

# yolov7-mia-07-grupo1

October 6, 2024

## 1 Yolov7 - Detección de Jugadores de Fútbol

Curso: Redes Neuronales y Aprendizaje Profundo (2024-2 A)

Grupo 1 - Integrantes:

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### 1.1 Descarga del código fuente yolo v

```
[ ]: !git clone https://github.com/WongKinYiu/yolov7.git
      %cd yolov7
```

```
Cloning into 'yolov7'...
remote: Enumerating objects: 1197, done.
remote: Total 1197 (delta 0), reused 0 (delta 0), pack-reused 1197 (from 1)
Receiving objects: 100% (1197/1197), 74.23 MiB | 43.64 MiB/s, done.
Resolving deltas: 100% (520/520), done.
/yolov7
```

### 1.2 Descargar data de entrenamiento y de validación - Football Player

```
[ ]: %cd data
      %mkdir football-player
      !curl -L "https://universe.roboflow.com/ds/ZWu76cSjXv?key=TZEkpGXwIT" >┐
      ↪roboflow.zip; unzip roboflow.zip; rm roboflow.zip
      %cd /content/yolov7
```

% Total	% Received	% Xferd	Average Speed	Time	Time	Time	Current	
			Dload	Upload	Total	Spent	Left	Speed
100	911	100	911	0	0	4034	0	--:--:-- --:--:-- --:--:-- 4048
100	64.2M	100	64.2M	0	0	115M	0	--:--:-- --:--:-- --:--:-- 115M

Archive: roboflow.zip  
inflating: README.dataset.txt  
inflating: README.roboflow.txt

```

inflating: data.yaml
creating: test/
creating: test/images/
extracting: test/images/08fd33_3_6_png.rf.bee65249830b3e263ebe95a999f39e34.jpg
extracting: test/images/08fd33_9_3_png.rf.f5439a0d252bbf8a8ce96169744b49b6.jpg
extracting: test/images/40cd38_7_6_png.rf.dc7957fcce915bc48188f18a7b19455b.jpg
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extracting: test/images/42ba34_5_5_png.rf.f691b18c36a92663c7241c99d4202bcc.jpg
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extracting: test/images/a9f16c_2_9_png.rf.c048a60764e56735d7465cdec974d102.jpg
creating: test/labels/
inflating: test/labels/08fd33_3_6_png.rf.bee65249830b3e263ebe95a999f39e34.txt
inflating: test/labels/08fd33_9_3_png.rf.f5439a0d252bbf8a8ce96169744b49b6.txt
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inflating: test/labels/744b27_7_4_png.rf.f34ba47e8f30126bc935832bd269ef19.txt

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inflating: test/labels/798b45_7_8_png.rf.95f8b6996ac5ac7ec5151e0f3e4cfe1c.txt
inflating: test/labels/a9f16c_2_10_png.rf.f29e544daf06eb8b4e968d158a40af1b.txt
inflating: test/labels/a9f16c_2_9_png.rf.c048a60764e56735d7465cdec974d102.txt
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    creating: train/images/
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extracting: train/images/4b770a\_1\_5\_png.rf.fc9f39154f902134b487d206f4cf1258.jpg  
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extracting:  
train/images/4b770a\_3\_10\_png.rf.0d1ab675182488ecd313d0e38290e8d3.jpg  
extracting: train/images/4b770a\_3\_2\_png.rf.31806c4d4b6a57caca3551e1f0f6c2ad.jpg  
extracting: train/images/4b770a\_3\_3\_png.rf.e543cd932e831ff9b8f7380018042b3d.jpg  
extracting: train/images/4b770a\_3\_4\_png.rf.cacc7055e1e6f0213d409e1c13846a90.jpg  
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extracting: train/images/4b770a\_5\_2\_png.rf.e75ab46a413e02628ecb8cdf3cf5d265.jpg  
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 valid/labels/573e61\_1\_10\_png.rf.3ca8a4cab961b09304f804c9b9bd3d31.txt  
 inflating:  
 valid/labels/573e61\_5\_10\_png.rf.2983f17a09c340e7cebc0407c1a57411.txt  
 inflating: valid/labels/744b27\_1\_6\_png.rf.6797d7dff2614cfefb38d4b2aca1d4d9a.txt  
 inflating: valid/labels/744b27\_1\_7\_png.rf.22205408fb02cc145441cc5979787d5c.txt  
 inflating: valid/labels/744b27\_3\_7\_png.rf.5b6a5310277d9027aef2e7d07da02ce4.txt  
 inflating: valid/labels/744b27\_7\_1\_png.rf.7335021ba416416693ed7ae6f6f6a382.txt  
 inflating: valid/labels/744b27\_7\_5\_png.rf.d5deafb9fee0c2ba7be675ca528b08df.txt  
 inflating: valid/labels/744b27\_7\_6\_png.rf.a1a5878ac806348acde7fd79abc78e82.txt  
 inflating: valid/labels/744b27\_7\_7\_png.rf.2f9964a882fa25f59bd62dde6867f6cb.txt  
 inflating: valid/labels/744b27\_9\_8\_png.rf.7b00f9f77e6bb12572f01620d39732c4.txt  
 inflating: valid/labels/798b45\_1\_1\_png.rf.410ced72bdcf784e47dd5d2920bae574.txt  
 inflating: valid/labels/798b45\_1\_2\_png.rf.f85272a367d64f62d3fa1bed8750cbb0.txt  
 inflating: valid/labels/798b45\_7\_4\_png.rf.c6884cb33be843080f1f9c6e3e7e5f75.txt  
 inflating: valid/labels/798b45\_7\_5\_png.rf.c9cc082832be80adb59eeb4737119bf4.txt  
 inflating: valid/labels/798b45\_9\_7\_png.rf.27e31a1e4981fe613104eb088e47c1ec.txt  
 inflating: valid/labels/798b45\_9\_8\_png.rf.938485d72eb836daf7594f478a7b2e4d.txt  
 inflating:  
 valid/labels/a9f16c\_8\_10\_png.rf.3028b2b8a61ac775683f2f11f6293053.txt

```
[ ]: ## Adaptación - Edición del archivo /content/yolov7/data/football-player/data.
      ↪yaml
      #train: data/football-player/train/images
      #val: data/football-player/valid/images
      #test: data/football-player/test/images
```

### 1.3 Entrenamiento

```
[28]: !python train.py --epochs 100 --workers 8 --device 0 --batch-size 16 --data
      ↪data/football-player/data.yaml --img 640 640 --cfg cfg/training/yolov7.yaml
      ↪--weights '' --name yolov7-football --hyp data/hyp.scratch.p5.yaml
```

