In [ ]:
```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="1JyiLkbtwZmSoXCqXEnc")
project = rf.workspace("grupo-6-placas").project("peru-plate-numbers")
version = project.version(3)
dataset = version.download("yolov11")
```

In [6]:
```
from ultralytics import YOLO
import os

# Load a model
model = YOLO("yolo11n.pt")

cwd = os.getcwd()
rel_path = r"Peru-Plate-Numbers-3\data.yaml"
# Train the model
train_results = model.train(
    data= os.path.join(cwd,rel_path),  # path to dataset YAML Peru-Plate-Numbers
    batch=-1,
    epochs=100,  # number of training epochs
    imgsz=640,  # training image size
    device=0,  # device to run on, i.e. device=0 or device=0,1,2,3 or device=cpu
)

# Evaluate model performance on the validation set
metrics = model.val()
```

```
Ultralytics 8.3.6  Python-3.10.11 torch-2.4.1+cu124 CUDA:0 (NVIDIA GeForce RTX 30
80, 10240MiB)
engine\trainer: task=detect, mode=train, model=yolo11n.pt, data=c:\Users\kainak0
\Documents\gitProjects\mia\MIA-203_redes_neuronales\Peru-Plate-Numbers-3\data.yam
l, epochs=100, time=None, patience=100, batch=-1, imgsz=640, save=True, save_peri
od=-1, cache=False, device=0, workers=8, project=None, name=train3, exist_ok=Fals
e, pretrained=True, optimizer=auto, verbose=True, seed=0, deterministic=True, sin
gle_cls=False, rect=False, cos_lr=False, close_mosaic=10, resume=False, amp=True,
fraction=1.0, profile=False, freeze=None, multi_scale=False, overlap_mask=True, m
ask_ratio=4, dropout=0.0, val=True, split=val, save_json=False, save_hybrid=Fals
e, conf=None, iou=0.7, max_det=300, half=False, dnn=False, plots=True, source=Non
e, vid_stride=1, stream_buffer=False, visualize=False, augment=False, agnostic_nm
s=False, classes=None, retina_masks=False, embed=None, show=False, save_frames=Fa
lse, save_txt=False, save_conf=False, save_crop=False, show_labels=True, show_con
f=True, show_boxes=True, line_width=None, format=torchscript, keras=False, optimi
ze=False, int8=False, dynamic=False, simplify=True, opset=None, workspace=4, nms=
False, lr0=0.01, lrf=0.01, momentum=0.937, weight_decay=0.0005, warmup_epochs=3.
0, warmup_momentum=0.8, warmup_bias_lr=0.1, box=7.5, cls=0.5, dfl=1.5, pose=12.0,
kobj=1.0, label_smoothing=0.0, nbs=64, hsv_h=0.015, hsv_s=0.7, hsv_v=0.4, degrees
=0.0, translate=0.1, scale=0.5, shear=0.0, perspective=0.0, flipud=0.0, fliplr=0.
5, bgr=0.0, mosaic=1.0, mixup=0.0, copy_paste=0.0, copy_paste_mode=flip, auto_aug
ment=randaugment, erasing=0.4, crop_fraction=1.0, cfg=None, tracker=botsort.yaml,
save_dir=runs\detect\train3
Overriding model.yaml nc=80 with nc=2

                   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]
  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]
  6                  -1  1     87040  ultralytics.nn.modules.block.C3k2
[128, 128, 1, True]
  7                  -1  1    295424  ultralytics.nn.modules.conv.Conv
[128, 256, 3, 2]
  8                  -1  1    346112  ultralytics.nn.modules.block.C3k2
[256, 256, 1, True]
  9                  -1  1    164608  ultralytics.nn.modules.block.SPPF
[256, 256, 5]
 10                  -1  1    249728  ultralytics.nn.modules.block.C2PSA
[256, 256, 1]
 11                  -1  1         0  torch.nn.modules.upsampling.Upsample
[None, 2, 'nearest']
 12             [-1, 6]  1         0  ultralytics.nn.modules.conv.Concat
[1]
 13                  -1  1    111296  ultralytics.nn.modules.block.C3k2
[384, 128, 1, False]
 14                  -1  1         0  torch.nn.modules.upsampling.Upsample
[None, 2, 'nearest']
 15             [-1, 4]  1         0  ultralytics.nn.modules.conv.Concat
[1]
 16                  -1  1     32096  ultralytics.nn.modules.block.C3k2
```

```
[256, 64, 1, False]
 17                  -1  1     36992  ultralytics.nn.modules.conv.Conv
[64, 64, 3, 2]
 18            [-1, 13]  1         0  ultralytics.nn.modules.conv.Concat
[1]
 19                  -1  1     86720  ultralytics.nn.modules.block.C3k2
[192, 128, 1, False]
 20                  -1  1    147712  ultralytics.nn.modules.conv.Conv
[128, 128, 3, 2]
 21            [-1, 10]  1         0  ultralytics.nn.modules.conv.Concat
[1]
 22                  -1  1    378880  ultralytics.nn.modules.block.C3k2
[384, 256, 1, True]
 23        [16, 19, 22]  1    431062  ultralytics.nn.modules.head.Detect
[2, [64, 128, 256]]
YOLO11n summary: 319 layers, 2,590,230 parameters, 2,590,214 gradients, 6.4 GFLOP
s

Transferred 448/499 items from pretrained weights
Freezing layer 'model.23.dfl.conv.weight'
AMP: running Automatic Mixed Precision (AMP) checks with YOLO11n...
AMP: checks passed
AutoBatch: Computing optimal batch size for imgsz=640 at 60.0% CUDA memory utiliz
ation.
AutoBatch: CUDA:0 (NVIDIA GeForce RTX 3080) 10.00G total, 0.10G reserved, 0.05G a
llocated, 9.85G free
      Params      GFLOPs  GPU_mem (GB)  forward (ms) backward (ms)
input                 output
     2590230       6.442         0.245         25.85         65.33        (1, 3,
640, 640)                    list
     2590230       12.88         0.354         20.86         25.35        (2, 3,
640, 640)                    list
     2590230       25.77         0.640         20.19         24.64        (4, 3,
640, 640)                    list
     2590230       51.53         1.168          22.2         26.19        (8, 3,
640, 640)                    list
     2590230       103.1         2.257         27.89         33.57       (16, 3,
640, 640)                    list
AutoBatch: Using batch-size 43 for CUDA:0 6.04G/10.00G (60%)
train: Scanning C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuronal
es\Peru-Plate-Numbers-3\train\labels... 1470 images, 0 backgrounds, 0 corrupt: 10
0%|██████████| 1470/1470 [00:00<00:00, 2276.83it/s]
train: New cache created: C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_rede
s_neuronales\Peru-Plate-Numbers-3\train\labels.cache
val: Scanning C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuronales
\Peru-Plate-Numbers-3\valid\labels... 138 images, 0 backgrounds, 0 corrupt: 100%|
██████████| 138/138 [00:00<00:00, 1710.79it/s]
val: New cache created: C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_
neuronales\Peru-Plate-Numbers-3\valid\labels.cache
WARNING  Box and segment counts should be equal, but got len(segments) = 240, len
(boxes) = 257. To resolve this only boxes will be used and all segments will be r
