

YOLOv8 is trained for Object Detection and Image Segmentation and Image

- Classification Tasks. We will run Object Detection and Image Segmentation tasks in this Tutorial

Model	size (pixels)	mAP _{val} 50-95	Speed CPU ONNX (ms)	Speed A100 TensorRT (ms)	params (M)	FLOPs (B)
YOLOv8n	640	37.3	80.4	0.99	3.2	8.7
YOLOv8s	640	44.9	128.4	1.20	11.2	28.6
YOLOv8m	640	50.2	234.7	1.83	25.9	78.9
YOLOv8l	640	52.9	375.2	2.39	43.7	165.2
YOLOv8x	640	53.9	479.1	3.53	68.2	257.8

Before Running The Script, Please Make Sure, You Have Selected the Run Time as GPU

- Import the Required Library

```
from IPython.display import Image
```

- Install Ultralytics Library

```
!pip install ultralytics==8.0.0
```

Looking in indexes: <https://pypi.org/simple>, <https://us-python.pkg.dev/colab-wheels/public/simple/>

Collecting ultralytics==8.0.0

 Downloading ultralytics-8.0.0-py3-none-any.whl (219 kB)

 219.8/219.8 KB 940.0 kB/s eta 0:00:00

Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (1.3.5)

Requirement already satisfied: matplotlib>=3.2.2 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (3.2.2)

Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (7.1.2)

Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (0.11.2)

Collecting thop>=0.1.1

 Downloading thop-0.1.1.post2209072238-py3-none-any.whl (15 kB)

Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (1.7.3)

Requirement already satisfied: tqdm>=4.64.0 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (4.64.1)

Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (6.0)

Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (1.21.6)

Requirement already satisfied: tensorboard>=2.4.1 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (2.9.1)

Requirement already satisfied: ipython in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (7.9.0)

Collecting hydra-core>=1.2.0

 Downloading hydra_core-1.3.1-py3-none-any.whl (154 kB)

 154.1/154.1 KB 18.6 MB/s eta 0:00:00

Requirement already satisfied: torch>=1.7.0 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (1.13.1+cu116)

Collecting GitPython>=3.1.24

 Downloading GitPython-3.1.30-py3-none-any.whl (184 kB)

 184.0/184.0 KB 22.4 MB/s eta 0:00:00

Requirement already satisfied: torchvision>=0.8.1 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (0.14.1+cu116)

Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (2.25.1)

Requirement already satisfied: psutil in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (5.4.8)

Requirement already satisfied: opencv-python>=4.1.1 in /usr/local/lib/python3.8/dist-packages (from ultralytics==8.0.0) (4.6.0.66)

Collecting gitdb<5,>=4.0.1

 Downloading gitdb-4.0.10-py3-none-any.whl (62 kB)

 62.7/62.7 KB 8.9 MB/s eta 0:00:00

Requirement already satisfied: importlib-resources in /usr/local/lib/python3.8/dist-packages (from hydra-core>=1.2.0->ultralytics==8.0.0) (5.10.2)

Requirement already satisfied: packaging in /usr/local/lib/python3.8/dist-packages (from hydra-core>=1.2.0->ultralytics==8.0.0) (23.0)

Collecting omegaconf<2.4,>=2.2

 Downloading omegaconf-2.3.0-py3-none-any.whl (79 kB)

 79.5/79.5 KB 11.3 MB/s eta 0:00:00

Collecting antlr4-python3-runtime==4.9.*

 Downloading antlr4-python3-runtime-4.9.3.tar.gz (117 kB)

 117.0/117.0 KB 15.3 MB/s eta 0:00:00

 Preparing metadata (setup.py) ... done

Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.8/dist-packages (from matplotlib>=3.2.2->ultralytics==8.0.0) (1.4.4)

Requirement already satisfied: pyparsing!=2.0.4,!>=2.1.2,!>=2.1.6,>=2.0.1 in /usr/local/lib/python3.8/dist-packages (from matplotlib>=3.2.2->ultralytics==8.0.0) (3.0.9)

Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.8/dist-packages (from matplotlib>=3.2.2->ultralytics==8.0.0) (2.8.2)

Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.8/dist-packages (from matplotlib>=3.2.2->ultralytics==8.0.0) (0.11.0)

Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.8/dist-packages (from pandas>=1.1.4->ultralytics==8.0.0) (2022.7.1)

Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.8/dist-packages (from requests>=2.23.0->ultralytics==8.0.0) (1.24.3)

Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.8/dist-packages (from requests>=2.23.0->ultralytics==8.0.0) (2.10)

Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.8/dist-packages (from requests>=2.23.0->ultralytics==8.0.0) (2022.12.7)

Requirement already satisfied: chardet<5,>=3.0.2 in /usr/local/lib/python3.8/dist-packages (from requests>=2.23.0->ultralytics==8.0.0) (4.0.0)

Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local/lib/python3.8/dist-packages (from tensorboard>=2.4.1->ultralytics==8.0.0) (0.4.6)

Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.8/dist-packages (from tensorboard>=2.4.1->ultralytics==8.0.0) (3.4.1)

Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.8/dist-packages (from tensorboard>=2.4.1->ultralytics==8.0.0) (1.4.0)

Requirement already satisfied: tensorflow-plugin-wit>=1.6.0 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (1.8.1)

Requirement already satisfied: wheel>=0.26 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (0.38.4)

Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (2.16.0)

Requirement already satisfied: protobuf<3.20,>=3.9.2 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (3.19.6)

Requirement already satisfied: werkzeug>=1.0.1 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (1.0.1)

Requirement already satisfied: grpcio>=1.24.3 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (1.51.1)

