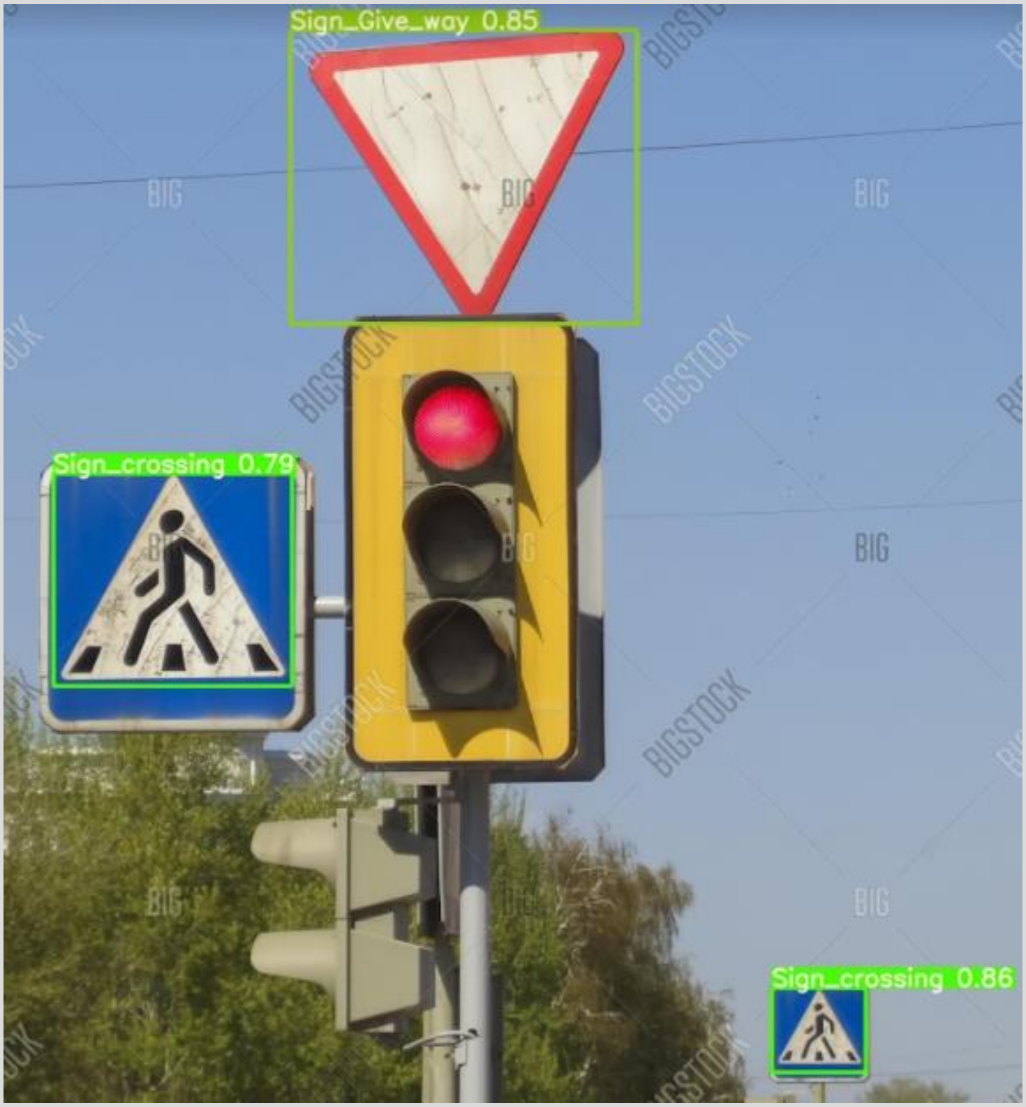


TRAFFIC SIGNS RECOGNITION USING THE YOLO ALGORITHM

ABSTRACT

Work report of How to implement the identification of traffic signs From labeling to training using Google Colaboratory and Yolov5

Author : Mohammad Nabizade Ardekani 96463168

Course:
Artificial intelligence

Professor : Mohsen Afsharchi

The University of zanjan

21 July 2021

دانشگاه زنجان

FIRST STEP: GATHERING DATASET

in the first step, I downloaded the information I needed, to create my dataset from photos of the following address.

https://www.mapillary.com/dataset/trafficsign

I used the labelimg tool to label my photos

SECOND STEP: USING LABELIMG

To use labelimg, we must first install it, which is easily done with the following command (windows cmd) :

```
pip install labelimg
```

After installing the labelimg we must open it, but there is one thing that can make using labelimg much easier.

classifying your files before opening labelimg

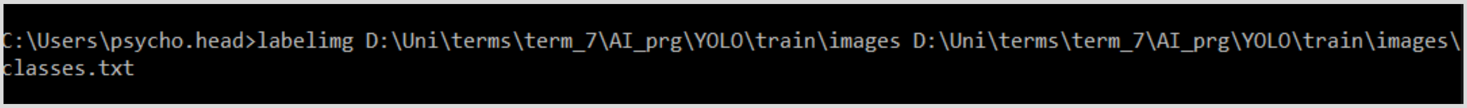
for example, in this project, we have 10 classes, so at first, we create a text file and write our classes in it

like this:

```
Sign_No_Stopping
Sign_Stop
Sign_No_parking
Sign_No_Entry
Sign_Bend_To_Right
Sign_crossing
Sign_Give_way
Sign_Turn_left
Sign_bump
Sign_No_Overtaking
```

Now we can open labelimg using this command:

```
Labelimg <images directory> <classes.txt directory>
```