emoved. To avoid this please supply either a detect or segment dataset, not a det
ect-segment mixed dataset.
```

```
Plotting labels to runs\detect\train3\labels.jpg...
optimizer: 'optimizer=auto' found, ignoring 'lr0=0.01' and 'momentum=0.937' and d
etermining best 'optimizer', 'lr0' and 'momentum' automatically...
optimizer: AdamW(lr=0.001667, momentum=0.9) with parameter groups 81 weight(decay
=0.0), 88 weight(decay=0.00033593750000000003), 87 bias(decay=0.0)
Image sizes 640 train, 640 val
Using 8 dataloader workers
Logging results to runs\detect\train3
Starting training for 100 epochs...

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      1/100      6.05G      1.774      4.183      1.079         22        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.20it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.23it/s]
                   all        138        257    0.00127      0.137   0.000784
0.000314

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      2/100      6.07G      1.556      2.026     0.9366         23        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.43it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.12it/s]
                   all        138        257    0.00596      0.814      0.0278
0.00954

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      3/100      6.12G      1.528      1.621     0.9404         31        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.61it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.47it/s]
                   all        138        257       0.81      0.393      0.669
0.349

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      4/100      6.09G      1.518      1.298     0.9535         22        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.59it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.09it/s]
                   all        138        257      0.732      0.471      0.686
0.387

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      5/100      6.13G      1.496      1.122     0.9426         34        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.03it/s]
                   all        138        257       0.86      0.916      0.918
0.531

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      6/100      6.09G      1.484      1.055     0.9354         38        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.53it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.51it/s]
                   all        138        257      0.278      0.659      0.285
0.137

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
```

```
      7/100      6.12G      1.429     0.9869     0.9375         36        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.68it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.62it/s]
                   all        138        257      0.818      0.796      0.872
0.517

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      8/100      6.12G      1.435     0.9616     0.9305         30        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.55it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.73it/s]
                   all        138        257      0.892      0.738       0.84
0.46

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      9/100      6.13G      1.419     0.9457     0.9283         30        640: 10
0%|██████████| 35/35 [00:12<00:00,  2.87it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.79it/s]
                   all        138        257      0.824      0.821      0.873
0.471

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     10/100      6.12G      1.392     0.8896     0.9211         19        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.28it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.25it/s]
                   all        138        257      0.852      0.868      0.881
0.387

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     11/100      6.12G      1.372     0.9042     0.9161         23        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.56it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.01it/s]
                   all        138        257      0.818      0.767      0.879
0.536

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     12/100      6.14G       1.36     0.8754      0.918         19        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.41it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.90it/s]
                   all        138        257      0.871      0.844      0.929
0.586

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     13/100      6.04G      1.341     0.8748     0.9138         22        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.28it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.20it/s]
                   all        138        257      0.875      0.853      0.909
0.567

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     14/100      6.09G      1.335     0.8698     0.9094         21        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.42it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.04it/s]
                   all        138        257      0.842      0.817       0.87
0.54
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     15/100      6.13G       1.33     0.8815     0.9005         21        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.69it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.16it/s]
                   all        138        257      0.626      0.435      0.303
0.183

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     16/100      6.09G      1.325     0.8859     0.9006         21        640: 10
0%|██████████| 35/35 [00:12<00:00,  2.81it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.34it/s]
                   all        138        257      0.861      0.866      0.913
0.597

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     17/100      6.09G      1.314      0.863     0.8975         25        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.32it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.21it/s]
                   all        138        257      0.884      0.835      0.918
0.62

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     18/100      6.13G      1.319     0.8613     0.9026         22        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.42it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.85it/s]