Requirement already satisfied: setuptools>=41.0.0 in /usr/local/lib/python3.8/dist-packages (from tensorflow>=2.4.1->ultralytics==8.0.0) (57.4.0)

```

Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/local/lib/python3.8/dist-packages (from tensorboard>=2.4.1->ultralytics==8.0.0) (0.6.1)
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.8/dist-packages (from torch>=1.7.0->ultralytics==8.0.0) (4.4.0)
Requirement already satisfied: pickleshare in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (0.7.5)
Requirement already satisfied: backcall in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (0.2.0)
Requirement already satisfied: traitlets>=4.2 in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (5.7.1)
Requirement already satisfied: decorator in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (4.4.2)
Requirement already satisfied: prompt-toolkit<2.1.0,>=2.0.0 in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (2.0.10)
Collecting jedi>=0.10
  Downloading jedi-0.18.2-py2.py3-none-any.whl (1.6 MB)
    1.6/1.6 MB 78.5 MB/s eta 0:00:00
Requirement already satisfied: pygments in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (2.6.1)
Requirement already satisfied: pexpect in /usr/local/lib/python3.8/dist-packages (from ipython->ultralytics==8.0.0) (4.8.0)
Collecting smmap<6,>=3.0.1
  Downloading smmap-5.0.0-py3-none-any.whl (24 kB)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.8/dist-packages (from google-auth<3,>=1.6.3->tensorboard>=2.4.1->ultralytics==8.0.0) (5.3.0)
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.8/dist-packages (from google-auth<3,>=1.6.3->tensorboard>=2.4.1->ultralytics==8.0.0) (4.9)
Requirement already satisfied: six>=1.9.0 in /usr/local/lib/python3.8/dist-packages (from google-auth<3,>=1.6.3->tensorboard>=2.4.1->ultralytics==8.0.0) (1.15.0)
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.8/dist-packages (from google-auth<3,>=1.6.3->tensorboard>=2.4.1->ultralytics==8.0.0) (0.2.8)
Requirement already satisfied: requests-oauthlib>=0.7.0 in /usr/local/lib/python3.8/dist-packages (from google-auth-oauthlib<0.5,>=0.4.1->tensorboard>=2.4.1->ultralytics==8.0.0) (1.3.1)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in /usr/local/lib/python3.8/dist-packages (from jedi>=0.10->ipython->ultralytics==8.0.0) (0.8.3)
Requirement already satisfied: importlib-metadata>=4.4 in /usr/local/lib/python3.8/dist-packages (from markdown>=2.6.8->tensorboard>=2.4.1->ultralytics==8.0.0) (6.0.0)
Requirement already satisfied: wcwidth in /usr/local/lib/python3.8/dist-packages (from prompt-toolkit<2.1.0,>=2.0.0->ipython->ultralytics==8.0.0) (0.2.6)
Requirement already satisfied: zipp>=3.1.0 in /usr/local/lib/python3.8/dist-packages (from importlib-resources->hydra-core>=1.2.0->ultralytics==8.0.0) (3.12.0)
Requirement already satisfied: ptyprocess>=0.5 in /usr/local/lib/python3.8/dist-packages (from pexpect->ipython->ultralytics==8.0.0) (0.7.0)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.8/dist-packages (from pyasn1-modules>=0.2.1->google-auth<3,>=1.6.3->tensorboard>=2.4.1->ultralytics==8.0.0) (0.4.8)
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.8/dist-packages (from requests-oauthlib>=0.7.0->google-auth-oauthlib<0.5,>=0.4.1->tensorboard>=2.4.1->ultralytics==8.0.0) (3.2.2)
Building wheels for collected packages: antlr4-python3-runtime
  Building wheel for antlr4-python3-runtime (setup.py) ... done
  Created wheel for antlr4-python3-runtime: filename=antlr4_python3_runtime-4.9.3-py3-none-any.whl size=144575 sha256=55aa3105b9ab8cd7bcd09ddb23e0069783ccaae8780a28572f3a50238bd7fa4
  Stored in directory: /root/.cache/pip/wheels/b1/a3/c2/6df046c09459b73cc9bb6c4401b0be6c47048baf9a1617c485
Successfully built antlr4-python3-runtime
Installing collected packages: antlr4-python3-runtime, smmap, omegaconf, jedi, thop, hydra-core, gitdb, GitPython, ultralytics
Successfully installed GitPython-3.1.30 antlr4-python3-runtime-4.9.3 gitdb-4.0.10 hydra-core-1.3.1 jedi-0.18.2 omegaconf-2.3.0 smmap-5.0.0 thop-0.1.1.post2209072238 ultralytics-8.0.0

```

✓ Check Whether the GPU is Available or Not

```

import torch

torch.cuda.is_available()

→ True

torch.__version__

```

Object Detection

✓ Run Object Detection on a Sample Image

```
!yolo task=detect mode=predict model=yolov8s.pt source='/content/image1.jpg'

→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8s.pt to yolov8s.pt...
100% 21.5M/21.5M [00:01<00:00, 11.8MB/s]

Fusing layers...
YOLOv8s summary: 168 layers, 11156544 parameters, 0 gradients, 28.6 GFLOPs
image 1/1 /content/image1.jpg: 448x640 11 persons, 1 bicycle, 1 motorcycle, 1 bus, 2 traffic lights, 2 backpacks, 3 handbags, 15.5ms
Speed: 0.5ms pre-process, 15.5ms inference, 40.3ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/detect/predict
```

✓ Display the Output Image

```
Image('/content/runs/detect/predict/image1.jpg')
```