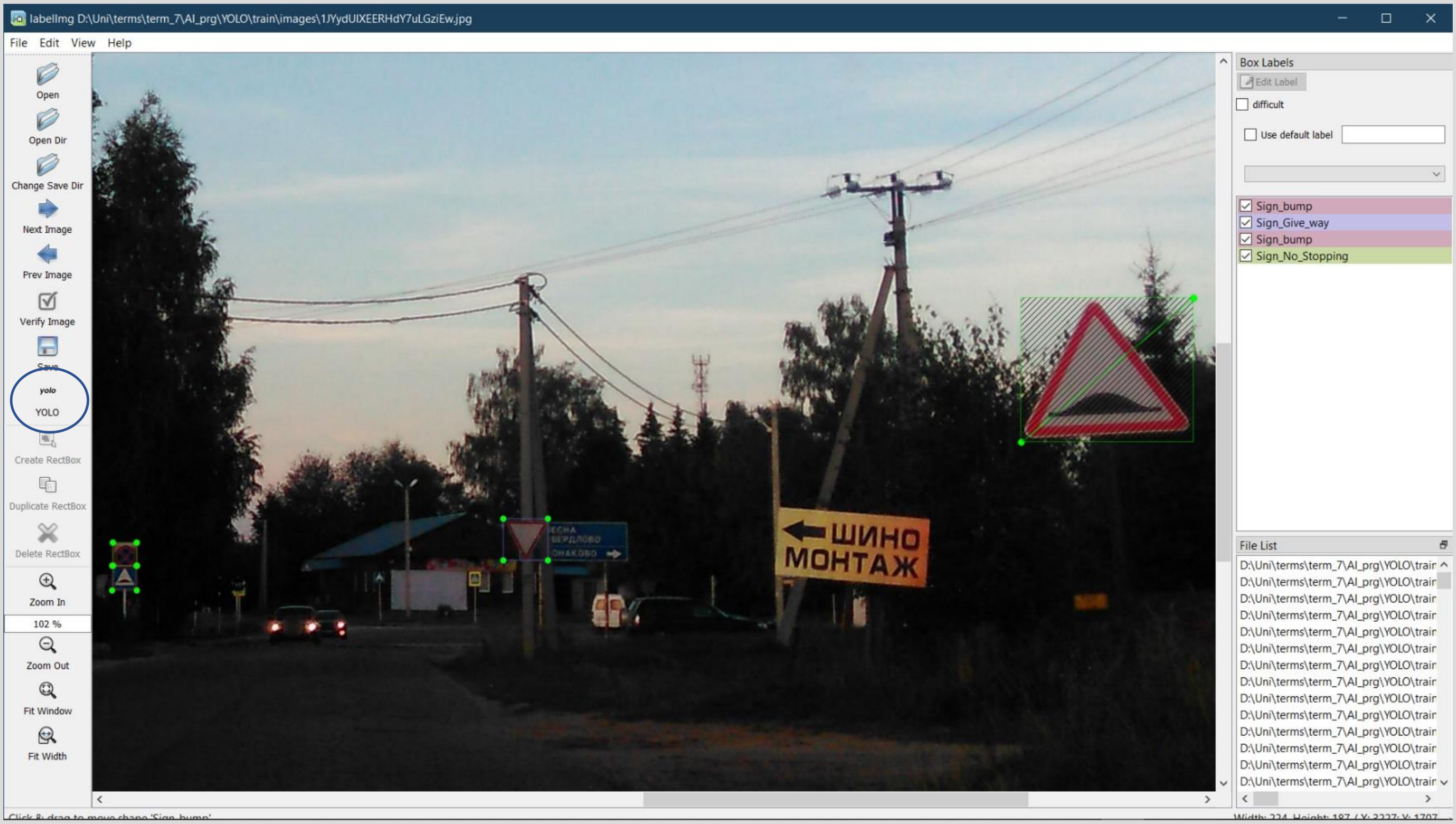


```
C:\Users\psycho.head>labelimg D:\Uni\terms\term_7\AI_prg\YOLO\train\images D:\Uni\terms\term_7\AI_prg\YOLO\train\images\
classes.txt
```

there are two things that we must consider while using labelimg

first, make sure you've selected the YOLO

and the second, to save txt file after labeling



labelImg D:\Uni\terms\term_7\AI_prg\YOLO\train\images\1JYydUIXEERHdY7uLGziEw.jpg

☐ difficult

☐ Use default label

☑ Sign_bump
☑ Sign_Give_way
☑ Sign_bump
☑ Sign_No_Stopping

D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train
D:\Uni\terms\term_7\AI_prg\YOLO\train

Click & drag to move shape 'Sign_bump'

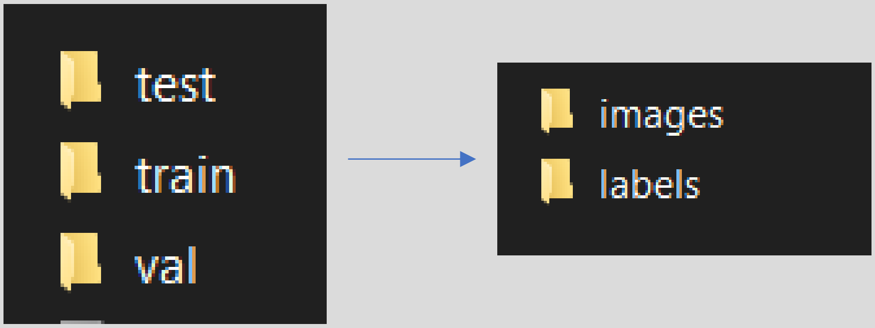
Width: 224, Height: 187 / X: 3227; Y: 1707

After labeling all our files we should split them into three root folders:

Train, val (valid), test

And in each folder, we must separate labels (text files) and images

EG:

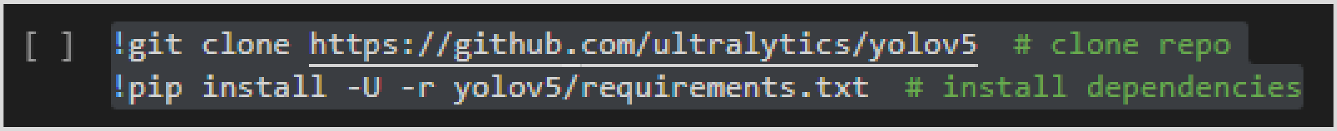


After reviewing nearly 7,000 random images, I collected about 1,000 labeled images for use in my train, valid, and test.

when data collection is done, we must zip all three files and upload them to Google Drive to be able to reach them using Google Colaboratory.