                   all        138        257      0.885      0.839      0.892
0.563

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     19/100      6.09G      1.299     0.8584     0.8969         17        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.33it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.86it/s]
                   all        138        257      0.571      0.691       0.57
0.35

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     20/100      6.16G      1.284     0.8448     0.8989         17        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.41it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.84it/s]
                   all        138        257      0.866      0.914       0.92
0.576

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     21/100      6.09G      1.316     0.8617     0.9009         29        640: 10
0%|██████████| 35/35 [00:17<00:00,  2.04it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.99it/s]
                   all        138        257      0.794      0.791      0.839
0.498

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     22/100      6.12G      1.301     0.8322     0.8943         39        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.85it/s]
                   all        138        257      0.854      0.866      0.873
0.537
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     23/100      6.14G      1.286     0.8231     0.9065         22        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.23it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.85it/s]
                   all        138        257      0.919      0.839      0.925
0.599

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     24/100      6.13G      1.283     0.8405     0.8963         18        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.20it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.17it/s]
                   all        138        257      0.795      0.808      0.844
0.555

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     25/100      6.08G      1.261     0.8257     0.8992         28        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.21it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.00it/s]
                   all        138        257      0.814      0.909      0.914
0.532

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     26/100       6.1G      1.295     0.8367     0.8962         24        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.42it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.25it/s]
                   all        138        257       0.93      0.868      0.918
0.579

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     27/100      6.12G      1.265     0.8284     0.8931         20        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.64it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.96it/s]
                   all        138        257      0.925      0.923      0.944
0.603

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     28/100      6.15G      1.265     0.8081     0.8885         35        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.24it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.91it/s]
                   all        138        257      0.879      0.913      0.896
0.578

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     29/100      6.12G      1.262     0.8325     0.9077         16        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.24it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.03it/s]
                   all        138        257      0.861      0.928      0.894
0.561

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     30/100      6.08G      1.259     0.8061     0.8891         27        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.59it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.14it/s]
```

```
                   all        138        257      0.888      0.918      0.921
0.617

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     31/100      6.07G       1.24     0.8018     0.8861         23        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.29it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.87it/s]
                   all        138        257      0.863      0.927      0.907
0.613

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     32/100      6.13G      1.254     0.8205      0.891         27        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.34it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.25it/s]
                   all        138        257      0.845      0.932      0.875
0.535

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     33/100      6.12G      1.247     0.8263     0.8822         33        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.22it/s]
                   all        138        257      0.895      0.925      0.901
0.604

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     34/100      6.12G      1.241     0.8043     0.8885         26        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.60it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.02it/s]
                   all        138        257      0.952      0.834      0.928
0.582

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     35/100      6.12G       1.23     0.8159     0.8895         30        640: 10
0%|██████████| 35/35 [00:12<00:00,  2.91it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.24it/s]
                   all        138        257      0.922      0.921      0.924
0.609

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     36/100      6.12G      1.218     0.8134     0.8898         21        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.51it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.99it/s]
                   all        138        257      0.832      0.919      0.848
0.564

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     37/100      6.09G      1.221     0.8051     0.8892         41        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.36it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.09it/s]
                   all        138        257      0.894      0.921      0.911
0.592

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
```

