71/80 100% 3 mAP50-95): 100 0.0577 Epoch 72/80 100% 3	GPU_mem 5.06G 4/34 [00:4 Class 0% all GPU_mem 5.07G 64/34 [00:4	box_loss 1.016 49<00:00, 1 Images 5/5 [00:02< 136 box_loss 1.002 46<00:00, 1 Images	cls_loss	dfl_loss 1.012 Box(P 3it/s] 0.369 dfl_loss 0.9965 Box(P	Instances 102 R 0.177 Instances 68	Size 640: mAP50 0.0907
Epoch 71/80 100% 3 mAP50-95): 10 0.0577 Epoch 72/80	GPU_mem 5.06G 4/34 [00:4 Class 0% all GPU_mem 5.07G 64/34 [00:4 Class	box_loss	cls_loss	dfl_loss 1.012 Box(P 3it/s] 0.369 dfl_loss 0.9965 Box(P	Instances 102 R 0.177 Instances 68	Size 640: mAP50 0.0907 Size 640: mAP50
Epoch 71/80 100% 3 mAP50-95): 100 0.0577 Epoch 72/80 100% 3	GPU_mem 5.06G 4/34 [00:4 Class 0% all GPU_mem 5.07G 64/34 [00:4 Class	box_loss	cls_loss	dfl_loss 1.012 Box(P 3it/s] 0.369 dfl_loss 0.9965 Box(P	Instances 102 R 0.177 Instances 68 R	Size 640: mAP50 0.0907 Size 640: mAP50

73/80 5.09G 100% 34/34 [00:4			0.9826	61	640:
Class mAP50-95): 100%	Images 5/5 [00:03<			R	mAP50
	136			0.157	0.0861
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
74/80 5.1G 100% 34/34 [00:4			0.9888	59	640:
Class mAP50-95): 100%	Images 5/5 [00:03<			R	mAP50
all 0.0554	136	690	0.42	0.173	0.0873
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
75/80 5.12G 100% 34/34 [00:4			0.9817	73	640:
	Images	Instances		R	mAP50
all 0.057	136	690	0.45	0.152	0.0886
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
76/80 5.13G			0.9729	66	640:
100% 34/34 [00:4 Class mAP50-95): 100%	Images	Instances		R	mAP50
	136			0.152	0.0919
0.0584					
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
77/80 5.15G 100% 34/34 [00:4			0.9807	82	640:
Class mAP50-95): 100%	Images 5/5 [00:02<			R	mAP50
all 0.0584	136	690	0.478	0.15	0.0916
Epoch GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
78/80 5.16G 100% 34/34 [00:4			0.9798	65	640:

		•	Instances		R	mAP50
mAP50-95): 100	0%	5/5 [00:02	<00:00, 1.8	3it/s]		
	all	136	690	0.459	0.156	0.0919
0.0587						
Epoch	GPU mem	box loss	cls_loss	dfl loss	Instances	Size
-	_	_	_	_		
			2.334	0.9711	47	640:
100% 34				,		
_		_	Instances		R	mAP50
mAP50-95): 100	0%	5/5 [00:03	<00:00, 1.4	3it/s]		
	all	136	690	0.463	0.155	0.0919
0.0588						
Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
80/80	5.19G	0.9468	2.312	0.974	92	640:
100% 34	4/34 [00:4	44<00:00, 1	l.31s/it]			
	Class	Images	Instances	Box(P	R	mAP50
mAP50-95): 100		_				
	all	136	690	0.46	0.157	0.0921
0.0588						

80 epochs completed in 1.143 hours.

Optimizer stripped from runs/detect/dentex_train/weights/last.pt, 5.6MB Optimizer stripped from runs/detect/dentex_train/weights/best.pt, 5.6MB

Validating runs/detect/dentex_train/weights/best.pt...