```
2024-10-06 22:42:18.114828: I tensorflow/core/util/port.cc:153] oneDNN custom
operations are on. You may see slightly different numerical results due to
floating-point round-off errors from different computation orders. To turn them
off, set the environment variable `TF_ENABLE_ONEDNN_OPTS=0`.
2024-10-06 22:42:18.132871: E
external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:485] Unable to register
cuFFT factory: Attempting to register factory for plugin cuFFT when one has
already been registered
2024-10-06 22:42:18.154243: E
external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:8454] Unable to register
cuDNN factory: Attempting to register factory for plugin cuDNN when one has
already been registered
2024-10-06 22:42:18.160759: E
external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1452] Unable to
register cuBLAS factory: Attempting to register factory for plugin cuBLAS when
one has already been registered
2024-10-06 22:42:18.176636: I tensorflow/core/platform/cpu_feature_guard.cc:210]
This TensorFlow binary is optimized to use available CPU instructions in
performance-critical operations.
To enable the following instructions: AVX2 AVX512F AVX512_VNNI FMA, in other
operations, rebuild TensorFlow with the appropriate compiler flags.
2024-10-06 22:42:19.339881: W
tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not
find TensorRT
YOLOR v0.1-128-ga207844 torch 2.4.1+cu121 CUDA:0 (NVIDIA A100-SXM4-40GB,
40513.8125MB)
```

```
Namespace(weights='', cfg='cfg/training/yolov7.yaml', data='data/football-
player/data.yaml', hyp='data/hyp.scratch.p5.yaml', epochs=100, batch_size=16,
img_size=[640, 640], rect=False, resume=False, nosave=False, notest=False,
noautoanchor=False, evolve=False, bucket='', cache_images=False,
image_weights=False, device='0', multi_scale=False, single_cls=False,
adam=False, sync_bn=False, local_rank=-1, workers=8, project='runs/train',
entity=None, name='yolov7-football', exist_ok=False, quad=False,
linear_lr=False, label_smoothing=0.0, upload_dataset=False, bbox_interval=-1,
```

save\_period=-1, artifact\_alias='latest', freeze=[0], v5\_metric=False, world\_size=1, global\_rank=-1, save\_dir='runs/train/yolov7-football14', total\_batch\_size=16)

**tensorboard:** Start with 'tensorboard --logdir runs/train', view at <http://localhost:6006/>

**hyperparameters:** lr0=0.01, lrf=0.1, momentum=0.937, weight\_decay=0.0005, warmup\_epochs=3.0, warmup\_momentum=0.8, warmup\_bias\_lr=0.1, box=0.05, cls=0.3, cls\_pw=1.0, obj=0.7, obj\_pw=1.0, iou\_t=0.2, anchor\_t=4.0, fl\_gamma=0.0, hsv\_h=0.015, hsv\_s=0.7, hsv\_v=0.4, degrees=0.0, translate=0.2, scale=0.9, shear=0.0, perspective=0.0, flipud=0.0,fliplr=0.5, mosaic=1.0, mixup=0.15, copy\_paste=0.0, paste\_in=0.15, loss\_ota=1

**wandb:** Install Weights & Biases for YOLOR logging with 'pip install wandb' (recommended)

Overriding model.yaml nc=80 with nc=4

	from	n	params	module	
arguments					
0	-1	1	928	models.common.Conv	[3,
32, 3, 1]					
1	-1	1	18560	models.common.Conv	[32,
64, 3, 2]					
2	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
3	-1	1	73984	models.common.Conv	[64,
128, 3, 2]					
4	-1	1	8320	models.common.Conv	
[128, 64, 1, 1]					
5	-2	1	8320	models.common.Conv	
[128, 64, 1, 1]					
6	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
7	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
8	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
9	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
10 [-1, -3, -5, -6]	1		0	models.common.Concat	[1]
11	-1	1	66048	models.common.Conv	
[256, 256, 1, 1]					
12	-1	1	0	models.common.MP	[]
13	-1	1	33024	models.common.Conv	
[256, 128, 1, 1]					
14	-3	1	33024	models.common.Conv	
[256, 128, 1, 1]					
15	-1	1	147712	models.common.Conv	
[128, 128, 3, 2]					
16	[-1, -3]	1	0	models.common.Concat	[1]

17		-1	1	33024	models.common.Conv	
[256, 128, 1, 1]						
18		-2	1	33024	models.common.Conv	
[256, 128, 1, 1]						
19		-1	1	147712	models.common.Conv	
[128, 128, 3, 1]						
20		-1	1	147712	models.common.Conv	
[128, 128, 3, 1]						
21		-1	1	147712	models.common.Conv	
[128, 128, 3, 1]						
22		-1	1	147712	models.common.Conv	
[128, 128, 3, 1]						
23	[-1, -3, -5, -6]	1		0	models.common.Concat	[1]
24		-1	1	263168	models.common.Conv	
[512, 512, 1, 1]						
25		-1	1	0	models.common.MP	[]
26		-1	1	131584	models.common.Conv	
[512, 256, 1, 1]						
27		-3	1	131584	models.common.Conv	
[512, 256, 1, 1]						
28		-1	1	590336	models.common.Conv	
[256, 256, 3, 2]						
29	[-1, -3]	1		0	models.common.Concat	[1]
30		-1	1	131584	models.common.Conv	
[512, 256, 1, 1]						
31		-2	1	131584	models.common.Conv	
[512, 256, 1, 1]						
32		-1	1	590336	models.common.Conv	
[256, 256, 3, 1]						
33		-1	1	590336	models.common.Conv	
[256, 256, 3, 1]						
34		-1	1	590336	models.common.Conv	
[256, 256, 3, 1]						
35		-1	1	590336	models.common.Conv	
[256, 256, 3, 1]						
36	[-1, -3, -5, -6]	1		0	models.common.Concat	[1]
37		-1	1	1050624	models.common.Conv	
[1024, 1024, 1, 1]						
38		-1	1	0	models.common.MP	[]
39		-1	1	525312	models.common.Conv	
[1024, 512, 1, 1]						
40		-3	1	525312	models.common.Conv	
[1024, 512, 1, 1]						
41		-1	1	2360320	models.common.Conv	
[512, 512, 3, 2]						
42	[-1, -3]	1		0	models.common.Concat	[1]
43		-1	1	262656	models.common.Conv	
[1024, 256, 1, 1]						

44	-2	1	262656	models.common.Conv	
[1024, 256, 1, 1]					
45	-1	1	590336	models.common.Conv	
[256, 256, 3, 1]					
46	-1	1	590336	models.common.Conv	
[256, 256, 3, 1]					
47	-1	1	590336	models.common.Conv	
[256, 256, 3, 1]					
48	-1	1	590336	models.common.Conv	
[256, 256, 3, 1]					
49	[-1, -3, -5, -6]	1	0	models.common.Concat	[1]
50	-1	1	1050624	models.common.Conv	
[1024, 1024, 1, 1]					
51	-1	1	7609344	models.common.SPPCSPC	
[1024, 512, 1]					
52	-1	1	131584	models.common.Conv	
[512, 256, 1, 1]					
53	-1	1	0	torch.nn.modules.upsampling.Upsample	
[None, 2, 'nearest']					
54	37	1	262656	models.common.Conv	
[1024, 256, 1, 1]					
55	[-1, -2]	1	0	models.common.Concat	[1]
56	-1	1	131584	models.common.Conv	
[512, 256, 1, 1]					
57	-2	1	131584	models.common.Conv	
[512, 256, 1, 1]					
58	-1	1	295168	models.common.Conv	
[256, 128, 3, 1]					
59	-1	1	147712	models.common.Conv	
[128, 128, 3, 1]					
60	-1	1	147712	models.common.Conv	
[128, 128, 3, 1]					
61	-1	1	147712	models.common.Conv	
[128, 128, 3, 1]					
62	[-1, -2, -3, -4, -5, -6]	1	0	models.common.Concat	
[1]					
63	-1	1	262656	models.common.Conv	
[1024, 256, 1, 1]					
64	-1	1	33024	models.common.Conv	
[256, 128, 1, 1]					
65	-1	1	0	torch.nn.modules.upsampling.Upsample	
[None, 2, 'nearest']					
66	24	1	65792	models.common.Conv	
[512, 128, 1, 1]					
67	[-1, -2]	1	0	models.common.Concat	[1]
68	-1	1	33024	models.common.Conv	
[256, 128, 1, 1]					
69	-2	1	33024	models.common.Conv	

[256, 128, 1, 1]					
70	-1	1	73856	models.common.Conv	
[128, 64, 3, 1]					
71	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
72	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
73	-1	1	36992	models.common.Conv	[64,
64, 3, 1]					
74[-1, -2, -3, -4, -5, -6]	1		0	models.common.Concat	
[1]					
75	-1	1	65792	models.common.Conv	
[512, 128, 1, 1]					
76	-1	1	0	models.common.MP	[]
77	-1	1	16640	models.common.Conv	
[128, 128, 1, 1]					
78	-3	1	16640	models.common.Conv	
[128, 128, 1, 1]					
79	-1	1	147712	models.common.Conv	
[128, 128, 3, 2]					
80 [-1, -3, 63]	1		0	models.common.Concat	[1]
81	-1	1	131584	models.common.Conv	
[512, 256, 1, 1]					
82	-2	1	131584	models.common.Conv	
[512, 256, 1, 1]					
83	-1	1	295168	models.common.Conv	
[256, 128, 3, 1]					
84	-1	1	147712	models.common.Conv	
[128, 128, 3, 1]					
85	-1	1	147712	models.common.Conv	
[128, 128, 3, 1]					
86	-1	1	147712	models.common.Conv	
[128, 128, 3, 1]					
87[-1, -2, -3, -4, -5, -6]	1		0	models.common.Concat	
[1]					
88	-1	1	262656	models.common.Conv	
[1024, 256, 1, 1]					
89	-1	1	0	models.common.MP	[]
90	-1	1	66048	models.common.Conv	
[256, 256, 1, 1]					
91	-3	1	66048	models.common.Conv	
[256, 256, 1, 1]					
92	-1	1	590336	models.common.Conv	
[256, 256, 3, 2]					
93 [-1, -3, 51]	1		0	models.common.Concat	[1]
94	-1	1	525312	models.common.Conv	
[1024, 512, 1, 1]					
95	-2	1	525312	models.common.Conv	