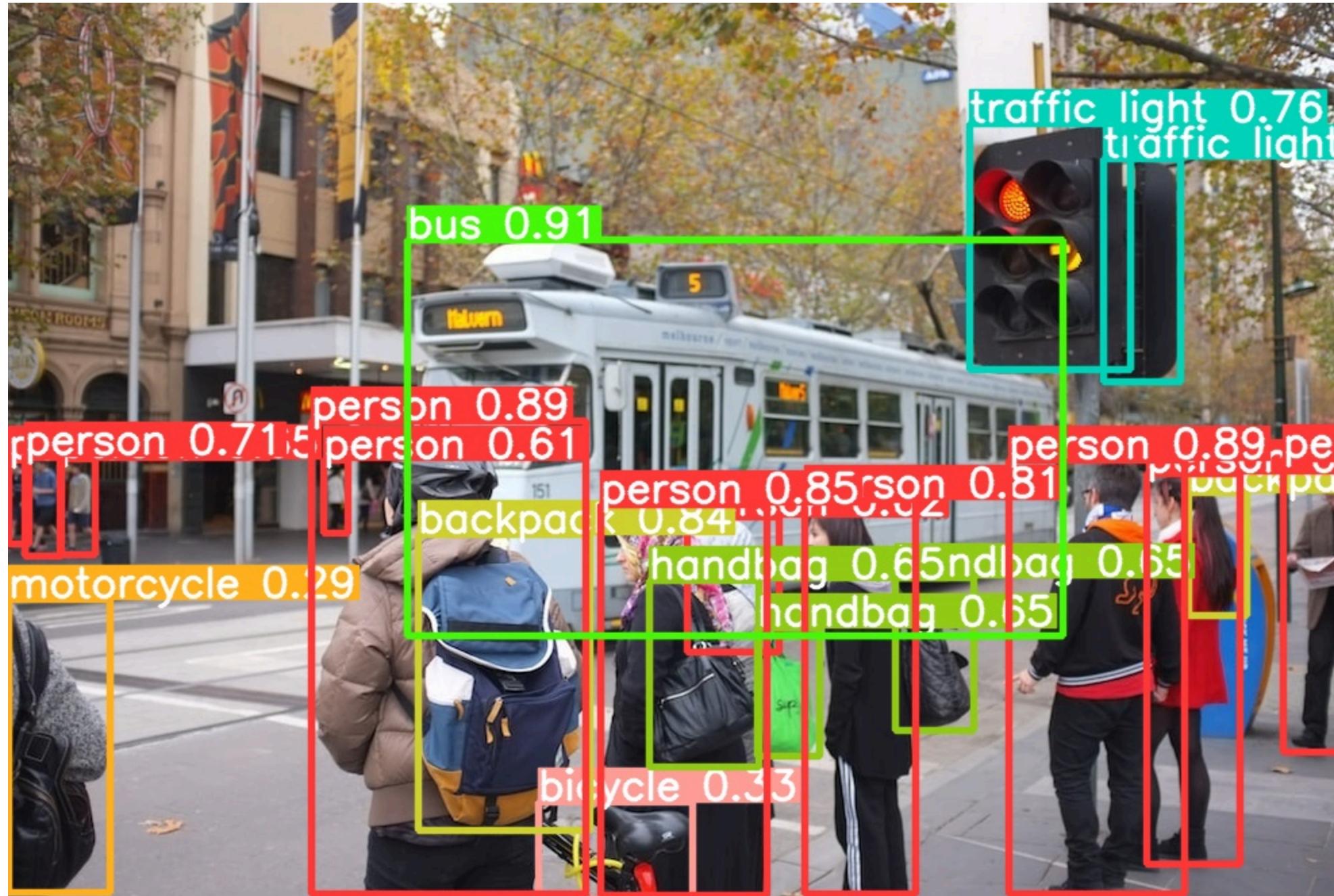
✓ To save the Bounding Box Information set `save_txt=True`

```
!yolo task=detect mode=predict model=yolov8s.pt source='/content/image1.jpg' save_txt=True
```

```
→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...
YOLOv8s summary: 168 layers, 11156544 parameters, 0 gradients, 28.6 GFLOPs
image 1/1 /content/image1.jpg: 448x640 11 persons, 1 bicycle, 1 motorcycle, 1 bus, 2 traffic lights, 2 backpacks, 3 handbags, 15.4ms
Speed: 0.5ms pre-process, 15.4ms inference, 1.9ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/detect/predict2
1 labels saved to runs/detect/predict2/labels
```

✓ Display the Output Image

```
Image('/content/runs/detect/predict2/image1.jpg')
```



✓ To save the "Crop Object" set `save_crop=True`

```
!yolo task=detect mode=predict model=yolov8s.pt source='/content/image1.jpg' save_crop=True
```

```
→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...
YOLOv8s summary: 168 layers, 11156544 parameters, 0 gradients, 28.6 GFLOPs
image 1/1 /content/image1.jpg: 448x640 11 persons, 1 bicycle, 1 motorcycle, 1 bus, 2 traffic lights, 2 backpacks, 3 handbags, 15.2ms
```

```
Speed: 0.4ms pre-process, 15.2ms inference, 1.9ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/detect/predict3
```

▼ Display the Output Image

```
Image('/content/runs/detect/predict3/crops/person/image16.jpg')
```



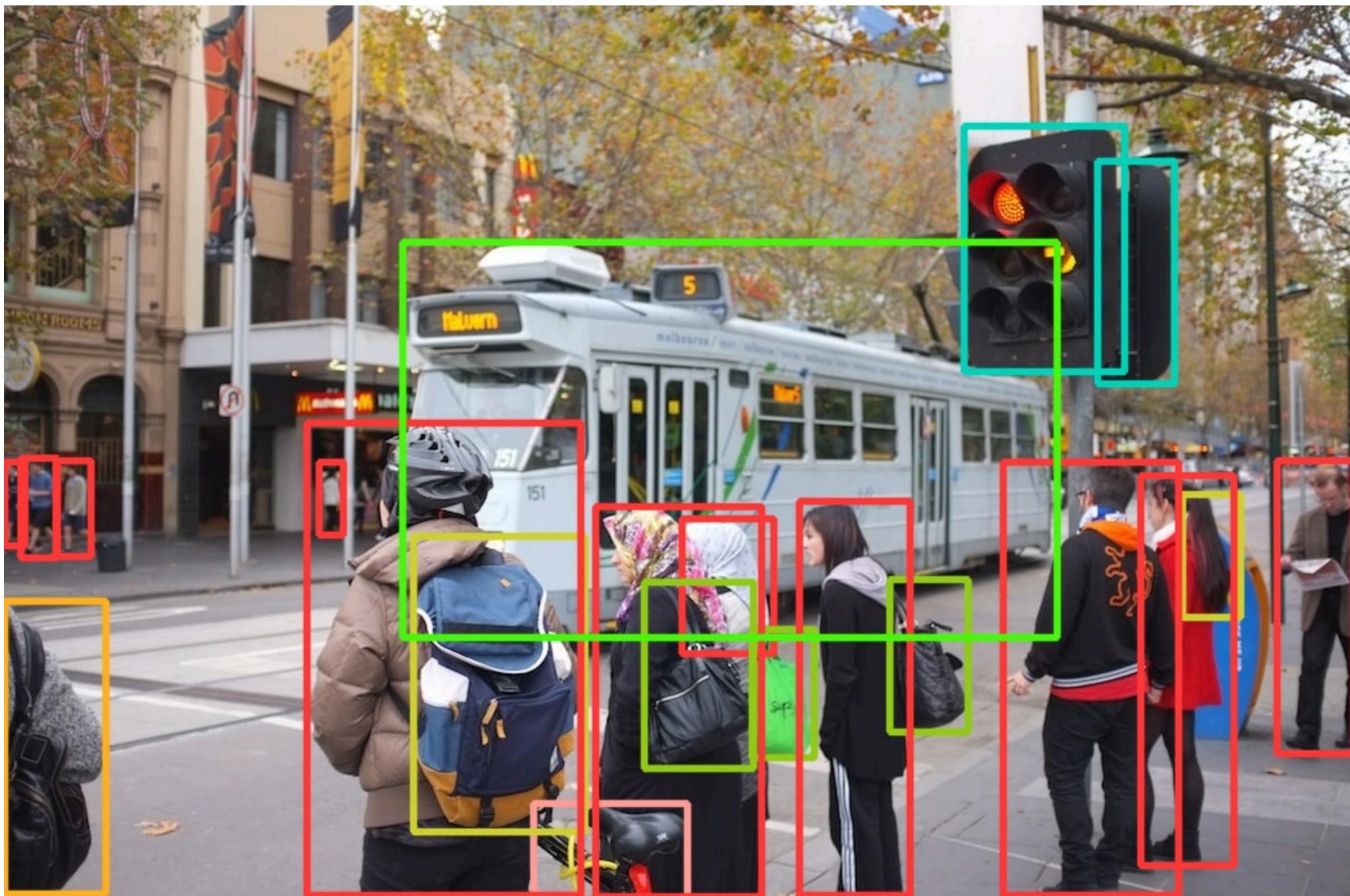
▼ To remove the confidence values and labels, we will use `hide_labels` and `hide_conf` Flags

```
!yolo task=detect mode=predict model=yolov8s.pt source='/content/image1.jpg' hide_labels=True hide_conf=True
```

```
→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...
YOLOv8s summary: 168 layers, 11156544 parameters, 0 gradients, 28.6 GFLOPs
image 1/1 /content/image1.jpg: 448x640 11 persons, 1 bicycle, 1 motorcycle, 1 bus, 2 traffic lights, 2 backpacks, 3 handbags, 15.1ms
Speed: 0.4ms pre-process, 15.1ms inference, 1.8ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/detect/predict4
```