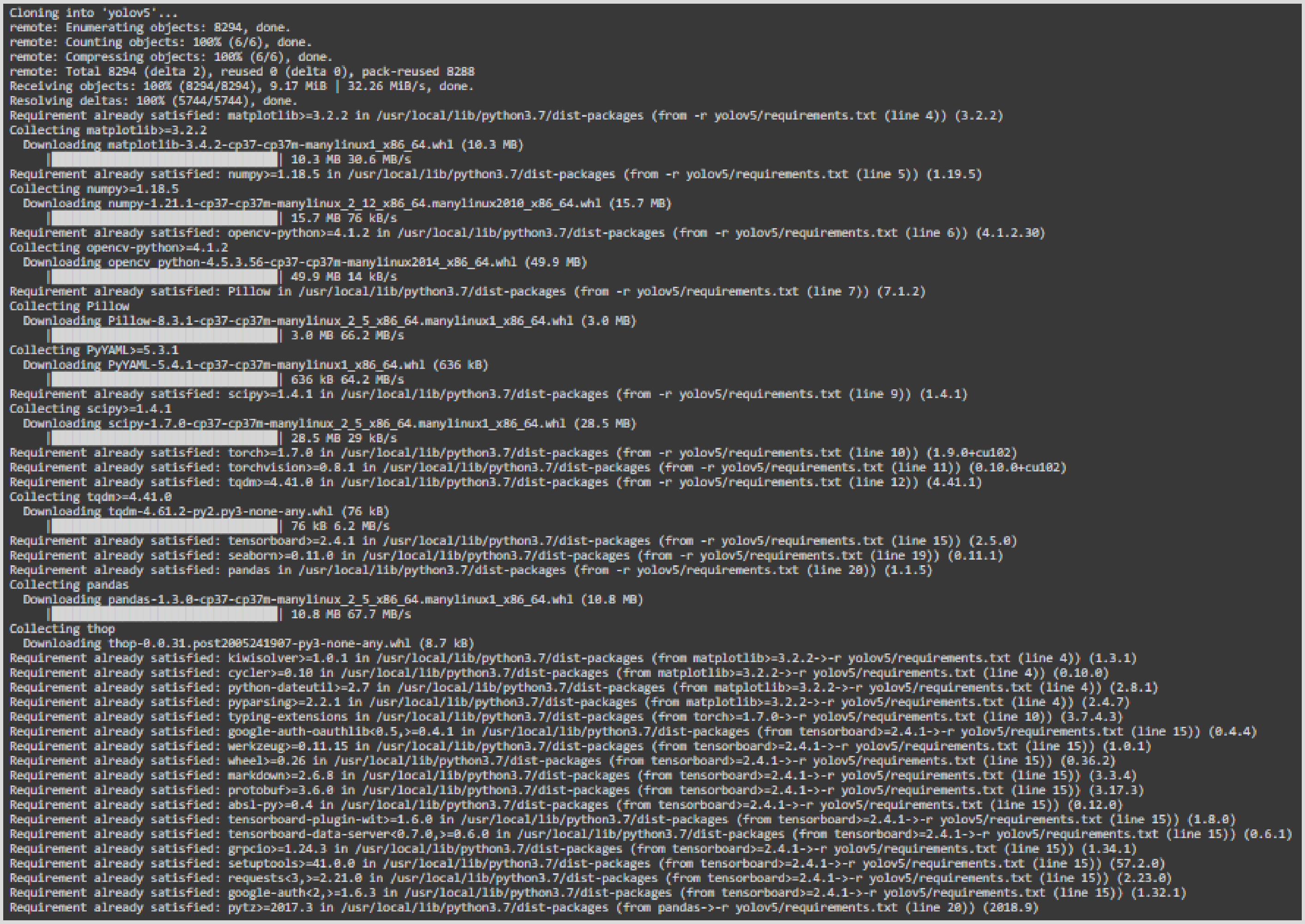
THIRD STEP: GOOGLE COLABORATORY

In the Google Colab environment, we need to do the following actions



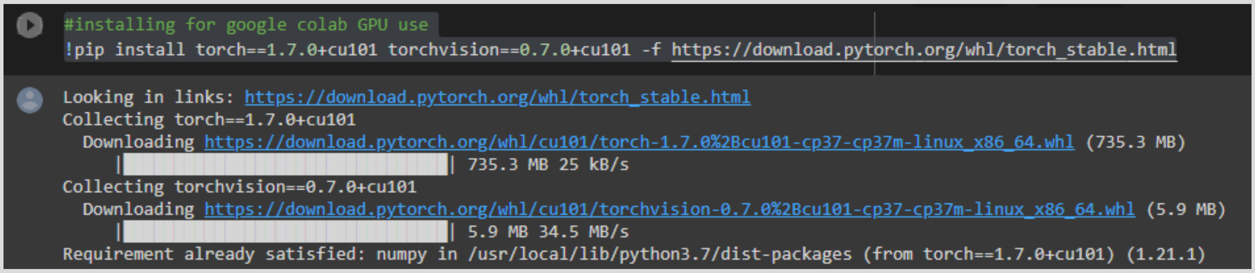
```
[ ]  !git clone https://github.com/ultralytics/yolov5  # clone repo
     !pip install -U -r yolov5/requirements.txt  # install dependencies
```