```

[1024, 512, 1, 1]
 96      -1  1   1180160  models.common.Conv
[512, 256, 3, 1]
 97      -1  1    590336  models.common.Conv
[256, 256, 3, 1]
 98      -1  1    590336  models.common.Conv
[256, 256, 3, 1]
 99      -1  1    590336  models.common.Conv
[256, 256, 3, 1]
100[-1, -2, -3, -4, -5, -6]  1      0  models.common.Concat
[1]
101      -1  1   1049600  models.common.Conv
[2048, 512, 1, 1]
102      75  1    328704  models.common.RepConv
[128, 256, 3, 1]
103      88  1   1312768  models.common.RepConv
[256, 512, 3, 1]
104     101  1   5246976  models.common.RepConv
[512, 1024, 3, 1]
105  [102, 103, 104]  1    50338  models.yolo.IDetect      [4,
[[12, 16, 19, 36, 40, 28], [36, 75, 76, 55, 72, 146], [142, 110, 192, 243, 459,
401]], [256, 512, 1024]]
Model Summary: 415 layers, 37212738 parameters, 37212738 gradients

```

Scaled weight\_decay = 0.0005

Optimizer groups: 95 .bias, 95 conv.weight, 98 other

/content/yolov7/utils/datasets.py:392: FutureWarning: You are using `torch.load` with `weights\_only=False` (the current default value), which uses the default pickle module implicitly. It is possible to construct malicious pickle data which will execute arbitrary code during unpickling (See <https://github.com/pytorch/pytorch/blob/main/SECURITY.md#untrusted-models> for more details). In a future release, the default value for `weights\_only` will be flipped to `True`. This limits the functions that could be executed during unpickling. Arbitrary objects will no longer be allowed to be loaded via this mode unless they are explicitly allowlisted by the user via `torch.serialization.add\_safe\_globals`. We recommend you start setting `weights\_only=True` for any use case where you don't have full control of the loaded file. Please open an issue on GitHub for any issues related to this experimental feature.

```

cache, exists = torch.load(cache_path), True # load
train: Scanning 'data/football-player/train/labels.cache' images
and labels... 298 found, 0 missing, 0 empty, 0 corrupted: 100% 298/298 [00:00<?,
?it/s]
/usr/lib/python3.10/multiprocessing/popen_fork.py:66: RuntimeWarning: os.fork()
was called. os.fork() is incompatible with multithreaded code, and JAX is
multithreaded, so this will likely lead to a deadlock.

```

