```
from google.colab import drive
drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
# Commented out IPython magic to ensure Python compatibility.
!git clone https://github.com/ultralytics/yolov5  # clone
# %cd yolov5
# %pip install -qr requirements.txt  # install
%cd yolov5
%pip install -qr requirements.txt  # install

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

```
YOLOv5 🚀 v7.0-62-g37d1e5e Python-3.8.16 torch-1.13.0+cu116 CUDA:0 (A100-SXM4-40GB, 40536MiB)
Setup complete ✅ (12 CPUs, 83.5 GB RAM, 23.1/166.8 GB disk)
```

```
import os
from IPython.display import Image, clear_output  # to display images

print(f"Setup complete. Using torch {torch.__version__} ({torch.cuda.get_device_properties(0).name if torch.cuda.is_available() else '
```

```
Setup complete. Using torch 1.13.0+cu116 (A100-SXM4-40GB)
```

```
# Train YOLOv5s on dataset
!python train.py --img 416 --batch 16 --epochs 70 --data /content/drive/MyDrive/Neetiraj_Assignment/Dataset/data.yaml --weights yolov5
```

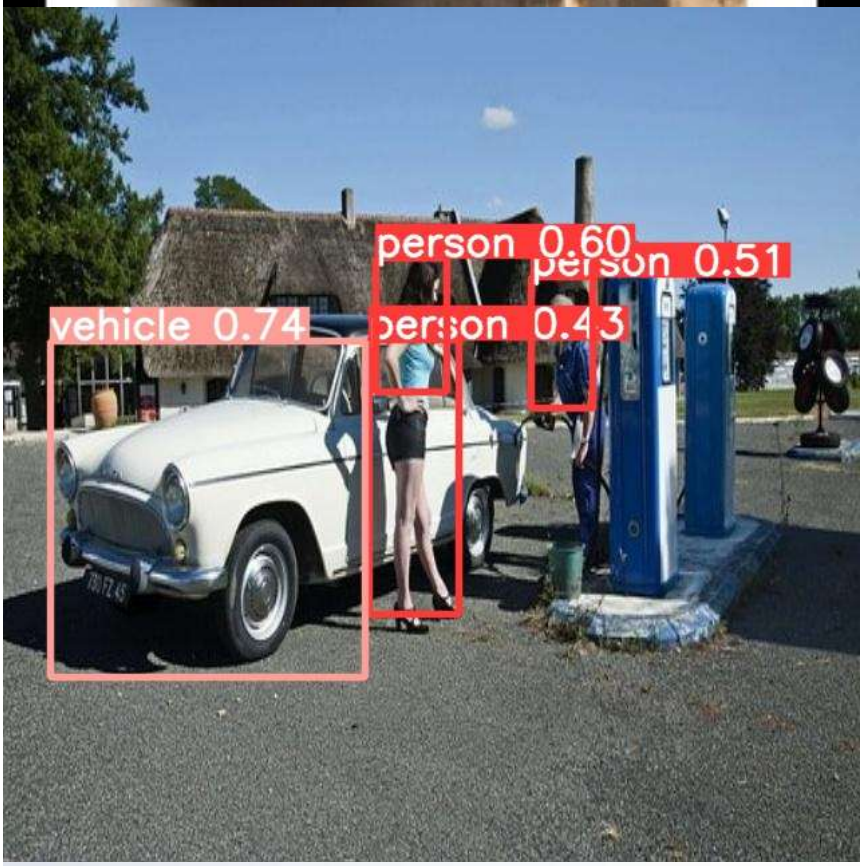
```
!python detect.py --weights runs/train/exp/weights/best.pt --img 416 --conf 0.25 --source /content/drive/MyDrive/Neetiraj_Assignment/D
```

```
detect: weights=['runs/train/exp/weights/best.pt'], source=/content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images, data=dat
YOLOv5 🚀 v7.0-62-g37d1e5e Python-3.8.16 torch-1.13.0+cu116 CUDA:0 (A100-SXM4-40GB, 40536MiB)