Ultralytics 8.3.155 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (Tesla T4, 15095MiB)

YOLOv12n summary (fused): 159 layers, 2,617,157 parameters, 0 gradients, 6.6 GFLOPs

mAP50-95): 100%	Class 5/	O	nstances):00, 1.50s	Box(P /it]	R	mAP50
	all	136	690	0.409	0.16	0.0972
0.0627						
11_	Carie	1	1	0	0	0
0						
11_Lesao_Peria	pical	1	1	1	0	0
0	-					
12	Carie	7	7	0	0	0.0306
0.0204	•					
12_Carie_Pro	funda	1	1	1	0	0
0						
13	Carie	2	2	1	0	0
0						

13_Carie_Profunda	1	1	0	0	0
0 14_Carie	8	8	0.16	0.125	0.0695
0.0451 14_Carie_Profunda	2	2	1	0	0.107
0.0321 15_Carie	13	13	0.209	0.231	0.11
0.0669 15_Carie_Profunda	2	2	1	0	0
0			0	0	0
15_Lesao_Periapical 0	1	1			
16_Carie 0.126	29	29	0.183	0.379	0.182
16_Carie_Profunda 0.0595	9	9	0	0	0.103
16_Lesao_Periapical	1	1	0	0	0
0 17_Carie	30	30	0.0662	0.1	0.0769
0.0543 17_Carie_Profunda	9	10	0.443	0.1	0.144
0.0506 17_Lesao_Periapical	1	1	0	0	0
0					
18_Carie 0.0281	11	11	0.0571	0.0909	0.0394
18_Carie_Profunda 0.108	7	7	0.174	0.143	0.16
18_Impactado	26	26	0.376	0.885	0.557
0.323 21_Carie	3	3	1	0	0.008
0.0056	1	1	1	0	0
21_Lesao_Periapical 0	1	1	1	O	O
22_Carie 0.0104	7	7	0	0	0.0139
22_Carie_Profunda	1	1	1	0	0
0					
22_Lesao_Periapical	1	1	1	0	0
23_Carie	1	1	0	0	0
0 24_Carie	2	2	0	0	0.00562
0.00449	2	2	U	U	0.00302
24_Carie_Profunda	4	4	1	0	0.254
0.153 24_Lesao_Periapical	1	1	0	0	0
0	1	1	Ů	Ŭ	0

25_Carie	15	15	0.0792	0.133	0.132
0.0866 25_Carie_Profunda	2	2	1	0	0.248
0.174 26_Carie	26	26	0.191	0.577	0.185
0.147 26_Carie_Profunda 0.0412	5	5	0	0	0.0731
26_Lesao_Periapical	1	1	1	0	0
27_Carie	22	22	0.0749	0.182	0.0795
27_Carie_Profunda 0.0293	6	6	1	0	0.0442
28_Carie 0.0442	8	8	0.0532	0.125	0.0742
28_Carie_Profunda 0.0247	7	7	0	0	0.0324
28_Impactado 0.255	21	21	0.353	1	0.54
31_Carie	1	1	0	0	0
31_Lesao_Periapical	1	1	0	0	0
32_Carie	1	1	0	0	0
32_Lesao_Periapical	1	1	0	0	0
33_Carie	3	3	1	0	0
33_Carie_Profunda 0	1	1	1	0	0
34_Carie 0.0567	14	14	0.159	0.214	0.0881
34_Carie_Profunda 0.00912	5	5	1	0	0.0181
35_Carie 0.158	19	19	0.149	0.579	0.227
35_Carie_Profunda 0.0121	6	6	0	0	0.018
35_Lesao_Periapical 0.0383	1	1	1	0	0.0765
36_Carie 0.134	23	23	0.137	0.739	0.17
36_Carie_Profunda 0.289	17	17	0.226	0.603	0.44
36_Lesao_Periapical 0.0278	6	6	0.0462	0.167	0.0426

37_Carie	34	34	0.15	0.647	0.212
0.157 37_Carie_Profunda	6	6	0	0	0.0688
0.055 37_Lesao_Periapical	2	2	1	0	0.0785
0.0489 38_Carie	9	9	0.0616	0.222	0.0845
0.0645 38_Carie_Profunda	3	3	1	0	0.0194
0.00855 38_Impactado	41	41	0.394	0.976	0.703
0.486 41_Carie	2	2	1	0	0
0 41_Lesao_Periapical	3	3	0	0	0
0 42_Carie	3	3	1	0	0
0 42_Lesao_Periapical	1	1	1	0	0
0 43_Carie	2	2	1	0	0
0 44_Carie	13	13	0.183	0.154	0.161
0.112 45_Carie	16	16	0.103	0.375	0.184
0.141 45_Carie_Profunda	4	4	0.247	0.25	0.0794
0.0686 45_Lesao_Periapical	1	1	1	0	0
0 46_Carie	35	35	0.209	0.8	0.214
0.159 46_Carie_Profunda	13	13	0.136	0.158	0.146
0.101 46_Lesao_Periapical	6	6	1	0	0.0816
0.037 47_Carie	39	39	0.164	0.744	0.237
0.18 47_Carie_Profunda	6	6	0.0752	0.167	0.0995
0.0661 47_Lesao_Periapical	1	1	1	0.107	0.0333
0					
48_Carie 0.0843	17	17	0.0925	0.294	0.115
48_Carie_Profunda 0.0993	6	6	0.289	0.167	0.162
48_Impactado 0.296	31	31	0.258	0.968	0.49