```

self.pid = os.fork()
val: Scanning 'data/football-player/valid/labels.cache' images and

```



labels... 49 found, 0 missing, 0 empty, 0 corrupted: 100% 49/49 [00:00<?, ?it/s]

**autoanchor:** Analyzing anchors... anchors/target = 2.53, Best

Possible Recall (BPR) = 0.9937

/content/yolov7/train.py:299: FutureWarning:

`torch.cuda.amp.GradScaler(args...)` is deprecated. Please use

`torch.amp.GradScaler('cuda', args...)` instead.

scaler = amp.GradScaler(enabled=cuda)

Image sizes 640 train, 640 test

Using 8 dataloader workers

Logging results to runs/train/yolov7-football14

Starting training for 100 epochs...

Epoch	gpu_mem	box	obj	cls	total	labels	img_size
0% 0/19	[00:00<?, ?it/s]						
/content/yolov7/train.py:360: FutureWarning:							
`torch.cuda.amp.autocast(args...)` is deprecated. Please use							
`torch.amp.autocast('cuda', args...)` instead.							
with amp.autocast(enabled=cuda):							
0/99	2.07G	0.06089	0.02806	0.01732	0.1063	306	
640: 100% 19/19	[00:25<00:00, 1.32s/it]						

Class	Images	Labels	P	R	mAP@.5
mAP@.5:.95:	0% 0/2	[00:00<?, ?it/s]			
/usr/local/lib/python3.10/dist-					
packages/torch/functional.py:513: UserWarning: torch.meshgrid: in an upcoming					
release, it will be required to pass the indexing argument. (Triggered					
internally at ../aten/src/ATen/native/TensorShape.cpp:3609.)					

Class	Images	Labels	P	R	mAP@.5
mAP@.5:.95:	100% 2/2	[00:15<00:00, 7.97s/it]			
all	49	0	0	0	0

0

Epoch	gpu_mem	box	obj	cls	total	labels	img_size
1/99	14.1G	0.05916	0.02612	0.01569	0.101	450	
640: 100% 19/19	[00:06<00:00, 2.84it/s]						
Class	Images	Labels	P	R	mAP@.5		
mAP@.5:.95:	100% 2/2	[00:00<00:00, 4.25it/s]					
all	49	0	0	0	0		

0

Epoch	gpu_mem	box	obj	cls	total	labels	img_size
2/99	17.4G	0.05861	0.02564	0.01405	0.0983	249	
640: 100% 19/19	[00:06<00:00, 2.80it/s]						
Class	Images	Labels	P	R	mAP@.5		
mAP@.5:.95:	100% 2/2	[00:00<00:00, 4.07it/s]					
all	49	0	0	0	0		

0

Epoch	gpu_mem	box	obj	cls	total	labels	img_size
-------	---------	-----	-----	-----	-------	--------	----------

```

    3/99      17.4G   0.05851   0.02301   0.01289   0.09441       245
640: 100% 19/19 [00:06<00:00,  2.80it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  3.78it/s]
      all        49         0         0         0         0

```

0

```

    Epoch  gpu_mem    box      obj      cls    total  labels  img_size
    4/99    17.4G   0.05756   0.02358   0.01204   0.09319    492
640: 100% 19/19 [00:06<00:00,  2.94it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  3.99it/s]
      all        49         0         0         0         0

```

0

```

    Epoch  gpu_mem    box      obj      cls    total  labels  img_size
    5/99    17.4G   0.05869   0.02172   0.01121   0.09161    430
640: 100% 19/19 [00:06<00:00,  2.80it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  4.77it/s]
      all        49       1174   0.000323   0.00488   8.29e-06

```

1.41e-06

```

    Epoch  gpu_mem    box      obj      cls    total  labels  img_size
    6/99    17.4G   0.05878   0.0225   0.01072   0.092     233
640: 100% 19/19 [00:06<00:00,  2.95it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  5.80it/s]
      all        49       1174   0.00029   0.00437   7.42e-06

```

1.38e-06

```

    Epoch  gpu_mem    box      obj      cls    total  labels  img_size
    7/99    17.4G   0.05695   0.02198   0.009998   0.08893    81
640: 100% 19/19 [00:06<00:00,  2.87it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  5.76it/s]
      all        49       1174   0.000329   0.00488   1.12e-05

```

2.64e-06

```

    Epoch  gpu_mem    box      obj      cls    total  labels  img_size
    8/99    17.4G   0.06181   0.02195   0.009964   0.09373   449
640: 100% 19/19 [00:06<00:00,  2.93it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  5.53it/s]
      all        49       1174   0.000343   0.00488   1.1e-05

```

1.94e-06

```

    Epoch  gpu_mem    box      obj      cls    total  labels  img_size

```

```

    9/99      17.4G   0.05673   0.02269   0.009025   0.08845       439
640: 100% 19/19 [00:06<00:00,  3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  5.32it/s]
      all        49       1174   0.000498   0.00694   2.39e-05
4.31e-06

```

```

    Epoch  gpu_mem      box      obj      cls      total  labels  img_size
    10/99   17.4G   0.05749   0.02264   0.009167   0.08929    280
640: 100% 19/19 [00:06<00:00,  3.01it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  4.59it/s]
      all        49       1174   0.00113   0.00385   3.75e-05
6.07e-06

```

```

    Epoch  gpu_mem      box      obj      cls      total  labels  img_size
    11/99   17.4G   0.05956   0.02143   0.008842   0.08982    186
640: 100% 19/19 [00:06<00:00,  2.96it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  3.72it/s]
      all        49       1174   0.000785   0.00308   2.15e-05
5e-06

```

```

    Epoch  gpu_mem      box      obj      cls      total  labels  img_size
    12/99   17.4G   0.06019   0.02136   0.009211   0.09076    413
640: 100% 19/19 [00:06<00:00,  2.94it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  3.36it/s]
      all        49       1174   0.00909   0.00874   0.000915
0.00023

```

```

    Epoch  gpu_mem      box      obj      cls      total  labels  img_size
    13/99   17.4G   0.05843   0.02182   0.009151   0.0894     430
640: 100% 19/19 [00:06<00:00,  2.95it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  3.31it/s]
      all        49       1174   0.0275   0.0193   0.00466
0.00119

```

```

    Epoch  gpu_mem      box      obj      cls      total  labels  img_size
    14/99   17.4G   0.05841   0.02142   0.008551   0.08838    305
640: 100% 19/19 [00:06<00:00,  2.99it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00,  3.20it/s]
      all        49       1174   0.0259   0.0236   0.00708
0.00138

```

```

    Epoch  gpu_mem      box      obj      cls      total  labels  img_size

```

```

15/99      17.4G    0.05182    0.02259    0.007236    0.08164      356
640: 100% 19/19 [00:06<00:00, 3.01it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.00it/s]
      all        49        1174      0.296      0.0411      0.0156
0.00362

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
16/99    17.4G    0.04956    0.02179    0.006773    0.07813    413
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.08it/s]
      all        49        1174      0.819      0.0668      0.0352
0.00956

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
17/99    17.4G    0.04763    0.022    0.006812    0.07644    332
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.65it/s]
      all        49        1174      0.848      0.0686      0.0529
0.0152

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
18/99    17.4G    0.04675    0.02006    0.006369    0.07318    268
640: 100% 19/19 [00:06<00:00, 2.94it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.28it/s]
      all        49        1174      0.857      0.0884      0.072
0.0195