Fusing layers...
Model summary: 157 layers, 7015519 parameters, 0 gradients, 15.8 GFLOPs
image 1/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/african-american-2751286__340-79_jpg.rf.46468a74bdd16e4ac
image 2/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/download-11-_jpg.rf.8d7081b60aa7718d45f55afbbbef4667.jpg:
image 3/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/download46_jpg.rf.c7b67e32be451ab4da764329c164e98a.jpg: 4
image 4/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/download47_jpg.rf.4d14314aab5c533a8d9bc3bbfceb8975.jpg: 4
image 5/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/download72_jpg.rf.65ef463d50b55eb0fd4bd2c0d9a3578b.jpg: 4
image 6/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/image11_jpg.rf.6ef002e495cde706dbb5f017303975ac.jpg: 416x
image 7/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/image13_jpg.rf.feeacd5d16bbe4add113344909735bac.jpg: 416x
image 8/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/image15_jpg.rf.4ce72c1d20b90ee883e9812a3caa724a.jpg: 416x
image 9/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/image25_jpg.rf.d484049b8190cd22abc0e04fff71ab97.jpg: 416x
image 10/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-1-_jpg.rf.6ef293c6f162db212cab865296d639ab.jpg: 4
image 11/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-16-_jpg.rf.1961322c50d2d7ad0c686c9d647945cc.jpg:
image 12/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-26-_jpg.rf.5ca04bfe7fe75e98a24add841ae112b7.jpg:
image 13/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-36-_jpg.rf.d0232df8c9139633eaf944598cad049b.jpg:
image 14/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-37-_jpg.rf.f2d55627258a3646e3b92202dccc6082.jpg:
image 15/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-43-_jpg.rf.9cd485216510c234b9bae0a38c655ffc.jpg:
image 16/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-48-_jpg.rf.b18d69f67bdbf765bfd4525fd56975b3.jpg:
image 17/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-56-_jpg.rf.9ff5a01de9a5bcdfdaee66ade7d663d9.jpg:
image 18/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-63-_jpg.rf.8f3ac4560763fb7f7e9be46ed3f9b821.jpg:
image 19/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-70-_jpg.rf.3d9199077a1ac866fd53bc7c930a9d40.jpg:
image 20/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/images-9-_jpg.rf.98931b30a5fb1661d1d76f29815d9c4d.jpg: 4
image 21/21 /content/drive/MyDrive/Neetiraj_Assignment/Dataset/test/images/simca-5324799__340-84_jpg.rf.694cf76890b90f9bf6bc4c6d947
Speed: 0.5ms pre-process, 11.3ms inference, 1.1ms NMS per image at shape (1, 3, 416, 416)
Results saved to runs/detect/exp
```