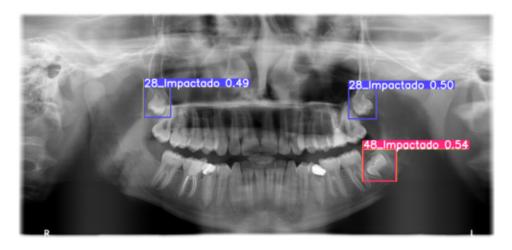
Speed: 0.1ms preprocess, 4.0ms inference, 0.0ms loss, 2.5ms postprocess per image
Results saved to runs/detect/dentex_train

```
[7]: results = model.predict(
    source="/content/dentex_yolo12n/images/val/train_655.png",
    conf=0.25,
    iou=0.7,
    save=True,
    save_crop=True,
    save_txt=True
)
```

image 1/1 /content/dentex_yolo12n/images/val/train_655.png: 320x640 2
18_Impactados, 2 28_Impactados, 1 38_Impactado, 1 48_Impactado, 98.1ms
Speed: 4.9ms preprocess, 98.1ms inference, 6.5ms postprocess per image at shape
(1, 3, 320, 640)
Results saved to runs/detect/dentex_train2
1 label saved to runs/detect/dentex_train2/labels

```
[8]: import matplotlib.pyplot as plt

plt.imshow(results[0].plot())
plt.axis('off')
plt.show()
```



[14]: !unzip validation_data.zip

Archive: validation_data.zip
 creating: validation_data/

creating: validation_data/quadrant_enumeration_disease/

```
creating: validation_data/quadrant_enumeration_disease/xrays/
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_44.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_18.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_32.png
  inflating: validation data/quadrant enumeration disease/xrays/val 41.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_27.png
  inflating: validation data/quadrant enumeration disease/xrays/val 15.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_26.png
   creating:
validation_data/quadrant_enumeration_disease/xrays/.ipynb_checkpoints/
  inflating: validation_data/quadrant_enumeration_disease/xrays/.ipynb_checkpoin
ts/val_0-checkpoint.png
  inflating: validation data/quadrant_enumeration_disease/xrays/val_34.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_45.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_28.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_22.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_40.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_24.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_13.png
  inflating: validation data/quadrant enumeration disease/xrays/val 46.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_6.png
  inflating: validation data/quadrant enumeration disease/xrays/val 31.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_33.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_10.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_2.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_14.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_1.png
  inflating: validation data/quadrant_enumeration_disease/xrays/val_20.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_30.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_5.png
  inflating: validation data/quadrant enumeration disease/xrays/val_9.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_49.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_4.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_37.png
  inflating: validation data/quadrant enumeration disease/xrays/val 48.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_21.png
  inflating: validation data/quadrant enumeration disease/xrays/val 16.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_35.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_25.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_12.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_11.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_23.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_17.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_47.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_7.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_36.png
  inflating: validation_data/quadrant_enumeration_disease/xrays/val_29.png
  inflating: validation data/quadrant enumeration disease/xrays/val_3.png
```

inflating: validation_data/quadrant_enumeration_disease/xrays/val_8.png inflating: validation_data/quadrant_enumeration_disease/xrays/val_38.png

image 1/1
/content/validation_data/quadrant_enumeration_disease/xrays/val_14.png: 320x640
1 38_Impactado, 1 48_Impactado, 16.9ms
Speed: 3.5ms preprocess, 16.9ms inference, 2.2ms postprocess per image at shape
(1, 3, 320, 640)
Results saved to runs/detect/dentex_train3
1 label saved to runs/detect/dentex_train3/labels

```
[16]: import matplotlib.pyplot as plt

plt.imshow(results[0].plot())
plt.axis('off')
plt.show()
```