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
19/99    17.4G    0.04429    0.01907    0.00699    0.07035    314
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 2.96it/s]
      all        49        1174      0.844      0.0975      0.0732
0.0171

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
20/99    17.4G    0.0458    0.021    0.006933    0.07374    344
640: 100% 19/19 [00:06<00:00, 2.97it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 5.13it/s]
      all        49        1174      0.0143      0.0054      0.00165
0.000556

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

21/99      17.4G    0.04279    0.02053    0.006806    0.07012      309
640: 100% 19/19 [00:06<00:00, 3.01it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.64it/s]
      all        49        1174      0.0659      0.057      0.0343
0.00744

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
22/99    17.4G    0.04172    0.02072    0.007145    0.06958    368
640: 100% 19/19 [00:06<00:00, 2.99it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 2.97it/s]
      all        49        1174      0.881      0.143      0.124
0.0338

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
23/99    17.4G    0.04148    0.01935    0.006703    0.06754    415
640: 100% 19/19 [00:06<00:00, 3.05it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.60it/s]
      all        49        1174      0.808      0.0879      0.042
0.00728

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
24/99    17.4G    0.04065    0.01994    0.007025    0.06762    448
640: 100% 19/19 [00:06<00:00, 2.95it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.51it/s]
      all        49        1174      0.863      0.126      0.0949
0.0202

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
25/99    17.4G    0.0392    0.01881    0.006949    0.06496    206
640: 100% 19/19 [00:06<00:00, 3.11it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.16it/s]
      all        49        1174      0.12      0.148      0.115
0.0244

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
26/99    17.4G    0.03789    0.02114    0.006408    0.06543    207
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.10it/s]
      all        49        1174      0.885      0.168      0.14
0.0372

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

27/99      17.4G    0.04036    0.01814    0.006932    0.06543      347
640: 100% 19/19 [00:06<00:00, 3.02it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.38it/s]
      all        49        1174      0.855      0.123      0.0877
0.0188

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
28/99    17.4G    0.03938    0.02192    0.006891    0.06819    518
640: 100% 19/19 [00:06<00:00, 2.99it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.45it/s]
      all        49        1174      0.854      0.122      0.0871
0.0178

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
29/99    17.4G    0.03835    0.01909    0.006496    0.06394    367
640: 100% 19/19 [00:06<00:00, 3.11it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.20it/s]
      all        49        1174      0.932      0.176      0.188
0.0596

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
30/99    17.4G    0.03916    0.02012    0.006913    0.06619    392
640: 100% 19/19 [00:06<00:00, 3.03it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.33it/s]
      all        49        1174      0.883      0.174      0.138
0.0342

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
31/99    17.4G    0.03591    0.02021    0.007219    0.06334    262
640: 100% 19/19 [00:06<00:00, 3.07it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.24it/s]
      all        49        1174      0.939      0.185      0.195
0.0672

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
32/99    17.4G    0.03683    0.01962    0.006903    0.06335    281
640: 100% 19/19 [00:06<00:00, 3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.29it/s]
      all        49        1174      0.915      0.19      0.181
0.0481

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

33/99      17.4G    0.03631    0.0236  0.007264   0.06717      323
640: 100% 19/19 [00:06<00:00, 2.93it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.56it/s]
      all        49        1174      0.624      0.135      0.119
0.0378

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
34/99    17.4G    0.03709  0.02094  0.007126  0.06515    223
640: 100% 19/19 [00:06<00:00, 3.07it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.44it/s]
      all        49        1174      0.887      0.165      0.136
0.0308

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
35/99    17.4G    0.03476  0.01839  0.007124  0.06027    353
640: 100% 19/19 [00:06<00:00, 3.01it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.28it/s]
      all        49        1174      0.927      0.18      0.182
0.0521

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
36/99    17.4G    0.03466  0.0218  0.00707   0.06354    305
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.08it/s]
      all        49        1174      0.94      0.19      0.203
0.0722

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
37/99    17.4G    0.03394  0.01912  0.006796  0.05985    240
640: 100% 19/19 [00:06<00:00, 2.96it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.29it/s]
      all        49        1174      0.939      0.18      0.18
0.0519

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
38/99    17.4G    0.03373  0.01944  0.006978  0.06015    285
640: 100% 19/19 [00:06<00:00, 3.08it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.44it/s]
      all        49        1174      0.935      0.185      0.196
0.0659

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

39/99      17.4G    0.03659    0.0184  0.006741    0.06174      148
640: 100% 19/19 [00:06<00:00, 3.03it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.17it/s]
      all        49        1174      0.931      0.19      0.191
0.0581

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
40/99    17.4G    0.03435  0.01714  0.006909    0.0584    368
640: 100% 19/19 [00:06<00:00, 3.08it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.35it/s]
      all        49        1174      0.946      0.204      0.212
0.0782

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
41/99    17.4G    0.03235  0.01795  0.006516    0.05681    541
640: 100% 19/19 [00:06<00:00, 2.96it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.38it/s]
      all        49        1174      0.945      0.202      0.213
0.0767

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
42/99    17.4G    0.03319  0.01783  0.006551    0.05757    258
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.44it/s]
      all        49        1174      0.954      0.199      0.217
0.089

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
43/99    17.4G    0.03155  0.0178  0.00724    0.05659    237
640: 100% 19/19 [00:06<00:00, 3.04it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.52it/s]
      all        49        1174      0.96      0.208      0.224
0.0964

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
44/99    17.4G    0.03329  0.01843  0.00681    0.05854    282
640: 100% 19/19 [00:06<00:00, 3.10it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.41it/s]
      all        49        1174      0.949      0.202      0.214
0.0885

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```



```

45/99      17.4G    0.03418    0.01734    0.006842    0.05836      308
640: 100% 19/19 [00:06<00:00, 3.02it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.52it/s]
      all        49        1174      0.958      0.208      0.224
0.0863

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
46/99    17.4G    0.03218    0.01933    0.006465    0.05798      223
640: 100% 19/19 [00:06<00:00, 3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.35it/s]
      all        49        1174      0.967      0.205      0.225
0.0905

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
47/99    17.4G    0.03385    0.01876    0.006702    0.05931      575
640: 100% 19/19 [00:06<00:00, 2.94it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.45it/s]
      all        49        1174      0.956      0.21      0.226
0.0921

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
48/99    17.4G    0.03292    0.01784    0.006692    0.05745      375
640: 100% 19/19 [00:06<00:00, 3.07it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.46it/s]
      all        49        1174      0.962      0.206      0.223
0.0923

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
49/99    17.4G    0.03127    0.01704    0.006082    0.05439      310
640: 100% 19/19 [00:06<00:00, 3.07it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.44it/s]
      all        49        1174      0.965      0.209      0.229
0.0907

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
50/99    17.4G    0.03076    0.0187    0.005805    0.05527      328
640: 100% 19/19 [00:06<00:00, 3.04it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.55it/s]
      all        49        1174      0.962      0.213      0.24
0.104

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

51/99      17.4G      0.0307      0.01815      0.005969      0.05482      266
640: 100% 19/19 [00:06<00:00, 3.03it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.35it/s]
      all      49      1174      0.972      0.21      0.24
0.107

