

```
!git clone https://github.com/ultralytics/yolov5 # clone
%cd yolov5
%pip install -qr requirements.txt # install
```

```
import torch
from yolov5 import utils
display = utils.notebook_init() # checks
```

YOLOv5 🚀 v6.0-148-gc1249a4 torch 1.10.0+cu111 CUDA:0 (Tesla K80, 11441MiB)  
Setup complete ✅ (2 CPUs, 12.7 GB RAM, 42.0/78.2 GB disk)

```
%cd /content/
!unzip /content/drive/MyDrive/last.zip
```

```
/content
Archive: /content/drive/MyDrive/last.zip
  creating: train/
  inflating: __MACOSX/._train
    creating: train/images/
  inflating: __MACOSX/train/._images
    creating: train/labels/
  inflating: __MACOSX/train/._labels
  inflating: train/images/3-16_jpg.rf.4de33081de872067c5d62af04ef86371.jpg
  inflating: __MACOSX/train/images/._3-16_jpg.rf.4de33081de872067c5d62af04ef86
  inflating: train/images/large-Cheetah-photo_jpg.rf.fd0d466aa869baa5cbc98fbd3
  inflating: __MACOSX/train/images/._large-Cheetah-photo_jpg.rf.fd0d466aa869ba
  inflating: train/images/18211186_403_jpg.rf.c7bfbaabd5495e75ffef6d5b5ec857ab
  inflating: __MACOSX/train/images/._18211186_403_jpg.rf.c7bfbaabd5495e75ffef6
  inflating: train/images/Bull_jpg.rf.44841e03f981a064aa52e50a0fabfaad.jpg
  inflating: __MACOSX/train/images/._Bull_jpg.rf.44841e03f981a064aa52e50a0fabf
  inflating: train/images/wildlifetrusts_40331200380_jpg.rf.008b1a4dda69053db4
  inflating: __MACOSX/train/images/._wildlifetrusts_40331200380_jpg.rf.008b1a4
  inflating: train/images/Image-w-cred-cap_-1200w-_Brown-Bear-page_-brown-bea
  inflating: __MACOSX/train/images/._Image-w-cred-cap_-1200w-_Brown-Bear-page
  inflating: train/images/Caterpillar-58b9e64d3df78c353c59f17d_jpg.rf.1b638ba7
  inflating: __MACOSX/train/images/._Caterpillar-58b9e64d3df78c353c59f17d_jpg.
  inflating: train/images/istockphoto-1255958454-170667a_jpg.rf.b34091a5ab55dd
  inflating: __MACOSX/train/images/._istockphoto-1255958454-170667a_jpg.rf.b34
  inflating: train/images/2019_Blog_CheetahBlog_Cheetahs_CreditNickGarbutt_jpg
  inflating: __MACOSX/train/images/._2019_Blog_CheetahBlog_Cheetahs_CreditNick
  inflating: train/images/cheetah-mother-and-cubs-on-termite-mound_jpg.rf.8b95
  inflating: __MACOSX/train/images/._cheetah-mother-and-cubs-on-termite-mound_
  inflating: train/images/peggy-anke-8eCRIYakME8-unsplash-1_jpg.rf.602cd5d38ff
  inflating: __MACOSX/train/images/._peggy-anke-8eCRIYakME8-unsplash-1_jpg.rf.
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  inflating: __MACOSX/train/images/._GettyImages-92779802-437a584389b6484c9139
  inflating: train/images/Charlene-Carr-Butterflies-Mating-e1564662907423_jpg.
  inflating: __MACOSX/train/images/._Charlene-Carr-Butterflies-Mating-e1564662
  inflating: train/images/Conversation-caterpillar-1-1024x606_jpg.rf.1fb0495f2
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  inflating: train/images/271869-2121x1414-canary-on-branch_jpg.rf.777a6bf9c47
  inflating: __MACOSX/train/images/._271869-2121x1414-canary-on-branch_jpg.rf.
  inflating: train/images/160750fe05e93448cf36331017e7d818--work-inspiration-p
  inflating: __MACOSX/train/images/._160750fe05e93448cf36331017e7d818--work-in
```

```

inflating: train/images/iranian_cheetah_roars_jpg.rf.58ba0cdf915ecc582f905f3
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inflating: __MACOSX/train/images/.longest-horn-spread-on-a-bull-living-stan
inflating: train/images/butterfly-blitz-gallery-images-scaled_jpg.rf.6de0abb
inflating: __MACOSX/train/images/.butterfly-blitz-gallery-images-scaled_jpg
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inflating: train/images/longest-horn-spread-on-a-bull-living-in-a-pond_tcm25
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inflating: train/images/WC6h6fkhSqqNyGM5pS3eAk_jpg.rf.88c9db0d7084eefdf81386
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inflating: train/images/images-1_jpg.rf.c3867c0e03998e8269d7437b791f1baf.jpg
inflating: __MACOSX/train/images/.images-1_jpg.rf.c3867c0e03998e8269d7437b7
inflating: train/images/1200px-Chenille_de_Grand_porte_queue_-macaon-_jpg.rf
inflating: __MACOSX/train/images/.1200px-Chenille_de_Grand_porte_queue_-mac
inflating: train/images/9ty8fytrd6yioob_jpg.rf.1f4a424631bb2e7b2f82d3bf447a6f
inflating: __MACOSX/train/images/.9ty8fytrd6yioob_jpg.rf.1f4a424631bb2e7b2f
inflating: train/images/300_cuba_ing_rf.2e5ba479a135633fa56e082e0784aa8a_in