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     38/100      6.09G      1.238      0.796     0.8833         28        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.56it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.04it/s]
                   all        138        257       0.88      0.954      0.908
0.597

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     39/100      6.15G      1.234     0.7947     0.8964         19        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.95it/s]
                   all        138        257      0.922      0.921       0.92
0.632

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     40/100      6.13G      1.202     0.7969     0.8806         30        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.36it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.06it/s]
                   all        138        257      0.885      0.931      0.897
0.602

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     41/100      6.12G      1.216     0.7885     0.8878         30        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.29it/s]
                   all        138        257      0.848       0.82      0.885
0.579

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     42/100      6.04G      1.206     0.7936     0.8807         31        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.69it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.00it/s]
                   all        138        257      0.886      0.869      0.908
0.639

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     43/100      6.09G      1.226     0.7976     0.8841         19        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.48it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.95it/s]
                   all        138        257      0.877      0.925      0.901
0.593

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     44/100      6.13G      1.209     0.8001     0.8853         26        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.22it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.19it/s]
                   all        138        257      0.873      0.942      0.883
0.579

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     45/100      6.09G      1.183     0.7878     0.8924         25        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.48it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.20it/s]
                   all        138        257      0.887      0.904      0.892
0.573
```

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      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     46/100      6.12G      1.181     0.7941     0.8811         21        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.53it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.94it/s]
                   all        138        257      0.878      0.947      0.873
0.574

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     47/100      6.12G      1.174      0.782     0.8732         27        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.48it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.05it/s]
                   all        138        257      0.822      0.913      0.826
0.551

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     48/100      6.09G      1.204     0.7857     0.8756         33        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.50it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.55it/s]
                   all        138        257      0.836      0.927      0.848
0.572

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     49/100      6.12G      1.189     0.7726     0.8777         30        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.34it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.28it/s]
                   all        138        257       0.93      0.914       0.92
0.634

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     50/100      6.14G      1.196     0.7784     0.8794         23        640: 10
0%|██████████| 35/35 [00:12<00:00,  2.70it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.09it/s]
                   all        138        257      0.916      0.916      0.911
0.64

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     51/100      6.09G      1.174      0.771     0.8662         19        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.61it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.12it/s]
                   all        138        257      0.912      0.907      0.923
0.641

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     52/100      6.13G      1.163     0.7895     0.8658         22        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.27it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.52it/s]
                   all        138        257      0.903      0.909      0.909
0.657

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     53/100      6.13G      1.169     0.7637      0.873         20        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.35it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.92it/s]
                   all        138        257      0.888      0.933      0.895
0.628
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     54/100      6.08G      1.167     0.7724     0.8773         17        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.07it/s]
                   all        138        257      0.858      0.925      0.866
0.589

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     55/100      6.07G      1.152     0.7542     0.8737         16        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.57it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.03it/s]
                   all        138        257      0.854      0.923      0.852
0.554

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     56/100      6.09G      1.149     0.7542     0.8712         20        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.40it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.69it/s]
                   all        138        257      0.867      0.942      0.874
0.6

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     57/100      6.12G      1.151     0.7567     0.8702         18        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.45it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.02it/s]
                   all        138        257      0.851      0.882      0.883
0.62

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     58/100      6.13G      1.162     0.7589     0.8719         33        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.28it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.49it/s]
                   all        138        257      0.903      0.907      0.898
0.623

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     59/100      6.12G      1.158      0.752      0.864         40        640: 10
0%|██████████| 35/35 [00:40<00:00,  1.14s/it]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:02<00:00,  1.34s/it]
                   all        138        257      0.882      0.926      0.889
0.592

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     60/100      6.12G      1.148     0.7577     0.8685         34        640: 10
0%|██████████| 35/35 [00:35<00:00,  1.00s/it]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:02<00:00,  1.29s/it]
                   all        138        257      0.898       0.93      0.895
0.612

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     61/100      6.13G      1.141     0.7654     0.8697         17        640: 10
0%|██████████| 35/35 [00:30<00:00,  1.15it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.57it/s]
```

```
                   all        138        257      0.874      0.929      0.919
0.641

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     62/100      6.14G      1.148     0.7694     0.8668         17        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.59it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.84it/s]
                   all        138        257      0.898      0.897      0.882
0.626

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     63/100      6.09G      1.154     0.7451     0.8698         27        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.51it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.11it/s]
                   all        138        257      0.883       0.91      0.891
0.631

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     64/100      6.08G      1.129     0.7512     0.8667         21        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.24it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.92it/s]
                   all        138        257      0.909      0.949      0.924