```

```

Epoch      gpu_mem      box      obj      cls      total      labels      img_size
52/99      17.4G      0.02987      0.01871      0.005816      0.0544      358
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.45it/s]
      all      49      1174      0.949      0.207      0.22
0.0783

```

```

Epoch      gpu_mem      box      obj      cls      total      labels      img_size
53/99      17.4G      0.03215      0.01841      0.005782      0.05634      186
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.50it/s]
      all      49      1174      0.956      0.217      0.232
0.0964

```

```

Epoch      gpu_mem      box      obj      cls      total      labels      img_size
54/99      17.4G      0.02994      0.01774      0.006261      0.05394      451
640: 100% 19/19 [00:06<00:00, 3.10it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.33it/s]
      all      49      1174      0.965      0.22      0.246
0.114

```

```

Epoch      gpu_mem      box      obj      cls      total      labels      img_size
55/99      17.4G      0.02959      0.01708      0.005616      0.05229      444
640: 100% 19/19 [00:06<00:00, 3.04it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.61it/s]
      all      49      1174      0.755      0.257      0.246
0.117

```

```

Epoch      gpu_mem      box      obj      cls      total      labels      img_size
56/99      17.4G      0.02834      0.01851      0.005313      0.05216      368
640: 100% 19/19 [00:06<00:00, 3.05it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.49it/s]
      all      49      1174      0.742      0.253      0.245
0.117

```

```

Epoch      gpu_mem      box      obj      cls      total      labels      img_size

```

```

57/99      17.4G    0.02939    0.0176  0.005619    0.05261      377
640: 100% 19/19 [00:06<00:00, 3.08it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.62it/s]
      all        49        1174      0.952    0.229    0.248
0.111

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
58/99    17.4G    0.03039  0.01837  0.005648  0.05441    400
640: 100% 19/19 [00:06<00:00, 3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.42it/s]
      all        49        1174      0.97    0.221    0.255
0.129

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
59/99    17.4G    0.0311  0.01793  0.005797  0.05483    407
640: 100% 19/19 [00:06<00:00, 3.02it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.54it/s]
      all        49        1174      0.96    0.231    0.263
0.132

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
60/99    17.4G    0.02765  0.0177  0.00533  0.05068    332
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.35it/s]
      all        49        1174      0.8     0.259    0.262
0.127

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
61/99    17.4G    0.02692  0.01685  0.005161  0.04894    348
640: 100% 19/19 [00:06<00:00, 3.10it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.45it/s]
      all        49        1174      0.808   0.256    0.265
0.13

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
62/99    17.4G    0.02722  0.01661  0.005376  0.04921    307
640: 100% 19/19 [00:06<00:00, 2.93it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.36it/s]
      all        49        1174      0.806   0.262    0.267
0.137

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

63/99      17.4G    0.02673    0.01693    0.005347    0.04901      295
640: 100% 19/19 [00:06<00:00, 3.09it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.61it/s]
      all        49        1174      0.785      0.261      0.263
0.135

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
64/99    17.4G    0.02743    0.01666    0.005068    0.04917      297
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.60it/s]
      all        49        1174      0.812      0.262      0.269
0.139

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
65/99    17.4G    0.02918    0.01704    0.005345    0.05156      356
640: 100% 19/19 [00:06<00:00, 3.02it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.51it/s]
      all        49        1174      0.82      0.266      0.272
0.144

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
66/99    17.4G    0.02566    0.0167    0.004886    0.04725      357
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.56it/s]
      all        49        1174      0.821      0.268      0.275
0.145

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
67/99    17.4G    0.02576    0.0174    0.004855    0.04801      253
640: 100% 19/19 [00:06<00:00, 3.09it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.54it/s]
      all        49        1174      0.812      0.265      0.278
0.148

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
68/99    17.4G    0.02524    0.01782    0.004929    0.04799      340
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.59it/s]
      all        49        1174      0.861      0.269      0.278
0.15

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

69/99      17.4G    0.02701    0.01751    0.005366    0.04988      336
640: 100% 19/19 [00:06<00:00, 3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.44it/s]
      all        49        1174      0.853      0.269      0.282
0.153

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
70/99    17.4G    0.02449    0.01679    0.004695    0.04598      385
640: 100% 19/19 [00:06<00:00, 3.04it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.57it/s]
      all        49        1174      0.802      0.282      0.286
0.159

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
71/99    17.4G    0.0247    0.01661    0.004577    0.04589      312
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.39it/s]
      all        49        1174      0.855      0.267      0.284
0.158

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
72/99    17.4G    0.02429    0.01728    0.004492    0.04606      229
640: 100% 19/19 [00:06<00:00, 3.08it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.55it/s]
      all        49        1174      0.819      0.283      0.289
0.161

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
73/99    17.4G    0.02427    0.01708    0.004609    0.04596      373
640: 100% 19/19 [00:06<00:00, 3.01it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.30it/s]
      all        49        1174      0.792      0.291      0.297
0.168

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
74/99    17.4G    0.02363    0.01681    0.004597    0.04504      298
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.58it/s]
      all        49        1174      0.816      0.285      0.292
0.164

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

75/99      17.4G   0.02349   0.01686   0.004665   0.04502       255
640: 100% 19/19 [00:06<00:00, 2.97it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.57it/s]
      all        49        1174      0.814      0.288      0.294
0.167

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
76/99    17.4G   0.02365   0.01731   0.004653   0.04561      266
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.66it/s]
      all        49        1174      0.814      0.288      0.297
0.169

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
77/99    17.4G   0.02328   0.01593   0.004519   0.04372      402
640: 100% 19/19 [00:06<00:00, 2.94it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.51it/s]
      all        49        1174      0.828      0.286      0.296
0.168

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
78/99    17.4G   0.0242    0.017   0.004362   0.04556      391
640: 100% 19/19 [00:06<00:00, 3.07it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.55it/s]
      all        49        1174      0.829      0.287      0.305
0.173

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
79/99    17.4G   0.02299   0.01748   0.00444    0.04492      477
640: 100% 19/19 [00:06<00:00, 3.01it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.56it/s]
      all        49        1174      0.822      0.288      0.303
0.171

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
80/99    17.4G   0.02391   0.01729   0.004548   0.04574      360
640: 100% 19/19 [00:06<00:00, 3.04it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.60it/s]
      all        49        1174      0.84      0.282      0.305
0.172

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

      81/99      17.4G    0.02589    0.01598    0.004813    0.04668      424
640: 100% 19/19 [00:06<00:00, 2.99it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.54it/s]
      all      49      1174      0.834      0.283      0.3
0.171

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      82/99      17.4G    0.02282    0.01597    0.004653    0.04345      225
640: 100% 19/19 [00:06<00:00, 3.05it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.50it/s]
      all      49      1174      0.817      0.292      0.304
0.174

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      83/99      17.4G    0.02611    0.01782    0.004467    0.0484      375
640: 100% 19/19 [00:06<00:00, 2.98it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.40it/s]
      all      49      1174      0.859      0.273      0.306
0.175

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      84/99      17.4G    0.02267    0.01774    0.004172    0.04458      257
640: 100% 19/19 [00:06<00:00, 2.97it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.50it/s]
      all      49      1174      0.81      0.293      0.311
0.177

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      85/99      17.4G    0.026      0.01823    0.004671    0.0489      362
640: 100% 19/19 [00:06<00:00, 2.97it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.64it/s]
      all      49      1174      0.782      0.309      0.315
0.178

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      86/99      17.4G    0.02256    0.01537    0.004333    0.04226      163
640: 100% 19/19 [00:06<00:00, 3.10it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.52it/s]
      all      49      1174      0.834      0.286      0.314
0.179

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size