[17]: resultados = model.val()

Ultralytics 8.3.155 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (Tesla T4, 15095MiB)

val: Fast image access (ping: 0.0 ± 0.0 ms, read: 2924.1 ± 585.8 MB/s, size: 4206.3 KB)

val: Scanning /content/dentex_yolo12n/labels/val.cache... 136

images, 0 backgrounds,				00:00 , ?it</th <th>:/s]</th>	:/s]
Class		Instances	Box(P	R	mAP50
mAP50-95): 100%	9/9 [00:11	<00:00, 1.3	25s/it]		
all	136	690	0.412	0.162	0.103
0.0667					
11_Carie	1	1	0	0	0
0 11_Lesao_Periapical	1	1	1	0	0
0	-	-	-	· ·	ŭ
12_Carie	7	7	0	0	0.0323
0.0222					
12_Carie_Profunda	1	1	1	0	0
13_Carie	2	2	1	0	0
0	_	_	_	•	_
13_Carie_Profunda	1	1	0	0	0
0			0.40	0.405	
14_Carie 0.0463	8	8	0.16	0.125	0.0693
14_Carie_Profunda	2	2	1	0	0.108
0.0216					
15_Carie	13	13	0.224	0.231	0.115
0.0739	0	0		•	
15_Carie_Profunda 0	2	2	1	0	0
15_Lesao_Periapical	1	1	0	0	0
0					
16_Carie	29	29	0.178	0.379	0.187
0.129	9	9	0.148	0.0821	0.135
16_Carie_Profunda 0.074	9	9	0.140	0.0021	0.135
16_Lesao_Periapical	1	1	0	0	0
0					
17_Carie	30	30	0.0797	0.124	0.0821
0.0585 17_Carie_Profunda	9	10	0.452	0.1	0.139
0.0504	9	10	0.402	0.1	0.103
17_Lesao_Periapical	1	1	0	0	0

٥					
0 18_Carie	11	11	0.0545	0.0909	0.0419
0.0288					
18_Carie_Profunda 0.112	7	7	0.147	0.143	0.166
18_Impactado	26	26	0.376	0.885	0.556
0.313 21_Carie	3	3	1	0	0.00818
0.00572					
21_Lesao_Periapical 0	1	1	1	0	0
22_Carie 0.0106	7	7	0	0	0.0142
22_Carie_Profunda	1	1	1	0	0
0 22_Lesao_Periapical	1	1	1	0	0
0					
23_Carie	1	1	0	0	0
24_Carie 0.00439	2	2	0	0	0.00548
0.00439 24_Carie_Profunda	4	4	1	0	0.254
0.153 24_Lesao_Periapical	1	1	0	0	0
0					
25_Carie 0.09	15	15	0.0796	0.133	0.139
25_Carie_Profunda	2	2	1	0	0.496
0.347	0.0	0.0	0.404	0 555	0.400
26_Carie 0.149	26	26	0.194	0.577	0.188
26_Carie_Profunda	5	5	0	0	0.071
0.0392					
26_Lesao_Periapical	1	1	1	0	0
0	00	00	0.0000	0.400	0.0757
27_Carie 0.0486	22	22	0.0686	0.182	0.0757
27_Carie_Profunda	6	6	1	0	0.0448
0.0304	· ·	G	-	· ·	0.0110
28_Carie	8	8	0.0534	0.125	0.0685
0.0431					
28_Carie_Profunda	7	7	0.0354	0.0304	0.0453
0.0346	0.4	0.4	0.050		
28_Impactado 0.263	21	21	0.353	1	0.539
0.265 31_Carie	1	1	0	0	0
0	-	-	v	v	v
31_Lesao_Periapical	1	1	0	0	0