0.661

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     65/100       6.1G      1.137     0.7471     0.8637         29        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.65it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.04it/s]
                   all        138        257      0.851      0.945      0.877
0.607

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     66/100      6.14G      1.132     0.7541     0.8701         20        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.92it/s]
                   all        138        257      0.878      0.928      0.883
0.6

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     67/100      6.04G      1.139     0.7433     0.8681         20        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.67it/s]
                   all        138        257       0.87      0.922      0.869
0.599

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     68/100      6.13G      1.137      0.759      0.866         24        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.13it/s]
                   all        138        257      0.903      0.915        0.9
0.639

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
```

```
     69/100      6.12G      1.126      0.753      0.861          30        640: 10
0%|██████████| 35/35 [00:28<00:00,  1.22it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:02<00:00,  1.09s/it]
                   all        138        257      0.922      0.906      0.911
0.656

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     70/100      6.13G      1.117     0.7508     0.8627          22        640: 10
0%|██████████| 35/35 [00:43<00:00,  1.23s/it]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.28it/s]
                   all        138        257       0.88        0.9      0.876
0.618

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     71/100      6.17G      1.118     0.7373     0.8626          26        640: 10
0%|██████████| 35/35 [00:16<00:00,  2.15it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.50it/s]
                   all        138        257      0.929       0.94      0.934
0.651

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     72/100      6.12G      1.115     0.7257     0.8633          24        640: 10
0%|██████████| 35/35 [00:16<00:00,  2.13it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.77it/s]
                   all        138        257      0.881      0.923      0.914
0.637

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     73/100      6.08G      1.116     0.7228     0.8634          22        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.24it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.85it/s]
                   all        138        257      0.901      0.928      0.908
0.65

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     74/100      6.06G       1.12     0.7318     0.8635          32        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.30it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.60it/s]
                   all        138        257      0.914      0.926      0.917
0.65

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     75/100      6.07G      1.121     0.7276     0.8619          18        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.26it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.49it/s]
                   all        138        257      0.902      0.943      0.915
0.657

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     76/100      6.13G      1.113     0.7334     0.8668          32        640: 10
0%|██████████| 35/35 [00:16<00:00,  2.07it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.61it/s]
                   all        138        257      0.908       0.92      0.891
0.628
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     77/100      6.14G      1.103     0.7435     0.8571         25        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.49it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.75it/s]
                   all        138        257      0.887      0.921       0.89
0.628

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     78/100      6.13G      1.106     0.7257     0.8522         15        640: 10
0%|██████████| 35/35 [00:17<00:00,  2.06it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.75it/s]
                   all        138        257      0.903      0.906       0.881
0.627

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     79/100      6.14G      1.105     0.7248     0.8617         20        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.36it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.97it/s]
                   all        138        257       0.92      0.908       0.906
0.649

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     80/100      6.09G      1.095     0.7194     0.8578         23        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.40it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.86it/s]
                   all        138        257      0.904      0.906       0.898
0.632

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     81/100      6.12G      1.095     0.7288     0.8523         23        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.32it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.65it/s]
                   all        138        257      0.908      0.923       0.897
0.645

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     82/100      6.12G      1.082     0.7271     0.8601         31        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.44it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.82it/s]
                   all        138        257      0.902      0.912       0.897
0.629

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     83/100      6.14G      1.085     0.7153     0.8572         20        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.33it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.04it/s]
                   all        138        257      0.901      0.922       0.902
0.633

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     84/100      6.12G      1.083     0.7035     0.8544         23        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.68it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.94it/s]
                   all        138        257      0.928      0.909       0.913
0.651
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     85/100      6.09G      1.085     0.7205     0.8576         18        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.24it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.70it/s]
                   all        138        257      0.899      0.905      0.887
0.619

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     86/100      6.08G      1.088     0.7085     0.8565         25        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.21it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.72it/s]
                   all        138        257      0.896      0.905      0.889
0.626

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     87/100       6.1G      1.052     0.7217      0.853         18        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.42it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.79it/s]
                   all        138        257      0.888      0.938      0.892
0.638

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     88/100      6.13G      1.053     0.7068      0.849         16        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.35it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.77it/s]
                   all        138        257      0.891      0.926      0.895
0.645

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     89/100      6.12G      1.082     0.7214      0.856         23        640: 10
0%|██████████| 35/35 [00:16<00:00,  2.15it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.93it/s]
                   all        138        257      0.925       0.92      0.917
0.66

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     90/100      6.14G       1.06     0.7057     0.8528         25        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.52it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.66it/s]
                   all        138        257      0.896      0.921      0.917
0.675

Closing dataloader mosaic

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     91/100      6.04G      1.037     0.7169     0.8567         16        640: 10
0%|██████████| 35/35 [00:20<00:00,  1.70it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.83it/s]
                   all        138        257       0.88      0.933      0.885
0.622

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
```