The command will install the dependencies as following



```
Cloning into 'yolov5'...
remote: Enumerating objects: 8294, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 8294 (delta 2), reused 0 (delta 0), pack-reused 8288
Receiving objects: 100% (8294/8294), 9.17 MiB | 32.26 MiB/s, done.
Resolving deltas: 100% (5744/5744), done.
Requirement already satisfied: matplotlib>=3.2.2 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 4)) (3.2.2)
Collecting matplotlib>=3.2.2
  Downloading matplotlib-3.4.2-cp37-cp37m-manylinux1_x86_64.whl (10.3 MB)
     |████████████████████████████████| 10.3 MB 30.6 MB/s
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 5)) (1.19.5)
Collecting numpy>=1.18.5
  Downloading numpy-1.21.1-cp37-cp37m-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (15.7 MB)
     |████████████████████████████████| 15.7 MB 76 kB/s
Requirement already satisfied: opencv-python>=4.1.2 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 6)) (4.1.2.30)
Collecting opencv-python>=4.1.2
  Downloading opencv_python-4.5.3.56-cp37-cp37m-manylinux2014_x86_64.whl (49.9 MB)
     |████████████████████████████████| 49.9 MB 14 kB/s
Requirement already satisfied: Pillow in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 7)) (7.1.2)
Collecting Pillow
  Downloading Pillow-8.3.1-cp37-cp37m-manylinux_2_5_x86_64.manylinux1_x86_64.whl (3.0 MB)
     |████████████████████████████████| 3.0 MB 66.2 MB/s
Collecting PyYAML>=5.3.1
  Downloading PyYAML-5.4.1-cp37-cp37m-manylinux1_x86_64.whl (636 kB)
     |████████████████████████████████| 636 kB 64.2 MB/s
Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 9)) (1.4.1)
Collecting scipy>=1.4.1
  Downloading scipy-1.7.0-cp37-cp37m-manylinux_2_5_x86_64.manylinux1_x86_64.whl (28.5 MB)
     |████████████████████████████████| 28.5 MB 29 kB/s
Requirement already satisfied: torch>=1.7.0 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 10)) (1.9.0+cu102)
Requirement already satisfied: torchvision>=0.8.1 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 11)) (0.10.0+cu102)
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 12)) (4.41.1)
Collecting tqdm>=4.41.0
  Downloading tqdm-4.61.2-py2.py3-none-any.whl (76 kB)
     |████████████████████████████████| 76 kB 6.2 MB/s
Requirement already satisfied: tensorboard>=2.4.1 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 15)) (2.5.0)
Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 19)) (0.11.1)
Requirement already satisfied: pandas in /usr/local/lib/python3.7/dist-packages (from -r yolov5/requirements.txt (line 20)) (1.1.5)
Collecting pandas
  Downloading pandas-1.3.0-cp37-cp37m-manylinux_2_5_x86_64.manylinux1_x86_64.whl (10.8 MB)
     |████████████████████████████████| 10.8 MB 67.7 MB/s
Collecting thop
  Downloading thop-0.0.31.post2005241907-py3-none-any.whl (8.7 kB)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=3.2.2->-r yolov5/requirements.txt (line 4)) (1.3.1)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=3.2.2->-r yolov5/requirements.txt (line 4)) (0.10.0)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=3.2.2->-r yolov5/requirements.txt (line 4)) (2.8.1)
Requirement already satisfied: pyparsing>=2.2.1 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=3.2.2->-r yolov5/requirements.txt (line 4)) (2.4.7)
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.7/dist-packages (from torch>=1.7.0->-r yolov5/requirements.txt (line 10)) (3.7.4.3)
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (0.4.4)
Requirement already satisfied: werkzeug>=0.11.15 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (1.0.1)
Requirement already satisfied: wheel>=0.26 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (0.36.2)
Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (3.3.4)
Requirement already satisfied: protobuf>=3.6.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (3.17.3)
Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (0.12.0)
Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (1.8.0)
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (0.6.1)
Requirement already satisfied: grpcio>=1.24.3 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (1.34.1)
Requirement already satisfied: setuptools>=41.0.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (57.2.0)
Requirement already satisfied: requests<3,>=2.21.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (2.23.0)
Requirement already satisfied: google-auth<2,>=1.6.3 in /usr/local/lib/python3.7/dist-packages (from tensorboard>=2.4.1->-r yolov5/requirements.txt (line 15)) (1.32.1)
Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.7/dist-packages (from pandas->-r yolov5/requirements.txt (line 20)) (2018.9)
```

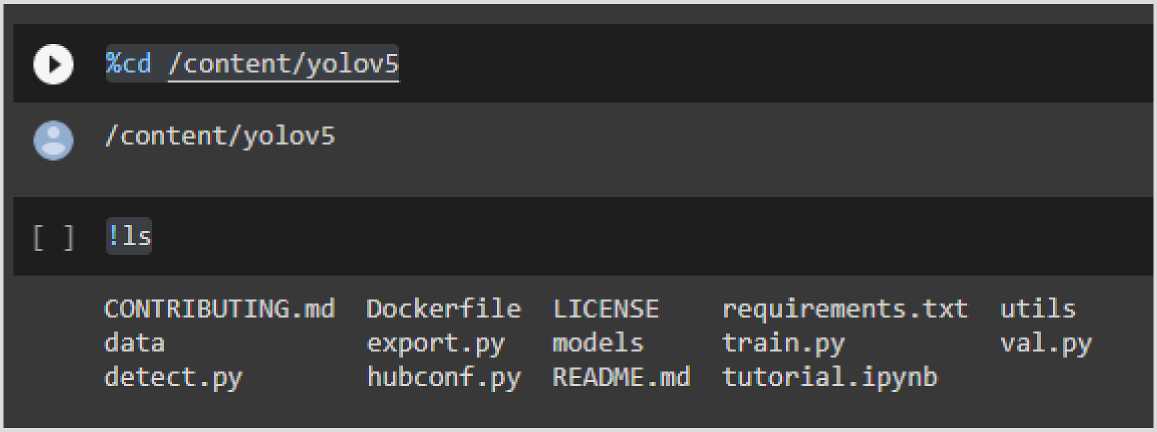
After installing the dependencies we must install GPU use



```
#installing for google colab GPU use
!pip install torch==1.7.0+cu101 torchvision==0.7.0+cu101 -f https://download.pytorch.org/whl/torch_stable.html
```

```
Looking in links: https://download.pytorch.org/whl/torch_stable.html
Collecting torch==1.7.0+cu101
  Downloading https://download.pytorch.org/whl/cu101/torch-1.7.0%2Bcu101-cp37-cp37m-linux_x86_64.whl (735.3 MB)
     |████████████████████████████████| 735.3 MB 25 kB/s
Collecting torchvision==0.7.0+cu101
  Downloading https://download.pytorch.org/whl/cu101/torchvision-0.7.0%2Bcu101-cp37-cp37m-linux_x86_64.whl (5.9 MB)
     |████████████████████████████████| 5.9 MB 34.5 MB/s
Requirement already satisfied: numpy in /usr/local/lib/python3.7/dist-packages (from torch==1.7.0+cu101) (1.21.1)
```

After doing the above steps, a folder named yolov5 should be created in the files section