```

```

      87/99      17.4G    0.02267    0.01538    0.004285    0.04234      346
640: 100% 19/19 [00:06<00:00, 3.14it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.49it/s]
      all        49        1174      0.875      0.284      0.317
0.181

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      88/99      17.4G    0.02309    0.01686    0.004131    0.04408      322
640: 100% 19/19 [00:06<00:00, 2.90it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.58it/s]
      all        49        1174      0.818      0.304      0.318
0.181

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      89/99      17.4G    0.02282    0.01674    0.004192    0.04375      457
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.38it/s]
      all        49        1174      0.835      0.297      0.319
0.185

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      90/99      17.4G    0.02214    0.01617    0.004197    0.04251      301
640: 100% 19/19 [00:06<00:00, 3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.39it/s]
      all        49        1174      0.805      0.309      0.32
0.183

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      91/99      17.4G    0.02261    0.01637    0.004224    0.0432      276
640: 100% 19/19 [00:06<00:00, 3.08it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.47it/s]
      all        49        1174      0.809      0.31      0.321
0.183

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size
      92/99      17.4G    0.02169    0.01719    0.003855    0.04274      350
640: 100% 19/19 [00:06<00:00, 2.93it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.51it/s]
      all        49        1174      0.822      0.304      0.328
0.186

```

```

      Epoch      gpu_mem      box      obj      cls      total      labels      img_size

```



```

93/99      17.4G    0.02241    0.01579    0.003982    0.04219      247
640: 100% 19/19 [00:06<00:00, 3.04it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.55it/s]
      all        49        1174      0.841      0.3      0.332
0.187

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
94/99    17.4G    0.02266    0.01663    0.004309    0.04361      483
640: 100% 19/19 [00:06<00:00, 2.96it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.60it/s]
      all        49        1174      0.867      0.296      0.328
0.187

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
95/99    17.4G    0.02167    0.0164    0.004005    0.04208      382
640: 100% 19/19 [00:06<00:00, 3.10it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.63it/s]
      all        49        1174      0.854      0.292      0.327
0.187

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
96/99    17.4G    0.02167    0.01677    0.003936    0.04238      269
640: 100% 19/19 [00:06<00:00, 3.02it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.47it/s]
      all        49        1174      0.878      0.291      0.336
0.19

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
97/99    17.4G    0.02226    0.01736    0.003946    0.04356      409
640: 100% 19/19 [00:06<00:00, 3.00it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.37it/s]
      all        49        1174      0.836      0.307      0.334
0.19

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size
98/99    17.4G    0.02171    0.01596    0.004063    0.04173      398
640: 100% 19/19 [00:06<00:00, 3.06it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:00<00:00, 3.15it/s]
      all        49        1174      0.836      0.306      0.336
0.189

```

```

Epoch  gpu_mem    box    obj    cls    total  labels  img_size

```

```

99/99      17.4G   0.02266   0.01681   0.004006   0.04348       365
640: 100% 19/19 [00:06<00:00,  3.03it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 2/2 [00:01<00:00,  1.47it/s]
      all        49        1174      0.805      0.317      0.333
0.187
      ball        49         45         1         0      0.0132
0.00213
      goalkeeper   49         39         1         0      0.0432
0.0257
      player      49        973      0.748      0.964      0.938
0.571
      referee     49        117      0.472      0.306      0.339
0.151
100 epochs completed in 0.245 hours.

```

/content/yolov7/utils/general.py:802: FutureWarning: You are using `torch.load` with `weights\_only=False` (the current default value), which uses the default pickle module implicitly. It is possible to construct malicious pickle data which will execute arbitrary code during unpickling (See <https://github.com/pytorch/pytorch/blob/main/SECURITY.md#untrusted-models> for more details). In a future release, the default value for `weights\_only` will be flipped to `True`. This limits the functions that could be executed during unpickling. Arbitrary objects will no longer be allowed to be loaded via this mode unless they are explicitly allowlisted by the user via `torch.serialization.add\_safe\_globals`. We recommend you start setting `weights\_only=True` for any use case where you don't have full control of the loaded file. Please open an issue on GitHub for any issues related to this experimental feature.

```

x = torch.load(f, map_location=torch.device('cpu'))
Optimizer stripped from runs/train/yolov7-football14/weights/last.pt, 74.8MB
Optimizer stripped from runs/train/yolov7-football14/weights/best.pt, 74.8MB

```

## 1.4 Test

```

[29]: !python test.py --data data/football-player/data.yaml --img 640 --batch 16
      ↪--conf 0.001 --iou 0.65 --device 0 --weights runs/train/yolov7-football14/
      ↪weights/best.pt --name yolov7-football_640_val

```

```

Namespace(weights=['runs/train/yolov7-football14/weights/best.pt'],
data='data/football-player/data.yaml', batch_size=16, img_size=640,
conf_thres=0.001, iou_thres=0.65, task='val', device='0', single_cls=False,
augment=False, verbose=False, save_txt=False, save_hybrid=False,
save_conf=False, save_json=False, project='runs/test',
name='yolov7-football_640_val', exist_ok=False, no_trace=False, v5_metric=False)
YOLOv7 v0.1-128-ga207844 torch 2.4.1+cu121 CUDA:0 (NVIDIA A100-SXM4-40GB,
40513.8125MB)