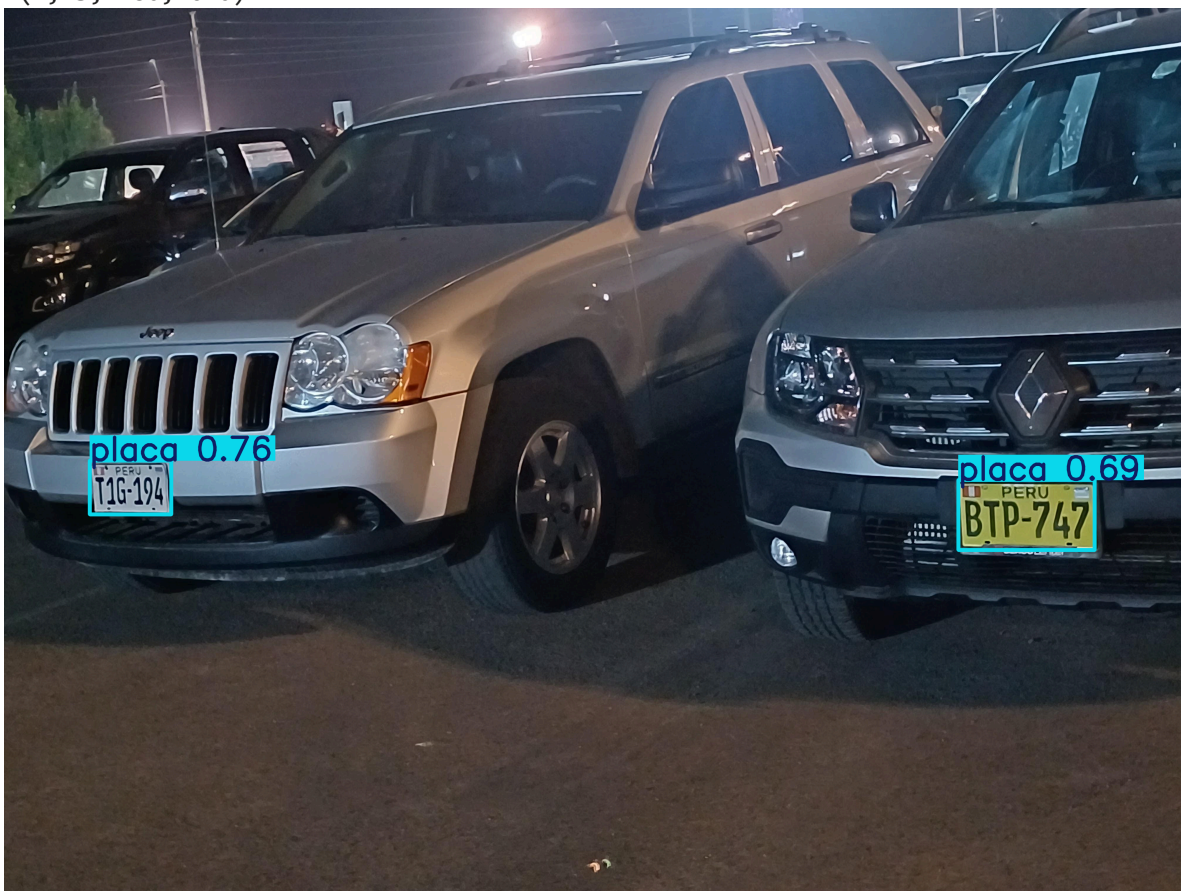
```
     92/100      6.04G      1.031      0.716     0.8531         11        640: 10
0%|██████████| 35/35 [00:14<00:00,  2.44it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.82it/s]
                   all        138        257      0.917      0.924       0.91
0.643

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     93/100      6.04G      1.019     0.7151     0.8562         18        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.67it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.84it/s]
                   all        138        257      0.897      0.948       0.89
0.632

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     94/100      6.04G      1.021      0.722     0.8504         12        640: 10
0%|██████████| 35/35 [00:15<00:00,  2.23it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.03it/s]
                   all        138        257      0.913       0.94      0.906
0.642

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     95/100      6.04G      1.012     0.7027      0.856         18        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.64it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.84it/s]
                   all        138        257      0.914      0.919      0.905
0.638

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     96/100      6.08G      1.013     0.6922     0.8474         12        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.57it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.13it/s]
                   all        138        257      0.909      0.913      0.913
0.658

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     97/100      6.02G      1.007     0.7101     0.8482         10        640: 10
0%|██████████| 35/35 [00:12<00:00,  2.80it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.00it/s]
                   all        138        257      0.908      0.924      0.903
0.642

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     98/100      6.04G      1.005     0.7158     0.8523         10        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.57it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.12it/s]
                   all        138        257      0.893      0.933      0.895
0.641

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
     99/100      6.08G      1.002     0.7109     0.8496         15        640: 10
0%|██████████| 35/35 [00:13<00:00,  2.60it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.17it/s]