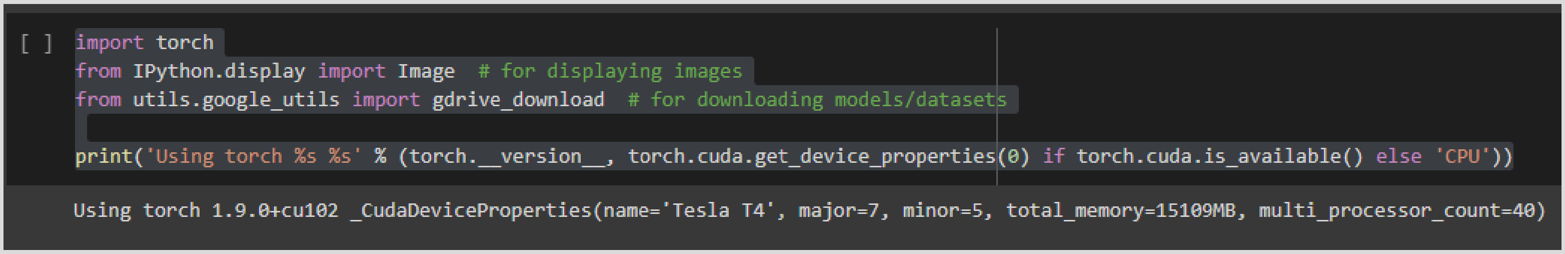
```
%cd /content/yolov5
```

```
/content/yolov5
```

```
[ ] !ls
```

```
CONTRIBUTING.md  Dockerfile  LICENSE    requirements.txt  utils
data             export.py   models     train.py          val.py
detect.py        hubconf.py  README.md  tutorial.ipynb
```

To examine what kind of GPU has been allocated for us, we can use the following command

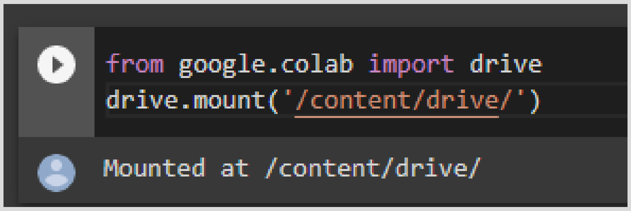


```
[ ] import torch
    from IPython.display import Image  # for displaying images
    from utils.google_utils import gdrive_download  # for downloading models/datasets

    print('Using torch %s %s' % (torch.__version__, torch.cuda.get_device_properties(0) if torch.cuda.is_available() else 'CPU'))
```

```
Using torch 1.9.0+cu102 _CudaDeviceProperties(name='Tesla T4', major=7, minor=5, total_memory=15109MB, multi_processor_count=40)
```

Allocated GPU: Tesla T4

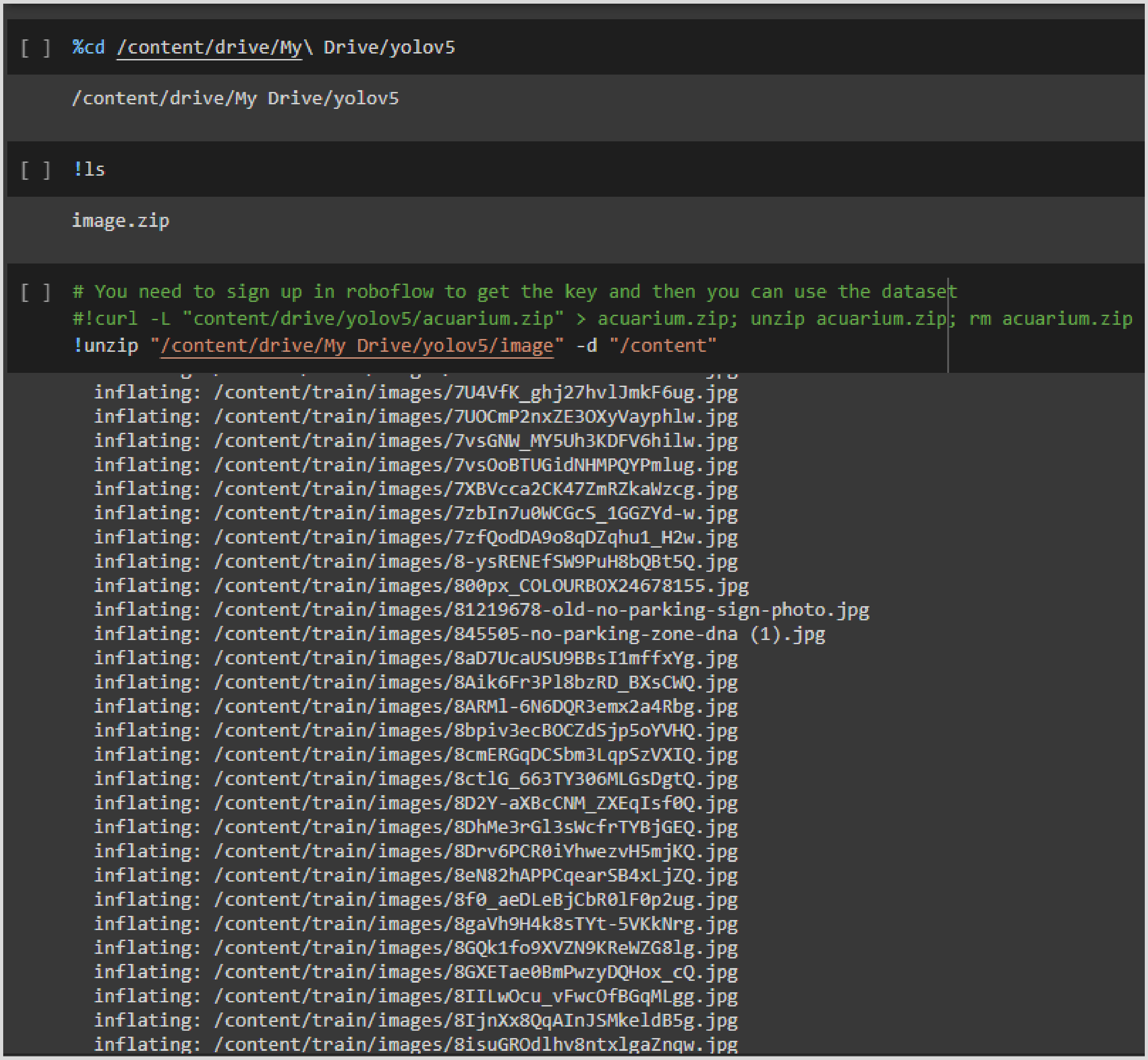
Now we must mount our Google Drive account to Google colab