```

```
!nvidia-smi
```

Fri Dec 17 04:09:51 2021

NVIDIA-SMI 495.44                      Driver Version: 460.32.03                      CUDA Version: 11.2									
GPU Name                      Persistence-M				Bus-Id                      Disp.A		Volatile Uncorr. ECC			
Fan	Temp	Perf	Pwr:Usage/Cap	Memory-Usage		GPU-Util	Compute M.	MIG M.	
=====+=====+=====									
0	Tesla K80		Off	00000000:00:04.0 Off				0	
N/A	48C	P8	30W / 149W	3MiB / 11441MiB		0%	Default	N/A	
+-----+-----+-----									

Processes:						
GPU	GI	CI	PID	Type	Process name	GPU Memory Usage
	ID	ID				
No running processes found						

```
%cd yolov5
```

```
%pip install -r requirements.txt # install
```

/content/yolov5

```
Requirement already satisfied: matplotlib>=3.2.2 in /usr/local/lib/python3.7/dis
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: opencv-python>=4.1.2 in /usr/local/lib/python3.7/
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.7/dist
Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.7/dist-pac
Requirement already satisfied: torch>=1.7.0 in /usr/local/lib/python3.7/dist-pac
```

Requirement already satisfied: torchvision>=0.8.1 in /usr/local/lib/python3.7/di  
 Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.7/dist-pac  
 Requirement already satisfied: tensorboard>=2.4.1 in /usr/local/lib/python3.7/di  
 Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.7/dist-pa  
 Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.7/dist-  
 Requirement already satisfied: thop in /usr/local/lib/python3.7/dist-packages (f  
 Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in /usr/  
 Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.7/dis  
 Requirement already satisfied: cycycler>=0.10 in /usr/local/lib/python3.7/dist-pac  
 Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.7/  
 Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /usr/l  
 Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-pac  
 Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dis  
 Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/di  
 Requirement already satisfied: typing-extensions in /usr/local/lib/python3.7/dis  
 Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.7/dist-  
 Requirement already satisfied: protobuf>=3.6.0 in /usr/local/lib/python3.7/dist-  
 Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.7  
 Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/loc  
 Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /usr/local/lib/p  
 Requirement already satisfied: werkzeug>=0.11.15 in /usr/local/lib/python3.7/dis  
 Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local/li  
 Requirement already satisfied: setuptools>=41.0.0 in /usr/local/lib/python3.7/di  
 Requirement already satisfied: grpcio>=1.24.3 in /usr/local/lib/python3.7/dist-p  
 Requirement already satisfied: wheel>=0.26 in /usr/local/lib/python3.7/dist-pack  
 Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.7/dist-pac  
 Requirement already satisfied: pytz>=2017.2 in /usr/local/lib/python3.7/dist-pac  
 Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages (fr  
 Requirement already satisfied: cachetools<5.0,>=2.0.0 in /usr/local/lib/python3.  
 Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.7  
 Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.7/dist-pa  
 Requirement already satisfied: requests-oauthlib>=0.7.0 in /usr/local/lib/python  
 Requirement already satisfied: importlib-metadata>=4.4 in /usr/local/lib/python3  
 Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.7/dist-packag  
 Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.7/  
 Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.7/dist-

```
%cd /content/yolov5
```

```
!python train.py --img 640 --batch 16 --epochs 60 --data coco128.yaml --weights yolov
```