                   all        138        257      0.896      0.926      0.896
0.646
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
    100/100      6.02G       1.01      0.711     0.8481         14        640: 10
0%|██████████| 35/35 [00:12<00:00,  2.75it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  3.10it/s]
                   all        138        257      0.901      0.923      0.897
0.641

100 epochs completed in 0.479 hours.
Optimizer stripped from runs\detect\train3\weights\last.pt, 5.5MB
Optimizer stripped from runs\detect\train3\weights\best.pt, 5.5MB

Validating runs\detect\train3\weights\best.pt...
Ultralytics 8.3.6  Python-3.10.11 torch-2.4.1+cu124 CUDA:0 (NVIDIA GeForce RTX 30
80, 10240MiB)
YOLO11n summary (fused): 238 layers, 2,582,542 parameters, 0 gradients, 6.3 GFLOP
s
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 2/2 [00:00<00:00,  2.06it/s]
                   all        138        257      0.895      0.922      0.916
0.675
                 Placa        106        203      0.869      0.918      0.878
0.57
                 placa         32         54      0.921      0.926      0.954
0.779
Speed: 0.2ms preprocess, 0.9ms inference, 0.0ms loss, 1.7ms postprocess per image
Results saved to runs\detect\train3
Ultralytics 8.3.6  Python-3.10.11 torch-2.4.1+cu124 CUDA:0 (NVIDIA GeForce RTX 30
80, 10240MiB)
YOLO11n summary (fused): 238 layers, 2,582,542 parameters, 0 gradients, 6.3 GFLOP
s
val: Scanning C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuronales
\Peru-Plate-Numbers-3\valid\labels.cache... 138 images, 0 backgrounds, 0 corrupt:
100%|██████████| 138/138 [00:00<?, ?it/s]
WARNING  Box and segment counts should be equal, but got len(segments) = 240, len
(boxes) = 257. To resolve this only boxes will be used and all segments will be r
emoved. To avoid this please supply either a detect or segment dataset, not a det
ect-segment mixed dataset.
                 Class     Images  Instances      Box(P          R      mAP50  mA
P50-95): 100%|██████████| 4/4 [00:04<00:00,  1.13s/it]
                   all        138        257      0.895      0.924      0.907
0.673
                 Placa        106        203       0.87      0.923      0.875
0.573
                 placa         32         54      0.921      0.926      0.939
0.773
Speed: 0.9ms preprocess, 3.9ms inference, 0.0ms loss, 1.4ms postprocess per image
Results saved to runs\detect\train32
```