▼ Display the Output Image

```
Image('/content/runs/detect/predict4/image1.jpg')
```



Run Object Detection on Videos

```
!yolo task=detect mode=predict model=yolov8s.pt source='/content/demo.mp4'
```

```
Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...
YOLOv8s summary: 168 layers, 11156544 parameters, 0 gradients, 28.6 GFLOPs
video 1/1 (1/1314) /content/demo.mp4: 384x640 3 cars, 24.1ms
video 1/1 (2/1314) /content/demo.mp4: 384x640 3 cars, 12.1ms
video 1/1 (3/1314) /content/demo.mp4: 384x640 3 cars, 12.8ms
video 1/1 (4/1314) /content/demo.mp4: 384x640 3 cars, 12.2ms
video 1/1 (5/1314) /content/demo.mp4: 384x640 5 cars, 12.2ms
video 1/1 (6/1314) /content/demo.mp4: 384x640 4 cars, 12.8ms
video 1/1 (7/1314) /content/demo.mp4: 384x640 6 cars, 14.2ms
video 1/1 (8/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 13.2ms
```

```
video 1/1 (9/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 13.1ms
video 1/1 (10/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 15.4ms
video 1/1 (11/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 14.3ms
video 1/1 (12/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 12.5ms
video 1/1 (13/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 12.0ms
video 1/1 (14/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 14.3ms
video 1/1 (15/1314) /content/demo.mp4: 384x640 7 cars, 2 trucks, 12.2ms
video 1/1 (16/1314) /content/demo.mp4: 384x640 8 cars, 2 trucks, 12.7ms
video 1/1 (17/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 11.9ms
video 1/1 (18/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 12.3ms
video 1/1 (19/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 11.7ms
video 1/1 (20/1314) /content/demo.mp4: 384x640 8 cars, 1 truck, 12.3ms
video 1/1 (21/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 14.8ms
video 1/1 (22/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 15.1ms
video 1/1 (23/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 15.2ms
video 1/1 (24/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 16.4ms
video 1/1 (25/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 15.3ms
video 1/1 (26/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 14.6ms
video 1/1 (27/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 15.2ms
video 1/1 (28/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 15.3ms
video 1/1 (29/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 15.9ms
video 1/1 (30/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 14.5ms
video 1/1 (31/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 11.7ms
video 1/1 (32/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 11.9ms
video 1/1 (33/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 11.6ms
video 1/1 (34/1314) /content/demo.mp4: 384x640 8 cars, 1 truck, 11.6ms
video 1/1 (35/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 11.7ms
video 1/1 (36/1314) /content/demo.mp4: 384x640 5 cars, 2 trucks, 11.5ms
video 1/1 (37/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.3ms
video 1/1 (38/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.4ms
video 1/1 (39/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.3ms
video 1/1 (40/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.3ms
video 1/1 (41/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 10.3ms
video 1/1 (42/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 10.5ms
video 1/1 (43/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.3ms
video 1/1 (44/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.3ms
video 1/1 (45/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.2ms
video 1/1 (46/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 9.4ms
video 1/1 (47/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 9.5ms
video 1/1 (48/1314) /content/demo.mp4: 384x640 5 cars, 9.6ms
video 1/1 (49/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 11.8ms
video 1/1 (50/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 12.1ms
video 1/1 (51/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 9.5ms
video 1/1 (52/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.1ms
video 1/1 (53/1314) /content/demo.mp4: 384x640 6 cars, 2 trucks, 10.5ms
video 1/1 (54/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 9.7ms
video 1/1 (55/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 9.7ms
```

✓ Display the Demo Video

```
!rm "/content/result_compressed.mp4"
→ rm: cannot remove '/content/result_compressed.mp4': No such file or directory
```

```
from IPython.display import HTML
from base64 import b64encode
import os

# Input video path
save_path = '/content/runs/detect/predict5/demo.mp4'

# Compressed video path
compressed_path = "/content/result_compressed.mp4"

os.system(f"ffmpeg -i {save_path} -vcodec libx264 {compressed_path}")

# Show video
mp4 = open(compressed_path, 'rb').read()
data_url = "data:video/mp4;base64," + b64encode(mp4).decode()
HTML("""
<video width=400 controls>
  <source src=\"%s\" type=\"video/mp4\">
</video>
""") % data_url)
```