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

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

To access our images file we should unzip it

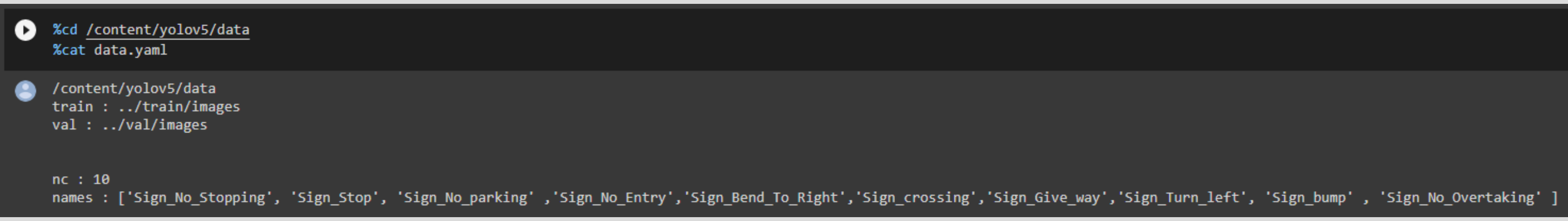


```
[ ]  %cd /content/drive/My\ Drive/yolov5

     /content/drive/My Drive/yolov5

[ ]  !ls

     image.zip

[ ]  # You need to sign up in roboflow to get the key and then you can use the dataset
     #!curl -L "content/drive/yolov5/acuarium.zip" > acuarium.zip; unzip acuarium.zip; rm acuarium.zip
     !unzip "/content/drive/My Drive/yolov5/image" -d "/content"
       inflating: /content/train/images/7U4VfK_ghj27hvlJmkF6ug.jpg
       inflating: /content/train/images/7UOCmP2nxZE3OXyVayphlw.jpg
       inflating: /content/train/images/7vsGNW_MY5Uh3KDFV6hilw.jpg
       inflating: /content/train/images/7vsOoBTUGidNHMPQYPmlug.jpg
       inflating: /content/train/images/7XBVcca2CK47ZmRZkaWzcg.jpg
       inflating: /content/train/images/7zbIn7u0WCGcS_1GGZYd-w.jpg
       inflating: /content/train/images/7zfQodDA9o8qDZqhu1_H2w.jpg
       inflating: /content/train/images/8-ysRENEfSW9PuH8bQBt5Q.jpg
       inflating: /content/train/images/800px_COLOURBOX24678155.jpg
       inflating: /content/train/images/81219678-old-no-parking-sign-photo.jpg
       inflating: /content/train/images/845505-no-parking-zone-dna (1).jpg
       inflating: /content/train/images/8aD7UcaUSU9BBsI1mffxYg.jpg
       inflating: /content/train/images/8Aik6Fr3Pl8bzRD_BXsCWQ.jpg
       inflating: /content/train/images/8ARMl-6N6DQR3emx2a4Rbg.jpg
       inflating: /content/train/images/8bpiv3ecBOCZdSjp5oYVHQ.jpg
       inflating: /content/train/images/8cmERGqDCSbm3LqpSzVXIQ.jpg
       inflating: /content/train/images/8ctlG_663TY306MLGsDgtQ.jpg
       inflating: /content/train/images/8D2Y-aXBcCNM_ZXEqIsf0Q.jpg
       inflating: /content/train/images/8DhMe3rGl3sWcfrTYBjGEQ.jpg
       inflating: /content/train/images/8Drv6PCR0iYhwezvH5mjKQ.jpg
       inflating: /content/train/images/8eN82hAPPCqearSB4xLjZQ.jpg
       inflating: /content/train/images/8f0_aeDLeBjCbR0lF0p2ug.jpg
       inflating: /content/train/images/8gaVh9H4k8sTYt-5VKkNrg.jpg
       inflating: /content/train/images/8GQk1fo9XVZN9KReWZG8lg.jpg
       inflating: /content/train/images/8GXETae0BmPwzyDQHox_cQ.jpg
       inflating: /content/train/images/8IILwOcu_vFwcOfBGqMLgg.jpg
       inflating: /content/train/images/8IjnXx8QqAInJSMkeldB5g.jpg
       inflating: /content/train/images/8isuGROdlhv8ntxlgaZnqw.jpg
```

Do not forget to create the yaml file as well

To create this file, we can create a YAML file in our system using Notepad and then change its format to .yaml

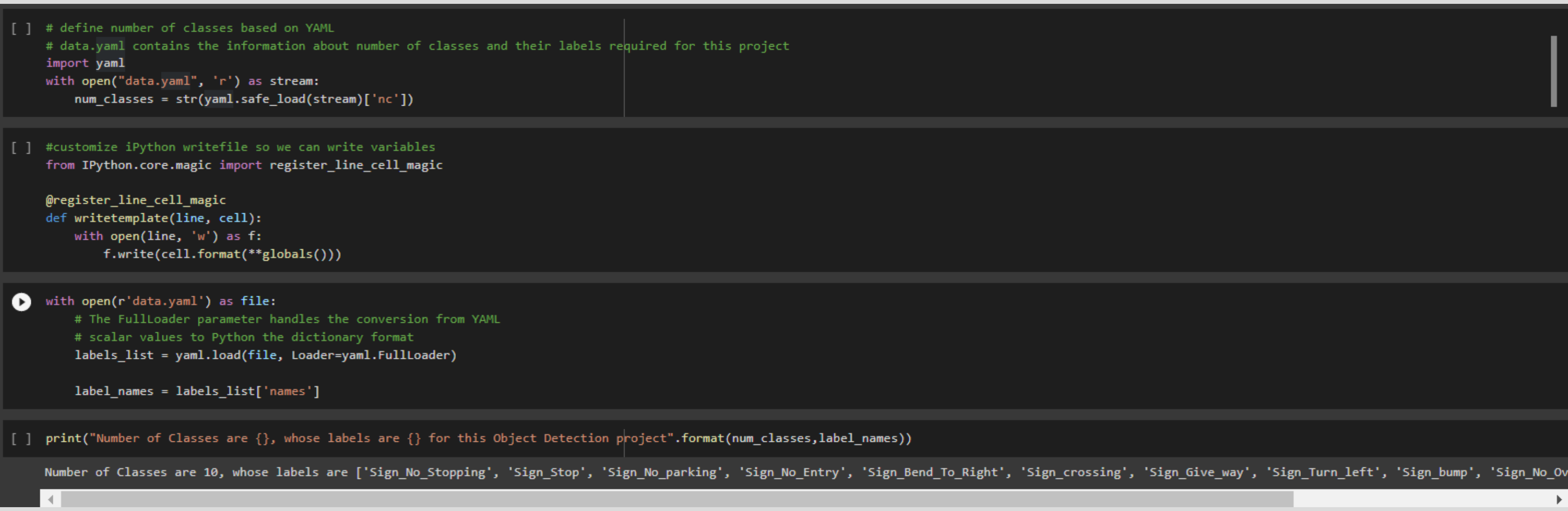
The file must contain the number of classes, class names, and the address of the val and train folder



```
%cd /content/yolov5/data
%cat data.yaml
```

```
/content/yolov5/data
train : ../train/images
val : ../val/images


nc : 10
names : ['Sign_No_Stopping', 'Sign_Stop', 'Sign_No_parking' ,'Sign_No_Entry','Sign_Bend_To_Right','Sign_crossing','Sign_Give_way','Sign_Turn_left', 'Sign_bump' , 'Sign_No_Overtaking' ]
```