0					
32_Carie	1	1	0	0	0
0					
32_Lesao_Periapical	1	1	0	0	0
33_Carie	3	3	1	0	0
0 33_Carie_Profunda	1	1	1	0	0
0 34_Carie	14	14	0.189	0.214	0.0973
0.063	F	F	4	0	0 0101
34_Carie_Profunda 0.00914	5	5	1	0	0.0181
35_Carie	19	19	0.157	0.579	0.246
0.177	C	0	0	0	0.0404
35_Carie_Profunda 0.0122	6	6	0	0	0.0181
35_Lesao_Periapical	1	1	1	0	0.0765
0.0383 36_Carie	23	23	0.137	0.739	0.184
0.146					
36_Carie_Profunda 0.287	17	17	0.222	0.604	0.424
36_Lesao_Periapical	6	6	0.0452	0.167	0.0429
0.028 37_Carie	34	34	0.149	0.647	0.232
0.169					
37_Carie_Profunda	6	6	0	0	0.0715
0.0568 37_Lesao_Periapical	2	2	1	0	0.0791
0.0493	2	2	1	U	0.0791
38_Carie	9	9	0.0613	0.222	0.0837
0.0649					0.0404
38_Carie_Profunda 0.00856	3	3	1	0	0.0194
38_Impactado	41	41	0.394	0.976	0.716
0.499					
41_Carie	2	2	1	0	0
0 41_Lesao_Periapical	3	3	0	0	0
0	_	_	•	•	-
42_Carie	3	3	1	0	0
0	1	1	1	0	0
42_Lesao_Periapical	1	1	1	U	U
43_Carie	2	2	1	0	0
0 44_Carie	13	13	0.188	0.154	0.172