```

```
/content/yolov7/models/experimental.py:252: FutureWarning: You are using
`torch.load` with `weights_only=False` (the current default value), which uses
the default pickle module implicitly. It is possible to construct malicious
pickle data which will execute arbitrary code during unpickling (See
https://github.com/pytorch/pytorch/blob/main/SECURITY.md#untrusted-models for
more details). In a future release, the default value for `weights_only` will be
flipped to `True`. This limits the functions that could be executed during
unpickling. Arbitrary objects will no longer be allowed to be loaded via this
mode unless they are explicitly allowlisted by the user via
`torch.serialization.add_safe_globals`. We recommend you start setting
`weights_only=True` for any use case where you don't have full control of the
loaded file. Please open an issue on GitHub for any issues related to this
experimental feature.
```

```
ckpt = torch.load(w, map_location=map_location) # load
Fusing layers...
RepConv.fuse_repvgg_block
RepConv.fuse_repvgg_block
RepConv.fuse_repvgg_block
IDetect.fuse
Model Summary: 314 layers, 36497954 parameters, 6194944 gradients
Convert model to Traced-model...
traced_script_module saved!
model is traced!
```

```
/usr/local/lib/python3.10/dist-packages/torch/functional.py:513: UserWarning:
torch.meshgrid: in an upcoming release, it will be required to pass the indexing
argument. (Triggered internally at
../aten/src/ATen/native/TensorShape.cpp:3609.)
```

```
return _VF.meshgrid(tensors, **kwargs) # type: ignore[attr-defined]
/content/yolov7/utils/datasets.py:392: FutureWarning: You are using `torch.load`
with `weights_only=False` (the current default value), which uses the default
pickle module implicitly. It is possible to construct malicious pickle data
which will execute arbitrary code during unpickling (See
https://github.com/pytorch/pytorch/blob/main/SECURITY.md#untrusted-models for
more details). In a future release, the default value for `weights_only` will be
flipped to `True`. This limits the functions that could be executed during
unpickling. Arbitrary objects will no longer be allowed to be loaded via this
mode unless they are explicitly allowlisted by the user via
`torch.serialization.add_safe_globals`. We recommend you start setting
`weights_only=True` for any use case where you don't have full control of the
loaded file. Please open an issue on GitHub for any issues related to this
experimental feature.
```

```
cache, exists = torch.load(cache_path), True # load
val: Scanning 'data/football-player/valid/labels.cache' images and
labels... 49 found, 0 missing, 0 empty, 0 corrupted: 100% 49/49 [00:00<?, ?it/s]
      Class      Images      Labels      P      R      mAP@.5
mAP@.5:.95: 100% 4/4 [00:02<00:00, 1.45it/s]
      all      49      1174      0.872      0.291      0.335
```

0.19	ball	49	45	1	0	0.0147
0.00276	goalkeeper	49	39	1	0	0.0507
0.0259	player	49	973	0.823	0.951	0.939
0.57	referee	49	117	0.667	0.214	0.337
0.161						

Speed: 11.9/14.3/26.1 ms inference/NMS/total per 640x640 image at batch-size 16  
 Results saved to runs/test/yolov7-football\_640\_val4

## 1.5 Validación

```
[44]: !python detect.py --weights runs/train/yolov7-football14/weights/best.pt --conf_
      ↪0.25 --img-size 640 --source /content/yolov7/data/football-player/valid/
      ↪images/08fd33_3_1_png.rf.894a7edd6b726ed886b3777ea55d6beb.jpg
```

```
Namespace(weights=['runs/train/yolov7-football14/weights/best.pt'],
source='/content/yolov7/data/football-
player/valid/images/08fd33_3_1_png.rf.894a7edd6b726ed886b3777ea55d6beb.jpg',
img_size=640, conf_thres=0.25, iou_thres=0.45, device='', view_img=False,
save_txt=False, save_conf=False, nosave=False, classes=None, agnostic_nms=False,
augment=False, update=False, project='runs/detect', name='exp', exist_ok=False,
no_trace=False)
YOLOv7 v0.1-128-ga207844 torch 2.4.1+cu121 CUDA:0 (NVIDIA A100-SXM4-40GB,
40513.8125MB)
```

```
/content/yolov7/models/experimental.py:252: FutureWarning: You are using
`torch.load` with `weights_only=False` (the current default value), which uses
the default pickle module implicitly. It is possible to construct malicious
pickle data which will execute arbitrary code during unpickling (See
https://github.com/pytorch/pytorch/blob/main/SECURITY.md#untrusted-models for
more details). In a future release, the default value for `weights_only` will be
flipped to `True`. This limits the functions that could be executed during
unpickling. Arbitrary objects will no longer be allowed to be loaded via this
mode unless they are explicitly allowlisted by the user via
`torch.serialization.add_safe_globals`. We recommend you start setting
`weights_only=True` for any use case where you don't have full control of the
loaded file. Please open an issue on GitHub for any issues related to this
experimental feature.
```

```
ckpt = torch.load(w, map_location=map_location) # load
Fusing layers...
RepConv.fuse_repvgg_block
RepConv.fuse_repvgg_block
RepConv.fuse_repvgg_block
IDetect.fuse
Model Summary: 314 layers, 36497954 parameters, 6194944 gradients
```

```
Convert model to Traced-model...
traced_script_module saved!
model is traced!
```

```
/usr/local/lib/python3.10/dist-packages/torch/functional.py:513: UserWarning:
torch.meshgrid: in an upcoming release, it will be required to pass the indexing
argument. (Triggered internally at
../aten/src/ATen/native/TensorShape.cpp:3609.)
  return _VF.meshgrid(tensors, **kwargs) # type: ignore[attr-defined]
21 players, Done. (6.8ms) Inference, (680.3ms) NMS
The image with the result is saved in:
runs/detect/exp9/08fd33_3_1_png.rf.894a7edd6b726ed886b3777ea55d6beb.jpg
Done. (0.791s)
```

```
[24]: # define helper functions to show images
def imShow(path):
    import cv2
    import matplotlib.pyplot as plt
    %matplotlib inline

    image = cv2.imread(path)
    height, width = image.shape[:2]
    resized_image = cv2.resize(image, (3*width, 3*height), interpolation = cv2.
↪INTER_CUBIC)

    fig = plt.gcf()
    fig.set_size_inches(18, 10)
    plt.axis("off")
    plt.imshow(cv2.cvtColor(resized_image, cv2.COLOR_BGR2RGB))
    plt.show()
```

```
[50]: print("Imagen Original")
imShow("/content/yolov7/data/football-player/valid/images/08fd33_3_1_png.rf.
↪894a7edd6b726ed886b3777ea55d6beb.jpg")
print("\nImagen luego de aplicar el modelo")
imShow("runs/detect/exp9/08fd33_3_1_png.rf.894a7edd6b726ed886b3777ea55d6beb.
↪jpg")
```

Imagen Original



Imagen luego de aplicar el modelo