```
import glob
from IPython.display import Image, display
for imageName in glob.glob('/content/yolov5/runs/detect/exp/*.jpg'):
    display(Image(filename=imageName))
    print("\n")
```


person 0.35

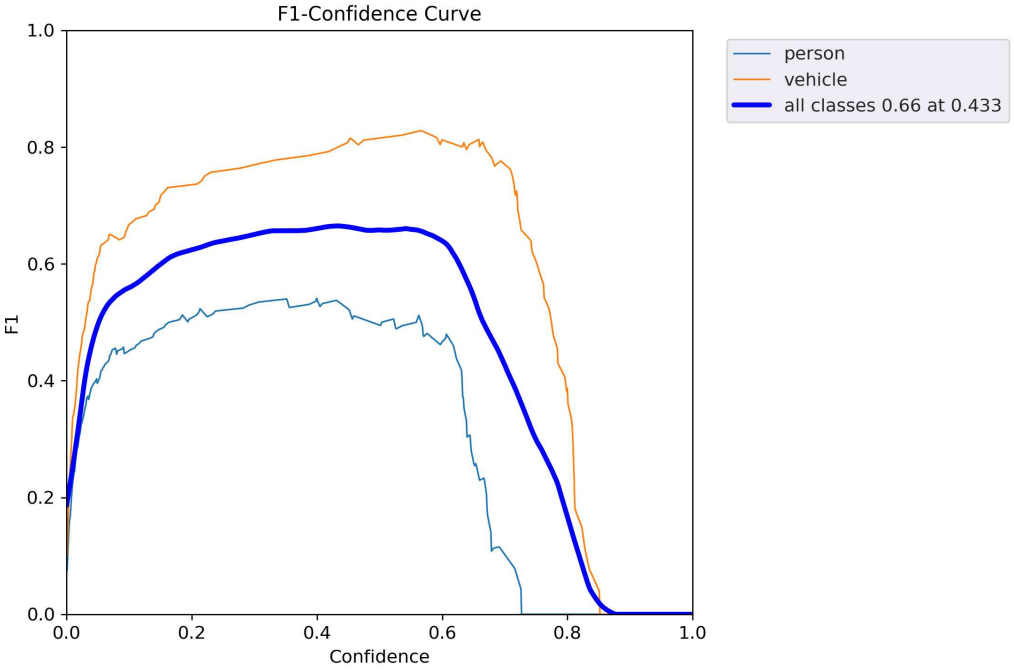

person 0.60
person 0.51
vehicle 0.74
person 0.43


person 0.60
vehicle 0.75

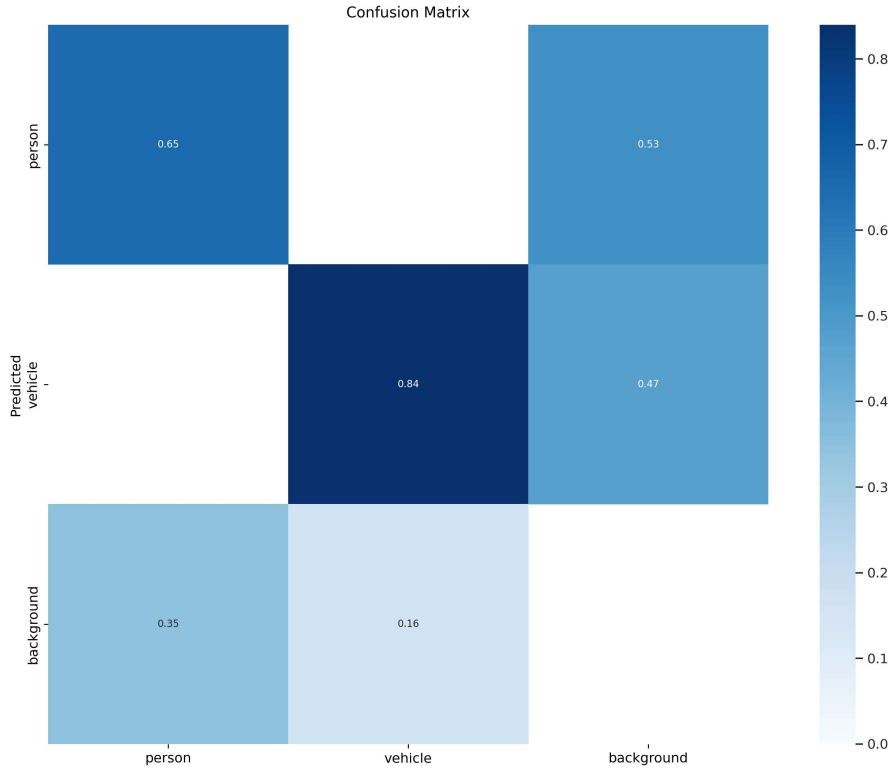
Visualize

for exprement where batchsize 16 and epoch 70

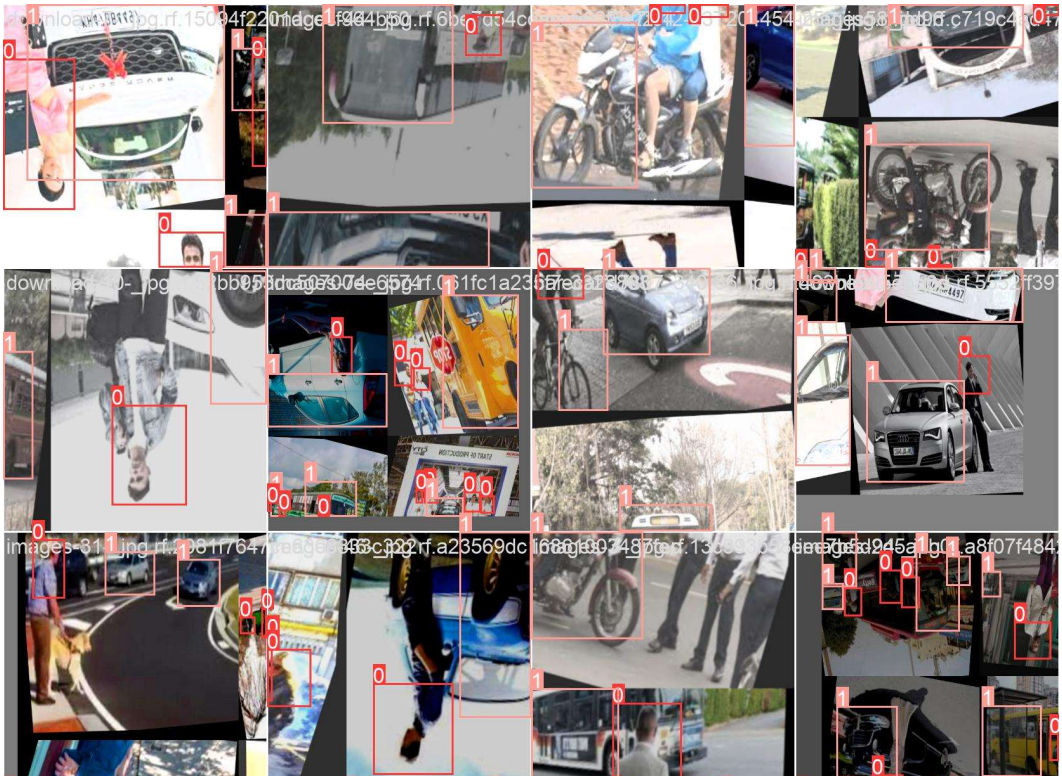
```
1 Image('/content/yolov5/runs/train/exp/F1_curve.png')
```