0:00 / 0:43

▼ Image Segmentation

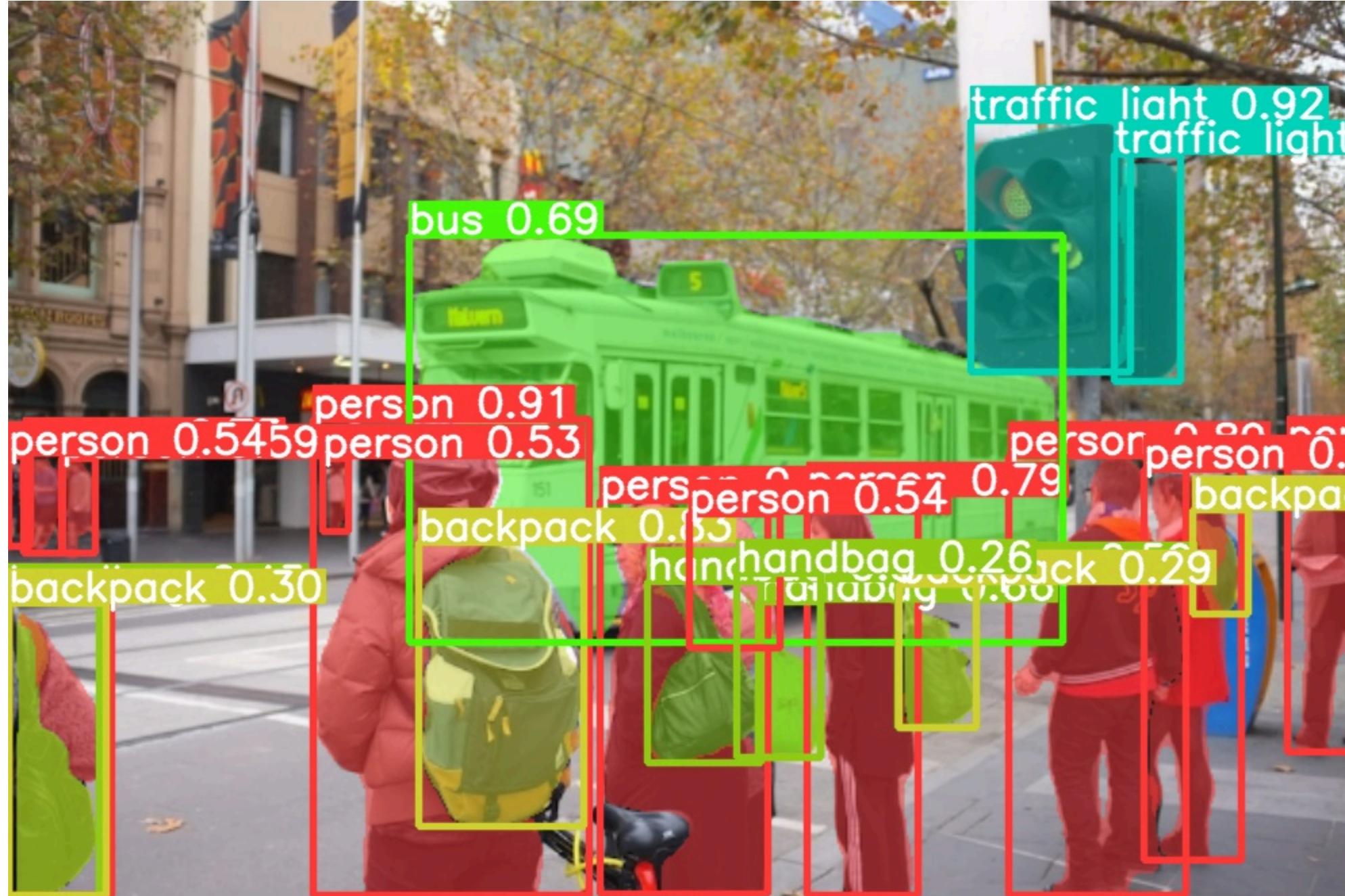
```
!yolo task=segment mode=predict model=yolov8s-seg.pt source='/content/image1.jpg'

→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8s-seg.pt to yolov8s-seg.pt...
100% 22.8M/22.8M [00:04<00:00, 5.83MB/s]

Fusing layers...
YOLOv8s-seg summary: 195 layers, 11810560 parameters, 0 gradients, 42.6 GFLOPs
image 1/1 /content/image1.jpg: 448x640 12 persons, 1 bus, 2 traffic lights, 4 backpacks, 5 handbags, 18.8ms
Speed: 0.4ms pre-process, 18.8ms inference, 3.8ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/segment/predict
```

✓ Display the Output Image

```
Image('/content/runs/segment/predict/image1.jpg')
```



✓ Hide Labels and Confidence Value

```
!yolo task=segment mode=predict model=yolov8s-seg.pt source='/content/image1.jpg' hide_labels=True hide_conf=True
```