In [ ]:
```
# # Load model
# model = YOLO(r"runs\detect\train4\weights\best.pt")
# metrics = model.val()
```

In [7]:
```
# Perform object detection on an image
results = model(r"Peru-Plate-Numbers-3\valid\images\20231009_202048_jpg.rf.1a67b
results[0].show()
```

```
image 1/1 c:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuronales\Peru-Plate-Numbers-3\valid\images\20231009_202048_jpg.rf.1a67b5b5f05ba6ea31d332fdfcc9c879.jpg: 480x640 2 placas, 45.5ms
Speed: 3.0ms preprocess, 45.5ms inference, 1.5ms postprocess per image at shape (1, 3, 480, 640)
```

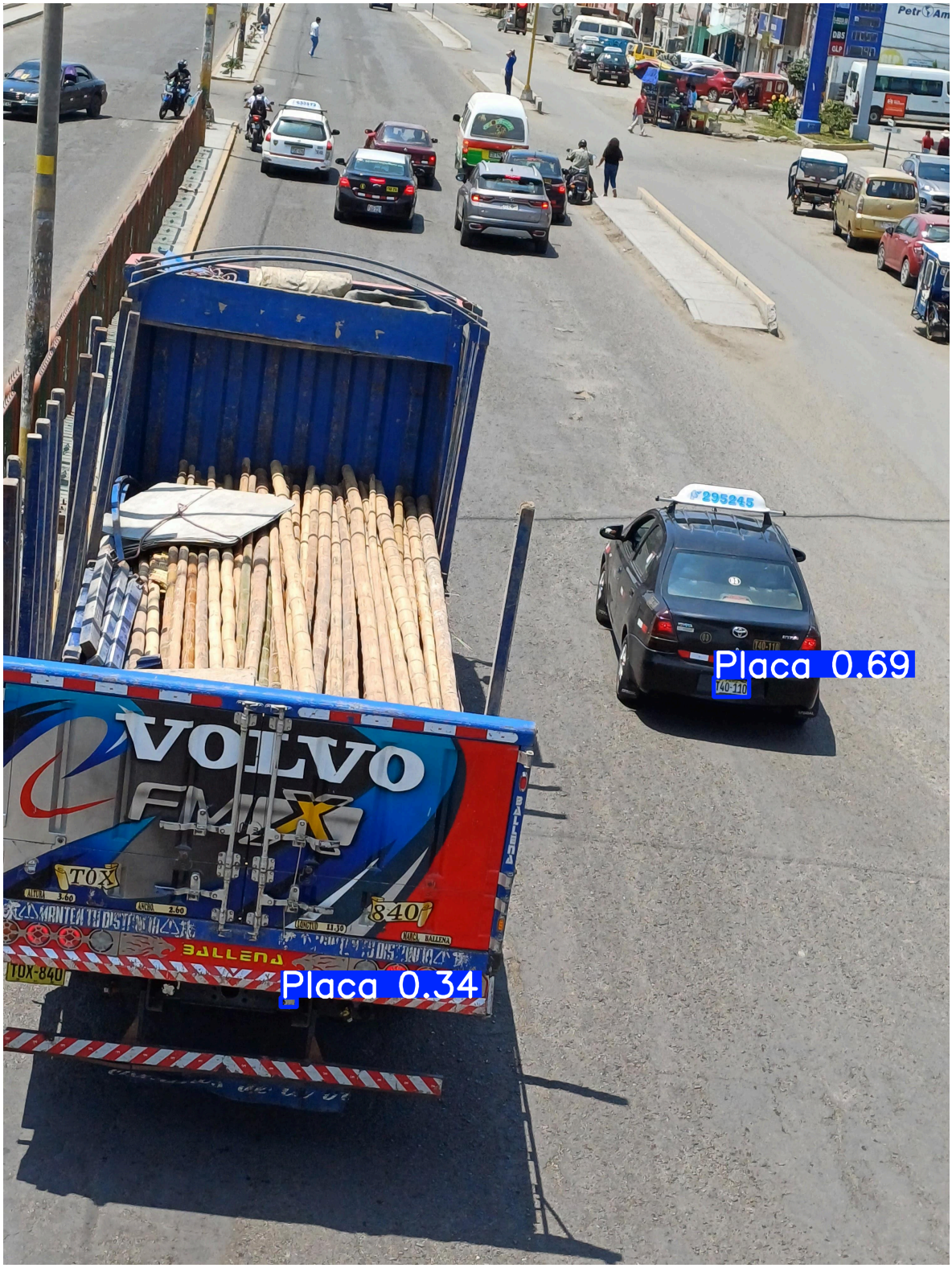


In [8]:
```
# Perform object detection on an image
results = model(r"C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuro
results[0].show()
```

```
image 1/1 C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuronales\Peru-Plate-Numbers-3\valid\images\Foto-Placa-453-_jpg.rf.74c2435a10f0ac4b5ec258fff82f50dc.jpg: 640x480 4 Placas, 44.6ms
Speed: 3.0ms preprocess, 44.6ms inference, 2.0ms postprocess per image at shape (1, 3, 640, 480)
```

In [9]:
```
# Perform object detection on an image
results = model(r"C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuro
results[0].show()
```

```
image 1/1 C:\Users\kainak0\Documents\gitProjects\mia\MIA-203_redes_neuronales\Per
u-Plate-Numbers-3\valid\images\Foto-Placa-505-_jpg.rf.5c1eaaeebfeefb8c38469e7adfd
0a0b2.jpg: 640x480 2 Placas, 7.5ms
Speed: 2.5ms preprocess, 7.5ms inference, 1.0ms postprocess per image at shape
(1, 3, 640, 480)
```


Placa 0.69
Placa 0.34
VOLVO
FMX
TOX
840
TOX-840