Epoch	gpu_mem	box	obj	cls	labels	img_size
51/59	3.7G	0.03592	0.01876	0.02073	15	640: 100% 1
	Class	Images	Labels	P	R	mAP@.5 mA
	all	149	220	0.739	0.826	0.84

Epoch	gpu_mem	box	obj	cls	labels	img_size
52/59	3.7G	0.04051	0.02081	0.01923	25	640: 100% 1
	Class	Images	Labels	P	R	mAP@.5 mA
	all	149	220	0.84	0.811	0.877

Epoch	gpu_mem	box	obj	cls	labels	img_size
53/59	3.7G	0.03601	0.0171	0.02183	11	640: 100% 1
	Class	Images	Labels	P	R	mAP@.5 mA
	all	149	220	0.881	0.852	0.902

Epoch	gpu_mem	box	obj	cls	labels	img_size
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Epoch	gpu_mem	box	obj	cls	labels	img_size
54/59	3.7G	0.03756	0.02	0.01838	18	640: 100% 1
	Class	Images	Labels		P	R
	all	149	220	0.827	0.873	0.889

Epoch	gpu_mem	box	obj	cls	labels	img_size
55/59	3.7G	0.03558	0.01901	0.0227	16	640: 100% 1
	Class	Images	Labels		P	R
	all	149	220	0.847	0.873	0.896

Epoch	gpu_mem	box	obj	cls	labels	img_size
56/59	3.7G	0.038	0.01973	0.01894	18	640: 100% 1
	Class	Images	Labels		P	R
	all	149	220	0.905	0.855	0.917

Epoch	gpu_mem	box	obj	cls	labels	img_size
57/59	3.7G	0.034	0.01914	0.01681	11	640: 100% 1
	Class	Images	Labels		P	R
	all	149	220	0.891	0.836	0.895

Epoch	gpu_mem	box	obj	cls	labels	img_size
58/59	3.7G	0.03645	0.01886	0.0189	17	640: 100% 1
	Class	Images	Labels		P	R
	all	149	220	0.877	0.851	0.915

Epoch	gpu_mem	box	obj	cls	labels	img_size
59/59	3.7G	0.03301	0.01908	0.01548	15	640: 100% 1
	Class	Images	Labels		P	R
	all	149	220	0.907	0.831	0.916

60 epochs completed in 0.255 hours.

Optimizer stripped from runs/train/exp2/weights/last.pt, 14.5MB

Optimizer stripped from runs/train/exp2/weights/best.pt, 14.5MB

Validating runs/train/exp2/weights/best.pt...

Fusing layers...