```
1 Image('/content/yolov5/runs/train/exp/confusion_matrix.png')
```



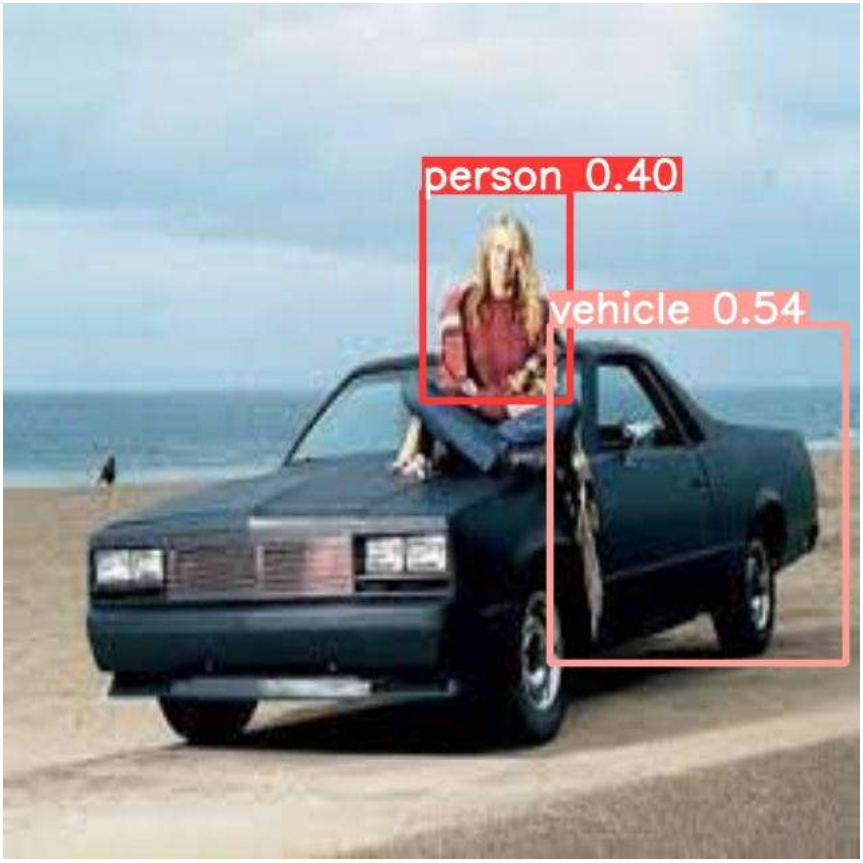

```
1 Image('/content/yolov5/runs/train/exp/train_batch0.jpg')
```



```
Image('/content/yolov5/runs/train/exp/train_batch2.jpg')
```


vehicle 0.78


vehicle 0.67
person


person 0.40
vehicle 0.54


person 0.28
vehicle 0.7


person 0.43
vehicle 0.61
vehicle 0.46


person 0.65
vehicle 0.48
person 0.46


person 0.65