0.121	45_Carie	16	16	0.102	0.375	0.18	
0.141	_						
	5_Carie_Profunda	4	4	0.247	0.25	0.0794	
0.0686	<u> </u>						
	Lesao_Periapical	1	1	1	0	0	
0	- 1						
0.47	46_Carie	35	35	0.205	0.8	0.228	
0.17 4	6_Carie_Profunda	13	13	0.132	0.153	0.14	
0.097							
46_ 0.0377	Lesao_Periapical	6	6	1	0	0.0829	
	47_Carie	39	39	0.164	0.751	0.235	
0.178	7_Carie_Profunda	6	6	0.0754	0.167	0.0996	
0.0661		O	Ū	0.0701	0.101	0.0550	
	Lesao_Periapical	1	1	1	0	0	
0	<u>-</u> <u>-</u>						
	48_Carie	17	17	0.0923	0.294	0.113	
0.0823	_						
4	8_Carie_Profunda	6	6	0.289	0.167	0.162	
0.101							
	48_Impactado	31	31	0.261	0.981	0.528	
0.316							
Speed:	1.4ms preprocess, 8.	2ms infere	nce, 0.0ms	loss, 2.9m	s postproce	ess per	
image							
Result	s saved to runs/detec	t/dentex_t	cain4				
[10].	("M5+mi as a ml abai a . ")						
-	("Métricas globais:")	1	FO O.E.) I.	`			
-		ados.box.ma	•)			
print	(f'mAP50-95: {resulta	ados.box.ma	.p:.3I}')				
Métric	as globais:						
mAP50:	•						
mAP50-							
	-r runs.zip runs/						
[10]. [:ZIP	r runs.zrp runs/						
addi	ng: runs/ (stored 0%)						
addi	ng: runs/detect/ (sto	red 0%)					
	ng: runs/detect/dente		(stored 0%)			
	ng: runs/detect/dente	_			d 1%)		
	ng: runs/detect/dente	_		10			
	ng: runs/detect/dente				deflated 49	9%)	
	ng: runs/detect/dente						
	ng: runs/detect/dente		_		tored 0%)		
	ng: runs/detect/dente		_	-		(deflated	
3%)			·				

```
adding: runs/detect/dentex_train2/crops/28_Impactado/train_6552.jpg (deflated
3%)
  adding: runs/detect/dentex_train2/crops/38_Impactado/ (stored 0%)
  adding: runs/detect/dentex_train2/crops/38_Impactado/train_655.jpg (deflated
3%)
  adding: runs/detect/dentex train2/crops/18 Impactado/ (stored 0%)
  adding: runs/detect/dentex train2/crops/18 Impactado/train 655.jpg (deflated
3%)
  adding: runs/detect/dentex_train2/crops/18_Impactado/train_6552.jpg (deflated
3%)
  adding: runs/detect/dentex_train2/crops/48_Impactado/ (stored 0%)
  adding: runs/detect/dentex_train2/crops/48_Impactado/train_655.jpg (deflated
3%)
  adding: runs/detect/dentex_train/ (stored 0%)
  adding: runs/detect/dentex_train/labels_correlogram.jpg (deflated 37%)
  adding: runs/detect/dentex_train/train_batch2381.jpg (deflated 14%)
  adding: runs/detect/dentex_train/labels.jpg (deflated 32%)
  adding: runs/detect/dentex_train/val_batch0_pred.jpg (deflated 11%)
  adding: runs/detect/dentex_train/train_batch2380.jpg (deflated 16%)
  adding: runs/detect/dentex train/val batch1 pred.jpg (deflated 12%)
  adding: runs/detect/dentex train/weights/ (stored 0%)
  adding: runs/detect/dentex train/weights/best.pt (deflated 11%)
  adding: runs/detect/dentex_train/weights/last.pt (deflated 11%)
  adding: runs/detect/dentex train/F1 curve.png (deflated 12%)
  adding: runs/detect/dentex_train/train_batch0.jpg (deflated 8%)
  adding: runs/detect/dentex_train/val_batch2 pred.jpg (deflated 11%)
  adding: runs/detect/dentex train/val batch2 labels.jpg (deflated 10%)
  adding: runs/detect/dentex_train/P_curve.png (deflated 8%)
  adding: runs/detect/dentex_train/val_batch0_labels.jpg (deflated 10%)
  adding: runs/detect/dentex_train/R_curve.png (deflated 11%)
  adding: runs/detect/dentex_train/confusion_matrix_normalized.png (deflated
25%)
  adding: runs/detect/dentex_train/train_batch2382.jpg (deflated 20%)
  adding: runs/detect/dentex_train/val_batch1_labels.jpg (deflated 11%)
  adding: runs/detect/dentex train/results.png (deflated 8%)
  adding: runs/detect/dentex_train/train_batch1.jpg (deflated 8%)
  adding: runs/detect/dentex train/confusion matrix.png (deflated 24%)
  adding: runs/detect/dentex_train/results.csv (deflated 61%)
  adding: runs/detect/dentex_train/args.yaml (deflated 53%)
  adding: runs/detect/dentex_train/PR_curve.png (deflated 11%)
  adding: runs/detect/dentex_train/train_batch2.jpg (deflated 6%)
  adding: runs/detect/dentex_train3/ (stored 0%)
  adding: runs/detect/dentex_train3/val_14.jpg (deflated 0%)
  adding: runs/detect/dentex_train3/labels/ (stored 0%)
  adding: runs/detect/dentex_train3/labels/val_14.txt (deflated 32%)
  adding: runs/detect/dentex_train3/crops/ (stored 0%)
  adding: runs/detect/dentex_train3/crops/38_Impactado/ (stored 0%)
  adding: runs/detect/dentex_train3/crops/38_Impactado/val_14.jpg (deflated 2%)
```

```
adding: runs/detect/dentex_train3/crops/48_Impactado/ (stored 0%)
       adding: runs/detect/dentex_train3/crops/48_Impactado/val_14.jpg (deflated 2%)
       adding: runs/detect/dentex_train4/ (stored 0%)
       adding: runs/detect/dentex_train4/val_batch0_pred.jpg (deflated 11%)
       adding: runs/detect/dentex train4/val batch1 pred.jpg (deflated 11%)
       adding: runs/detect/dentex_train4/F1_curve.png (deflated 12%)
       adding: runs/detect/dentex train4/val batch2 pred.jpg (deflated 12%)
       adding: runs/detect/dentex_train4/val_batch2_labels.jpg (deflated 11%)
       adding: runs/detect/dentex_train4/P_curve.png (deflated 8%)
       adding: runs/detect/dentex_train4/val_batch0_labels.jpg (deflated 10%)
       adding: runs/detect/dentex_train4/R_curve.png (deflated 11%)
       adding: runs/detect/dentex_train4/confusion_matrix_normalized.png (deflated
     25%)
       adding: runs/detect/dentex_train4/val_batch1_labels.jpg (deflated 10%)
       adding: runs/detect/dentex_train4/confusion_matrix.png (deflated 24%)
       adding: runs/detect/dentex_train4/PR_curve.png (deflated 11%)
[20]: from google.colab import files
      files.download("runs.zip")
     <IPython.core.display.Javascript object>
     <IPython.core.display.Javascript object>
```