Model Summary: 213 layers, 7029004 parameters, 0 gradients, 15.9 GFLOPs

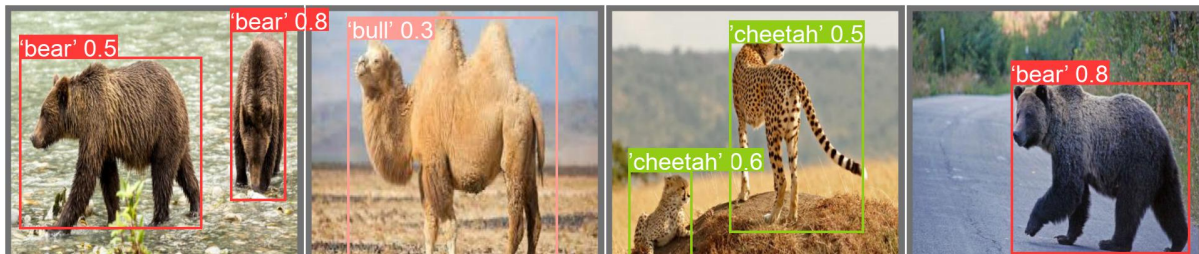
Class	Images	Labels	P	R	mAP@.5	mA
all	149	220	0.908	0.831	0.916	
'bear'	149	32	0.934	1	0.993	
'bull'	149	30	0.722	0.865	0.808	
'butterfly'	149	40	0.774	0.95	0.95	
'camel'	149	26	0.928	0.493	0.695	

display.Image(filename='/content/yolov5/runs/train/exp2/train\_batch0.jpg', width=600)



```
display.Image(filename='/content/yolov5/runs/train/exp2/val_batch0_pred.jpg', width=6
```

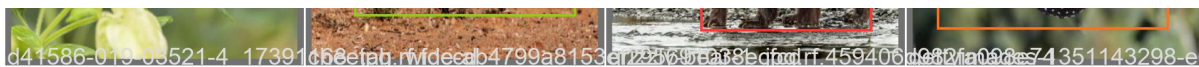
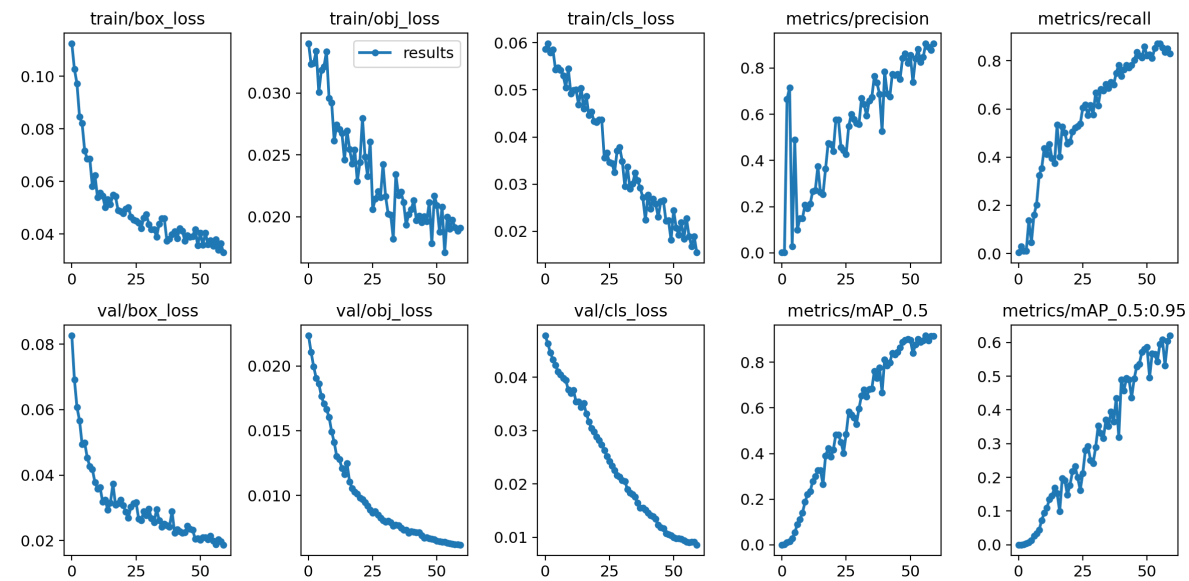




```
from utils.plots import plot_results
plot_results('/content/yolov5/runs/train/exp2/results.csv')
```



```
display.Image(filename='/content/yolov5/runs/train/exp2/results.png', width=600)
```



✓ 0s completed at 9:49 PM