data.yaml



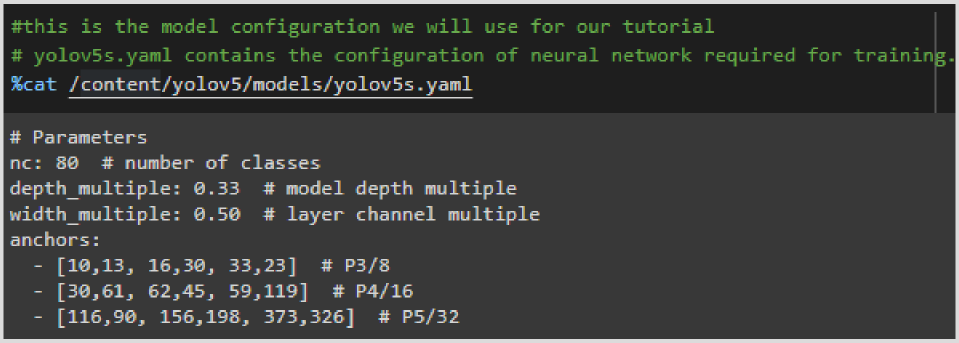
```
[ ] # define number of classes based on YAML
    # data.yaml contains the information about number of classes and their labels required for this project
    import yaml
    with open("data.yaml", 'r') as stream:
        num_classes = str(yaml.safe_load(stream)['nc'])
```

```
[ ] #customize iPython writefile so we can write variables
    from IPython.core.magic import register_line_cell_magic

    @register_line_cell_magic
    def writetemplate(line, cell):
        with open(line, 'w') as f:
            f.write(cell.format(**globals()))
```

```
    with open(r'data.yaml') as file:
        # The FullLoader parameter handles the conversion from YAML
        # scalar values to Python the dictionary format
        labels_list = yaml.load(file, Loader=yaml.FullLoader)

        label_names = labels_list['names']
```

```
[ ] print("Number of Classes are {}, whose labels are {} for this Object Detection project".format(num_classes,label_names))

    Number of Classes are 10, whose labels are ['Sign_No_Stopping', 'Sign_Stop', 'Sign_No_parking', 'Sign_No_Entry', 'Sign_Bend_To_Right', 'Sign_crossing', 'Sign_Give_way', 'Sign_Turn_left', 'Sign_bump', 'Sign_No_Ov
```

there is a file in yolo called coco.yaml which has 80 classes we should replace classes to 10 using the following codes

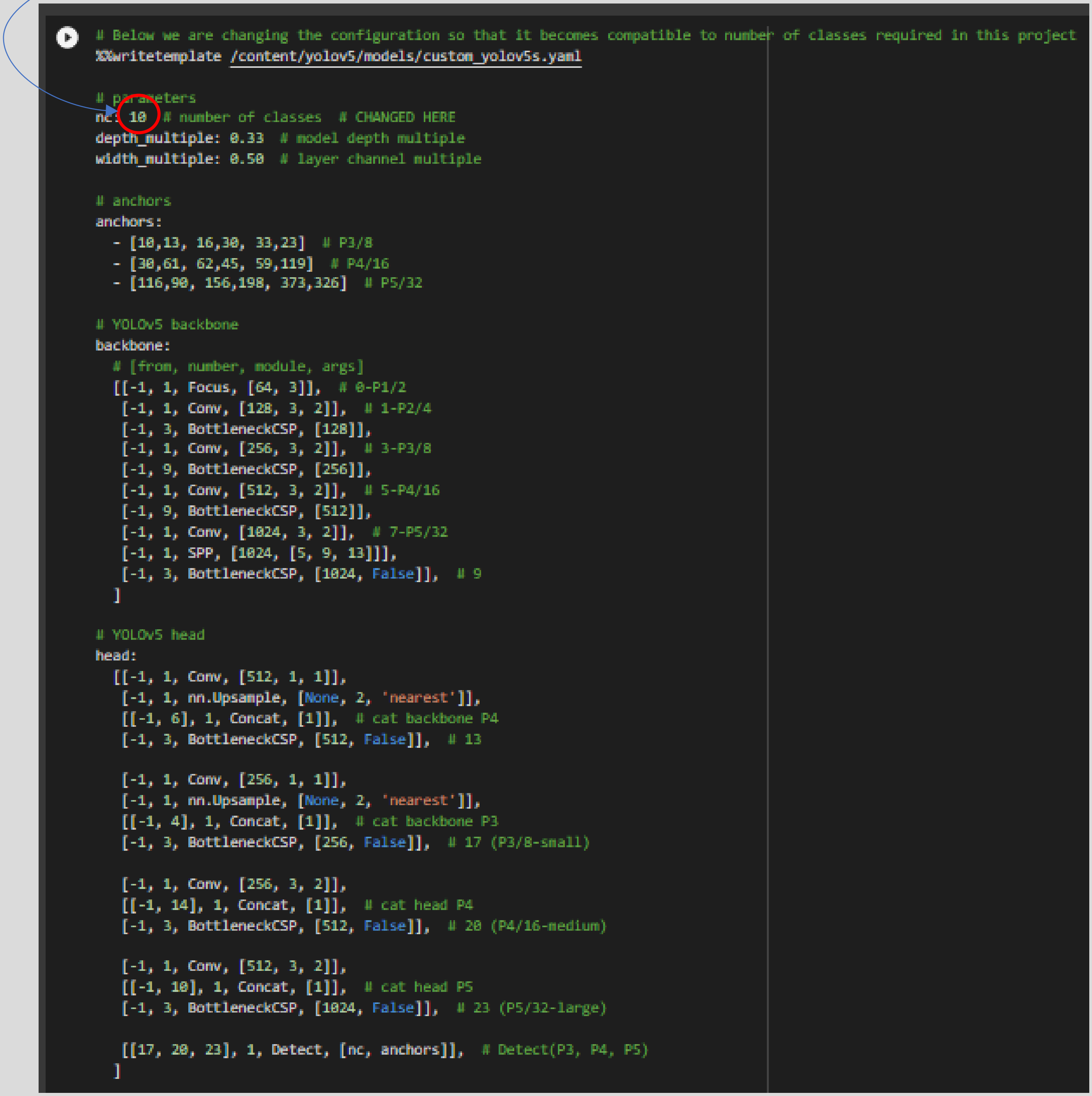


```
#this is the model configuration we will use for our tutorial
# yolov5s.yaml contains the configuration of neural network required for training.
%cat /content/yolov5/models/yolov5s.yaml
```

```
# Parameters
nc: 80  # number of classes
depth_multiple: 0.33  # model depth multiple
width_multiple: 0.50  # layer channel multiple
anchors:
  - [10,13, 16,30, 33,23]  # P3/8
  - [30,61, 62,45, 59,119]  # P4/16
  - [116,90, 156,198, 373,326]  # P5/32
```

