

```
!git clone https://github.com/ultralytics/yolov5
```

```
Cloning into 'yolov5'...  
remote: Enumerating objects: 11367, done.  
remote: Total 11367 (delta 0), reused 0 (delta 0), pack-reused 11367  
Receiving objects: 100% (11367/11367), 11.28 MiB | 22.60 MiB/s, done.  
Resolving deltas: 100% (7847/7847), done.
```

```
%cd /content/yolov5  
!pip install -U -r requirements.txt  
import torch  
from IPython.display import Image
```

/content/yolov5

Requirement already satisfied: matplotlib>=3.2.2 in /usr/local/lib/python3.7/

Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.7/dist-

Requirement already satisfied: opencv-python>=4.1.2 in /usr/local/lib/python3.

Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.7/dist-

Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.7/dist-

Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.7/d

Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: torch>=1.7.0 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: torchvision>=0.8.1 in /usr/local/lib/python3.7/

Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: tensorboard>=2.4.1 in /usr/local/lib/python3.7/

Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.7/dist-

Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.7/di

Requirement already satisfied: thop in /usr/local/lib/python3.7/dist-packages

Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.7/

Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.7/di

Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.7/

Requirement already satisfied: pyparsing>=2.2.1 in /usr/local/lib/python3.7/d

Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.

Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/

Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.

Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: charset-normalizer~2.0.0 in /usr/local/lib/pyt

Requirement already satisfied: typing-extensions in /usr/local/lib/python3.7/

Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/

Requirement already satisfied: protobuf>=3.6.0 in /usr/local/lib/python3.7/di

Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local

Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /usr/local/lib

Requirement already satisfied: wheel>=0.26 in /usr/local/lib/python3.7/dist-pa

Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.

Requirement already satisfied: werkzeug>=0.11.15 in /usr/local/lib/python3.7/

Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.7/di

Requirement already satisfied: grpcio>=1.24.3 in /usr/local/lib/python3.7/di

Requirement already satisfied: setuptools>=41.0.0 in /usr/local/lib/python3.7/

Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.7/dist-p

Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages

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.

Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.7/dist-

Requirement already satisfied: requests-oauthlib>=0.7.0 in /usr/local/lib/pyt

Requirement already satisfied: importlib-metadata>=4.4 in /usr/local/lib/pytho

Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.7/dist-pac

Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.

Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.7/di

```
!nvidia-smi
```

```
Thu Mar 17 15:25:45 2022
```

NVIDIA-SMI		460.32.03		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	58C	P8	32W / 149W		0MiB / 11441MiB		0%	Default	N/A

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

```
!git clone https://github.com/iAmEthanMai/mask-detection-dataset.git
```

```
Cloning into 'mask-detection-dataset'...
remote: Enumerating objects: 3502, done.
remote: Total 3502 (delta 0), reused 0 (delta 0), pack-reused 3502
Receiving objects: 100% (3502/3502), 400.63 MiB | 32.17 MiB/s, done.
Resolving deltas: 100% (881/881), done.
Checking out files: 100% (2567/2567), done.
```

```
!python3 /content/yolov5/train.py --batch 1 --epochs 100 --data /content/mask-detection-dataset
```

Class	Images	Labels	P	R	mAP@.5	mAP@.5	mAP@.5
all	85	492	0.627	0.697	0.677		

Epoch	gpu_mem	box	obj	cls	labels	img_size	
93/99	0.86G	0.02553	0.02969	0.003823	1	640: 100%	
Class	Images	Labels	P	R	mAP@.5	mAP@.5	mAP@.5
Class	Images	Labels	P	R	mAP@.5	mAP@.5	mAP@.5
all	85	492	0.639	0.695	0.659		

Epoch	gpu_mem	box	obj	cls	labels	img_size	
94/99	0.86G	0.02557	0.03025	0.003883	34	640: 100%	
Class	Images	Labels	P	R	mAP@.5	mAP@.5	mAP@.5
Class	Images	Labels	P	R	mAP@.5	mAP@.5	mAP@.5

	Class	Images	Labels	P	R	mAP@.5 mIoU
	all	85	492	0.664	0.66	0.661

Epoch	gpu_mem	box	obj	cls	labels	img_size
95/99	0.86G	0.02567	0.02931	0.00358	3	640: 100% (
	Class	Images	Labels	P	R	mAP@.5 mIoU
	Class	Images	Labels	P	R	mAP@.5 mIoU
	all	85	492	0.649	0.666	0.646

Epoch	gpu_mem	box	obj	cls	labels	img_size
96/99	0.86G	0.0262	0.0315	0.004624	13	640: 100% (
	Class	Images	Labels	P	R	mAP@.5 mIoU
	Class	Images	Labels	P	R	mAP@.5 mIoU
	all	85	492	0.816	0.547	0.636

Epoch	gpu_mem	box	obj	cls	labels	img_size
97/99	0.86G	0.02562	0.03164	0.004235	6	640: 100% (
	Class	Images	Labels	P	R	mAP@.5 mIoU
	Class	Images	Labels	P	R	mAP@.5 mIoU
	all	85	492	0.687	0.641	0.67

Epoch	gpu_mem	box	obj	cls	labels	img_size
98/99	0.86G	0.02528	0.03108	0.003958	55	640: 100% (
	Class	Images	Labels	P	R	mAP@.5 mIoU
	Class	Images	Labels	P	R	mAP@.5 mIoU
	all	85	492	0.628	0.693	0.637

Epoch	gpu_mem	box	obj	cls	labels	img_size
99/99	0.86G	0.02555	0.03046	0.004365	1	640: 100% (
	Class	Images	Labels	P	R	mAP@.5 mIoU
	Class	Images	Labels	P	R	mAP@.5 mIoU
	all	85	492	0.598	0.732	0.655

100 epochs completed in 4.517 hours.

Optimizer stripped from yolov5/runs/train/exp/weights/last.pt, 14.4MB

Optimizer stripped from yolov5/runs/train/exp/weights/best.pt, 14.4MB

Validating yolov5/runs/train/exp/weights/best.pt...

Fusing layers...

Model Summary: 213 layers, 7018216 parameters, 0 gradients, 15.8 GFLOPs

Class	Images	Labels	P	R	mAP@.5 mIoU
Class	Images	Labels	P	R	mAP@.5 mIoU
all	85	492	0.687	0.641	0.67
0	85	92	0.656	0.576	0.624
1	85	390	0.85	0.849	0.893
2	85	10	0.554	0.497	0.494

Results saved to **yolov5/runs/train/exp**