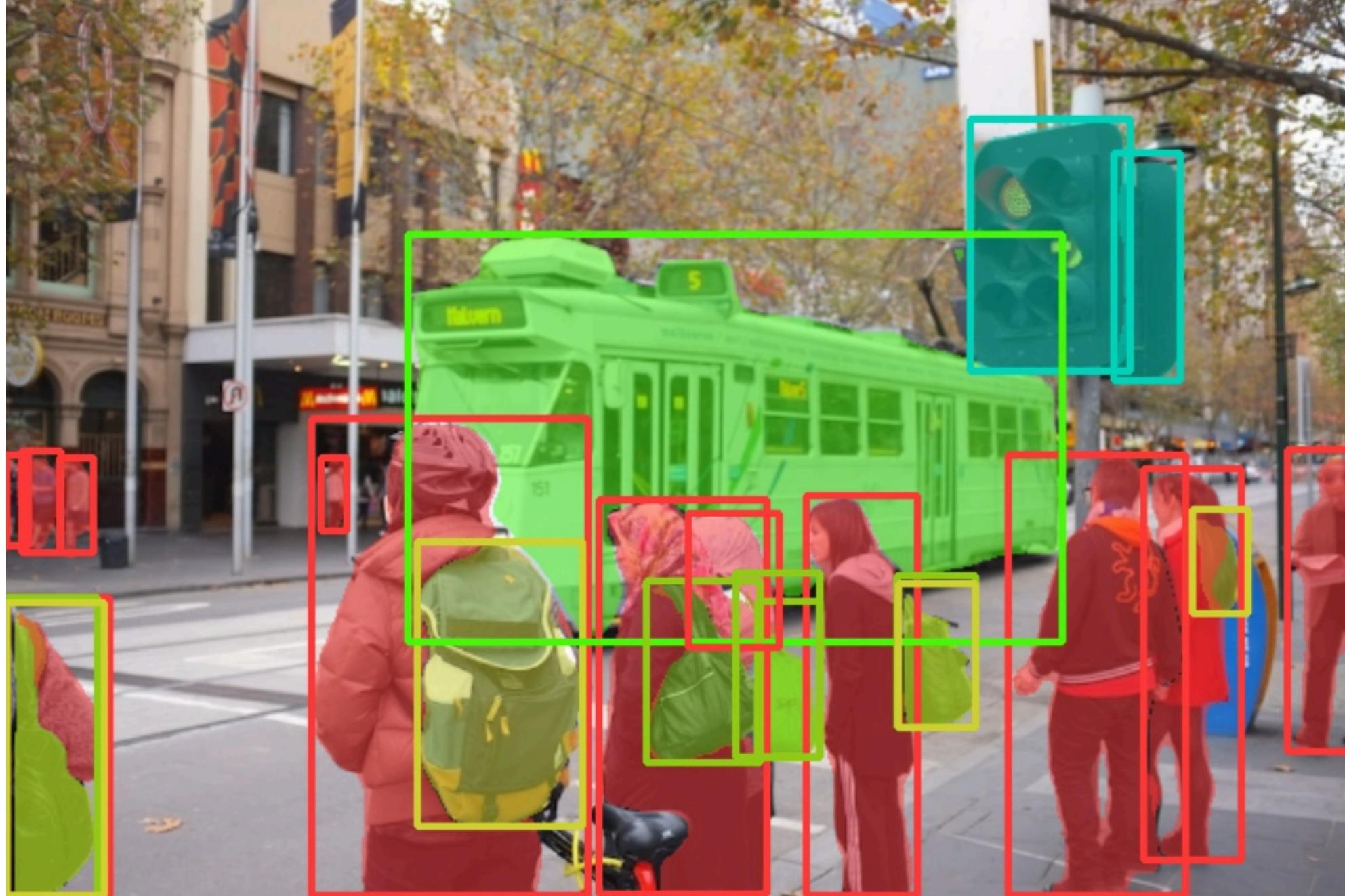
→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...

YOLOv8s-seg summary: 195 layers, 11810560 parameters, 0 gradients, 42.6 GFLOPs
image 1/1 /content/image1.jpg: 448x640 12 persons, 1 bus, 2 traffic lights, 4 backpacks, 5 handbags, 20.5ms

```
Speed: 0.4ms pre-process, 20.5ms inference, 3.4ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/segment/predict2
```

▼ Display the Output Image

```
Image('/content/runs/segment/predict2/image1.jpg')
```



▼ Run Segmentation on Video

```
!yolo task=segment mode=predict model=yolov8s-seg.pt source='/content/demo.mp4'
```

Ultralytics YOLOv8.0.0 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)

Fusing layers...

YOLOv8s-seg summary: 195 layers, 11810560 parameters, 0 gradients, 42.6 GFLOPs

video 1/1 (1/1314) /content/demo.mp4: 384x640 3 cars, 21.0ms
video 1/1 (2/1314) /content/demo.mp4: 384x640 3 cars, 14.8ms
video 1/1 (3/1314) /content/demo.mp4: 384x640 3 cars, 14.7ms
video 1/1 (4/1314) /content/demo.mp4: 384x640 4 cars, 14.7ms
video 1/1 (5/1314) /content/demo.mp4: 384x640 4 cars, 14.8ms
video 1/1 (6/1314) /content/demo.mp4: 384x640 5 cars, 17.3ms
video 1/1 (7/1314) /content/demo.mp4: 384x640 6 cars, 14.8ms
video 1/1 (8/1314) /content/demo.mp4: 384x640 6 cars, 12.5ms
video 1/1 (9/1314) /content/demo.mp4: 384x640 6 cars, 12.6ms
video 1/1 (10/1314) /content/demo.mp4: 384x640 6 cars, 12.6ms
video 1/1 (11/1314) /content/demo.mp4: 384x640 6 cars, 13.8ms
video 1/1 (12/1314) /content/demo.mp4: 384x640 6 cars, 12.7ms
video 1/1 (13/1314) /content/demo.mp4: 384x640 6 cars, 12.5ms
video 1/1 (14/1314) /content/demo.mp4: 384x640 5 cars, 12.6ms
video 1/1 (15/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 11.7ms
video 1/1 (16/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 14.5ms
video 1/1 (17/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 18.0ms
video 1/1 (18/1314) /content/demo.mp4: 384x640 4 cars, 11.6ms
video 1/1 (19/1314) /content/demo.mp4: 384x640 4 cars, 11.4ms
video 1/1 (20/1314) /content/demo.mp4: 384x640 4 cars, 11.4ms
video 1/1 (21/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 11.5ms
video 1/1 (22/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 11.1ms
video 1/1 (23/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 10.8ms
video 1/1 (24/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 11.0ms
video 1/1 (25/1314) /content/demo.mp4: 384x640 3 cars, 12.5ms
video 1/1 (26/1314) /content/demo.mp4: 384x640 4 cars, 10.9ms
video 1/1 (27/1314) /content/demo.mp4: 384x640 4 cars, 13.6ms
video 1/1 (28/1314) /content/demo.mp4: 384x640 4 cars, 10.4ms
video 1/1 (29/1314) /content/demo.mp4: 384x640 4 cars, 11.1ms
video 1/1 (30/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 11.5ms
video 1/1 (31/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 14.6ms
video 1/1 (32/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 11.5ms
video 1/1 (33/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 10.8ms
video 1/1 (34/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 11.0ms
video 1/1 (35/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.4ms
video 1/1 (36/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 11.2ms
video 1/1 (37/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.4ms
video 1/1 (38/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 11.8ms
video 1/1 (39/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 11.2ms
video 1/1 (40/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.2ms
video 1/1 (41/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.3ms
video 1/1 (42/1314) /content/demo.mp4: 384x640 5 cars, 2 trucks, 11.7ms
video 1/1 (43/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.7ms
video 1/1 (44/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 10.6ms
video 1/1 (45/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 10.8ms
video 1/1 (46/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 11.1ms
video 1/1 (47/1314) /content/demo.mp4: 384x640 5 cars, 12.3ms
video 1/1 (48/1314) /content/demo.mp4: 384x640 5 cars, 1 truck, 10.6ms
video 1/1 (49/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 11.2ms
video 1/1 (50/1314) /content/demo.mp4: 384x640 5 cars, 11.0ms
video 1/1 (51/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 10.3ms
video 1/1 (52/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 13.7ms
video 1/1 (53/1314) /content/demo.mp4: 384x640 7 cars, 1 truck, 12.3ms
video 1/1 (54/1314) /content/demo.mp4: 384x640 5 cars, 13.6ms
video 1/1 (55/1314) /content/demo.mp4: 384x640 6 cars, 1 truck, 11.7ms

✓ Display the Output Video for Segmentation

```
!rm "/content/result_compressed.mp4"

from IPython.display import HTML
from base64 import b64encode
import os

# Input video path
save_path = '/content/runs/segment/predict3/demo.mp4'

# Compressed video path
compressed_path = "/content/result_compressed.mp4"

os.system(f"ffmpeg -i {save_path} -vcodec libx264 {compressed_path}")

# Show video
mp4 = open(compressed_path, 'rb').read()
data_url = "data:video/mp4;base64," + b64encode(mp4).decode()
HTML("""
<video width=400 controls>
  <source src="%s" type="video/mp4">
</video>
""") % data_url)
```



0:00 / 0:43

Export Model in ONNX Format

✓ Detection

```
!yolo task=detect mode=export model=yolov8s.pt format=onnx
```

```
→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CPU  
Fusing layers...  
YOLOv8s summary: 168 layers, 11156544 parameters, 0 gradients, 28.6 GFLOPs
```

```
PyTorch: starting from yolov8s.pt with output shape (1, 84, 8400) (21.5 MB)  
requirements: YOLOv5 requirement "onnx>=1.12.0" not found, attempting AutoUpdate...  
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the source of the following dependency conflicts.  
tensorflow 2.9.2 requires protobuf<3.20,>=3.9.2, but you have protobuf 3.20.3 which is incompatible.  
tensorboard 2.9.1 requires protobuf<3.20,>=3.9.2, but you have protobuf 3.20.3 which is incompatible.  
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/  
Collecting onnx>=1.12.0  
  Downloading onnx-1.13.0-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (13.5 MB)  
   ━━━━━━━━━━━━━━━━ 13.5/13.5 MB 48.5 MB/s eta 0:00:00  
Collecting protobuf<4,>=3.20.2  
  Downloading protobuf-3.20.3-cp38-cp38-manylinux_2_5_x86_64.manylinux1_x86_64.whl (1.0 MB)  
   ━━━━━━━━━━━━━━ 1.0/1.0 MB 68.6 MB/s eta 0:00:00  
Requirement already satisfied: typing-extensions>=3.6.2.1 in /usr/local/lib/python3.8/dist-packages (from onnx>=1.12.0) (4.4.0)  
Requirement already satisfied: numpy>=1.16.6 in /usr/local/lib/python3.8/dist-packages (from onnx>=1.12.0) (1.21.6)  
Installing collected packages: protobuf, onnx  
Attempting uninstall: protobuf  
  Found existing installation: protobuf 3.19.6  
  Uninstalling protobuf-3.19.6:  
    Successfully uninstalled protobuf-3.19.6  
Successfully installed onnx-1.13.0 protobuf-3.20.3
```

```
requirements: 1 package updated per ['onnx>=1.12.0']  
requirements: ⚠ Restart runtime or rerun command for updates to take effect
```

```
ONNX: starting export with onnx 1.13.0...  
ONNX: export success ✓ 13.3s, saved as yolov8s.onnx (42.8 MB)
```

```
Export complete (15.2s)  
Results saved to /content  
Predict: yolo task=detect mode=predict model=yolov8s.onnx -WARNING ⚠ not yet supported for YOLOv8 exported models  
Validate: yolo task=detect mode=val model=yolov8s.onnx -WARNING ⚠ not yet supported for YOLOv8 exported models  
Visualize: https://netron.app
```

Segmentation

```
!yolo task=segment mode=export model=yolov8s-seg.pt format=onnx
```

```
→ Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CPU  
Fusing layers...  
YOLOv8s-seg summary: 195 layers, 11810560 parameters, 0 gradients, 42.6 GFLOPs  
PyTorch: starting from yolov8s-seg.pt with output shape (1, 116, 8400) (22.8 MB)  
ONNX: starting export with onnx 1.13.0...  
ONNX: export success ✓ 1.5s, saved as yolov8s-seg.onnx (45.3 MB)  
Export complete (3.0s)  
Results saved to /content  
Predict: yolo task=segment mode=predict model=yolov8s-seg.onnx -WARNING ⚠ not yet supported for YOLOv8 exported models
```

Validate: yolo task=segment mode=val model=yolov8s-seg.onnx -WARNING ⚠️ not yet supported for YOLOv8 exported models
Visualize: <https://netron.app>

To Do All this in Python Instead of Command Line

▼ For Image

```
from ultralytics import YOLO
```

```
#Initialize YOLO with the model name
model = YOLO("yolov8m.pt")
#Predict Method Takes all the parameters of the Command Line Interface
model.predict(source='/content/image1.jpg', save=True, conf=0.5, save_txt=True)
```

→ Downloading <https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8m.pt> to yolov8m.pt...
100% 49.7M/49.7M [00:05<00:00, 8.54MB/s]

```
Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...
YOLOv8m summary: 218 layers, 25886080 parameters, 0 gradients, 78.9 GFLOPs
image 1/1 /content/image1.jpg: 448x640 11 persons, 1 bicycle, 1 bus, 1 traffic light, 1 backpack, 3 handbags, 100.1ms
Speed: 0.4ms pre-process, 100.1ms inference, 2.3ms postprocess per image at shape (1, 3, 640, 640)
Results saved to runs/detect/predict6
1 labels saved to runs/detect/predict6/labels
[tensor([[2.24000e+02, 3.09000e+02, 4.34000e+02, 6.59000e+02, 9.11621e-01, 0.00000e+00],
       [9.44000e+02, 3.37000e+02, 1.00000e+03, 5.55000e+02, 9.02344e-01, 0.00000e+00],
       [7.38000e+02, 3.37000e+02, 8.70000e+02, 6.61000e+02, 8.90625e-01, 0.00000e+00],
       [2.96000e+02, 1.75000e+02, 7.79000e+02, 4.67000e+02, 8.90137e-01, 5.00000e+00],
       [5.89000e+02, 3.67000e+02, 6.72000e+02, 6.61000e+02, 8.75977e-01, 0.00000e+00],
       [4.38000e+02, 3.71000e+02, 5.58000e+02, 6.59000e+02, 8.56934e-01, 0.00000e+00],
       [3.02000e+02, 4.02000e+02, 4.32000e+02, 6.12000e+02, 8.32031e-01, 2.40000e+01],
       [8.36000e+02, 3.48000e+02, 9.09000e+02, 6.39000e+02, 7.88086e-01, 0.00000e+00],
       [6.97000e+02, 8.70000e+01, 8.29000e+02, 2.73000e+02, 7.73438e-01, 9.00000e+00],
       [4.74000e+02, 4.27000e+02, 5.54000e+02, 5.65000e+02, 7.37305e-01, 2.60000e+01],
       [6.58000e+02, 4.32000e+02, 7.14000e+02, 5.38000e+02, 7.12402e-01, 2.60000e+01],
       [8.00000e+00, 3.35000e+02, 4.00000e+01, 4.08000e+02, 6.68945e-01, 0.00000e+00],
       [3.90000e+01, 3.39000e+02, 6.90000e+01, 4.10000e+02, 6.46973e-01, 0.00000e+00],
       [1.00000e+00, 4.41000e+02, 7.70000e+01, 6.59000e+02, 6.45996e-01, 0.00000e+00],
       [3.91000e+02, 5.89000e+02, 5.06000e+02, 6.62000e+02, 6.27930e-01, 1.00000e+00],
       [5.54000e+02, 4.69000e+02, 5.99000e+02, 5.57000e+02, 6.18652e-01, 2.60000e+01],
       [2.35000e+02, 3.41000e+02, 2.52000e+02, 3.92000e+02, 6.16211e-01, 0.00000e+00],
       [0.00000e+00, 3.36000e+02, 1.60000e+01, 4.05000e+02, 5.34180e-01, 0.00000e+00]], device='cuda:0')]
```

▼ Display the Output Image

```
Image('/content/runs/detect/predict6/image1.jpg')
```



For Video

```
#Initialize YOLO with the model name
model = YOLO("yolov8m.pt")
#Predict Method Takes all the parameters of the Command Line Interface
model.predict(source='/content/demo.mp4', save=False, conf=0.5, save_txt = False)
```

```
Ultralytics YOLOv8.0.0 🚀 Python-3.8.10 torch-1.13.1+cu116 CUDA:0 (Tesla T4, 15110MiB)
Fusing layers...
YOLOv8m summary: 218 layers, 25886080 parameters, 0 gradients, 78.9 GFLOPs
video 1/1 (1/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 109.5ms
video 1/1 (2/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 18.3ms
video 1/1 (3/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 18.6ms
```

```
video 1/1 (4/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 17.4ms
video 1/1 (5/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 22.5ms
video 1/1 (6/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 17.9ms
video 1/1 (7/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 18.1ms
video 1/1 (8/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 19.0ms
video 1/1 (9/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 17.2ms
video 1/1 (10/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 22.9ms
video 1/1 (11/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 17.4ms
video 1/1 (12/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 20.8ms
video 1/1 (13/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 17.2ms
video 1/1 (14/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 19.2ms
video 1/1 (15/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 18.6ms
video 1/1 (16/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 17.3ms
video 1/1 (17/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 15.5ms
video 1/1 (18/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 18.3ms
video 1/1 (19/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 15.9ms
video 1/1 (20/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 19.5ms
video 1/1 (21/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 16.7ms
video 1/1 (22/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 16.5ms
video 1/1 (23/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 15.4ms
video 1/1 (24/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 16.4ms
video 1/1 (25/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 15.2ms
video 1/1 (26/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 17.5ms
video 1/1 (27/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 15.0ms
video 1/1 (28/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 20.2ms
video 1/1 (29/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 19.2ms
video 1/1 (30/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 20.3ms
video 1/1 (31/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 17.2ms
video 1/1 (32/1314) /content/demo.mp4: 384x640 1 car, 1 truck, 18.3ms
video 1/1 (33/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 18.1ms
video 1/1 (34/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 19.5ms
video 1/1 (35/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 16.3ms
video 1/1 (36/1314) /content/demo.mp4: 384x640 2 cars, 1 truck, 26.4ms
video 1/1 (37/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 17.4ms
video 1/1 (38/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 15.6ms
video 1/1 (39/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 16.5ms
video 1/1 (40/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.8ms
video 1/1 (41/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 16.9ms
video 1/1 (42/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 17.9ms
video 1/1 (43/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 17.8ms
video 1/1 (44/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 18.2ms
video 1/1 (45/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 17.4ms
video 1/1 (46/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.5ms
video 1/1 (47/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.0ms
video 1/1 (48/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.6ms
video 1/1 (49/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.5ms
video 1/1 (50/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 16.7ms
video 1/1 (51/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.8ms
video 1/1 (52/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 15.7ms
video 1/1 (53/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 16.9ms
video 1/1 (54/1314) /content/demo.mp4: 384x640 4 cars, 1 truck, 17.4ms
video 1/1 (55/1314) /content/demo.mp4: 384x640 3 cars, 1 truck, 16.4ms
```

▼ Display the Output Video

```
!rm "/content/result_compressed.mp4"

from IPython.display import HTML
from base64 import b64encode
import os

# Input video path
save_path = '/content/runs/detect/predict7/demo.mp4'

# Compressed video path
compressed_path = "/content/result_compressed.mp4"

os.system(f"ffmpeg -i {save_path} -vcodec libx264 {compressed_path}")

# Show video
mp4 = open(compressed_path, 'rb').read()
data_url = "data:video/mp4;base64," + b64encode(mp4).decode()
HTML("""
<video width=400 controls>
  <source src="%s" type="video/mp4">
</video>
""") % data_url)
```



0:00 / 0:43

To Export the Model in the onnx Format comment model.predict line and add the
model.export()