this is the original .yaml file

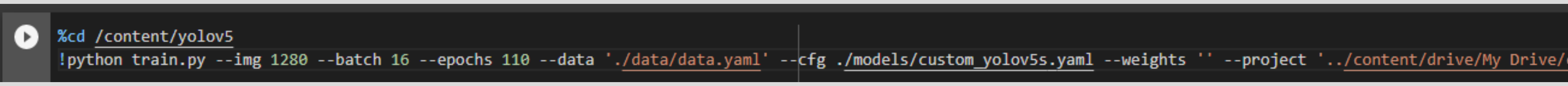
We change nc from 80 to the number of our classes in this case 10



```
# Below we are changing the configuration so that it becomes compatible to number of classes required in this project
%%writetemplate /content/yolov5/models/custom_yolov5s.yaml

# parameters
nc: 10 # number of classes  # CHANGED HERE
depth_multiple: 0.33  # model depth multiple
width_multiple: 0.50  # layer channel multiple

# anchors
anchors:
  - [10,13, 16,30, 33,23]  # P3/8
  - [30,61, 62,45, 59,119]  # P4/16
  - [116,90, 156,198, 373,326]  # P5/32

# YOLOv5 backbone
backbone:
  # [from, number, module, args]
  [[-1, 1, Focus, [64, 3]],  # 0-P1/2
   [-1, 1, Conv, [128, 3, 2]],  # 1-P2/4
   [-1, 3, BottleneckCSP, [128]],
   [-1, 1, Conv, [256, 3, 2]],  # 3-P3/8
   [-1, 9, BottleneckCSP, [256]],
   [-1, 1, Conv, [512, 3, 2]],  # 5-P4/16
   [-1, 9, BottleneckCSP, [512]],
   [-1, 1, Conv, [1024, 3, 2]],  # 7-P5/32
   [-1, 1, SPP, [1024, [5, 9, 13]]],
   [-1, 3, BottleneckCSP, [1024, False]],  # 9
  ]

# YOLOv5 head
head:
  [[-1, 1, Conv, [512, 1, 1]],
   [-1, 1, nn.Upsample, [None, 2, 'nearest']],
   [[-1, 6], 1, Concat, [1]],  # cat backbone P4
   [-1, 3, BottleneckCSP, [512, False]],  # 13

   [-1, 1, Conv, [256, 1, 1]],
   [-1, 1, nn.Upsample, [None, 2, 'nearest']],
   [[-1, 4], 1, Concat, [1]],  # cat backbone P3
   [-1, 3, BottleneckCSP, [256, False]],  # 17 (P3/8-small)

   [-1, 1, Conv, [256, 3, 2]],
   [[-1, 14], 1, Concat, [1]],  # cat head P4
   [-1, 3, BottleneckCSP, [512, False]],  # 20 (P4/16-medium)

   [-1, 1, Conv, [512, 3, 2]],
   [[-1, 10], 1, Concat, [1]],  # cat head P5
   [-1, 3, BottleneckCSP, [1024, False]],  # 23 (P5/32-large)

   [[17, 20, 23], 1, Detect, [nc, anchors]],  # Detect(P3, P4, P5)
  ]
```

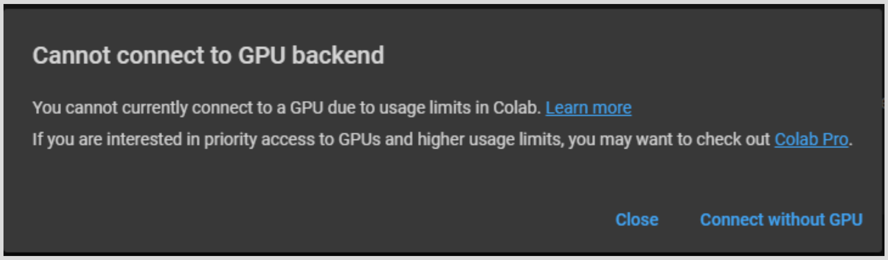
The most important part is here **training**

with following code we start the training



```
%cd /content/yolov5
!python train.py --img 1280 --batch 16 --epochs 110 --data './data/data.yaml' --cfg ./models/custom_yolov5s.yaml --weights '' --project '../content/drive/My Drive/
```

after 7 hours of training, I faced this error



Cannot connect to GPU backend

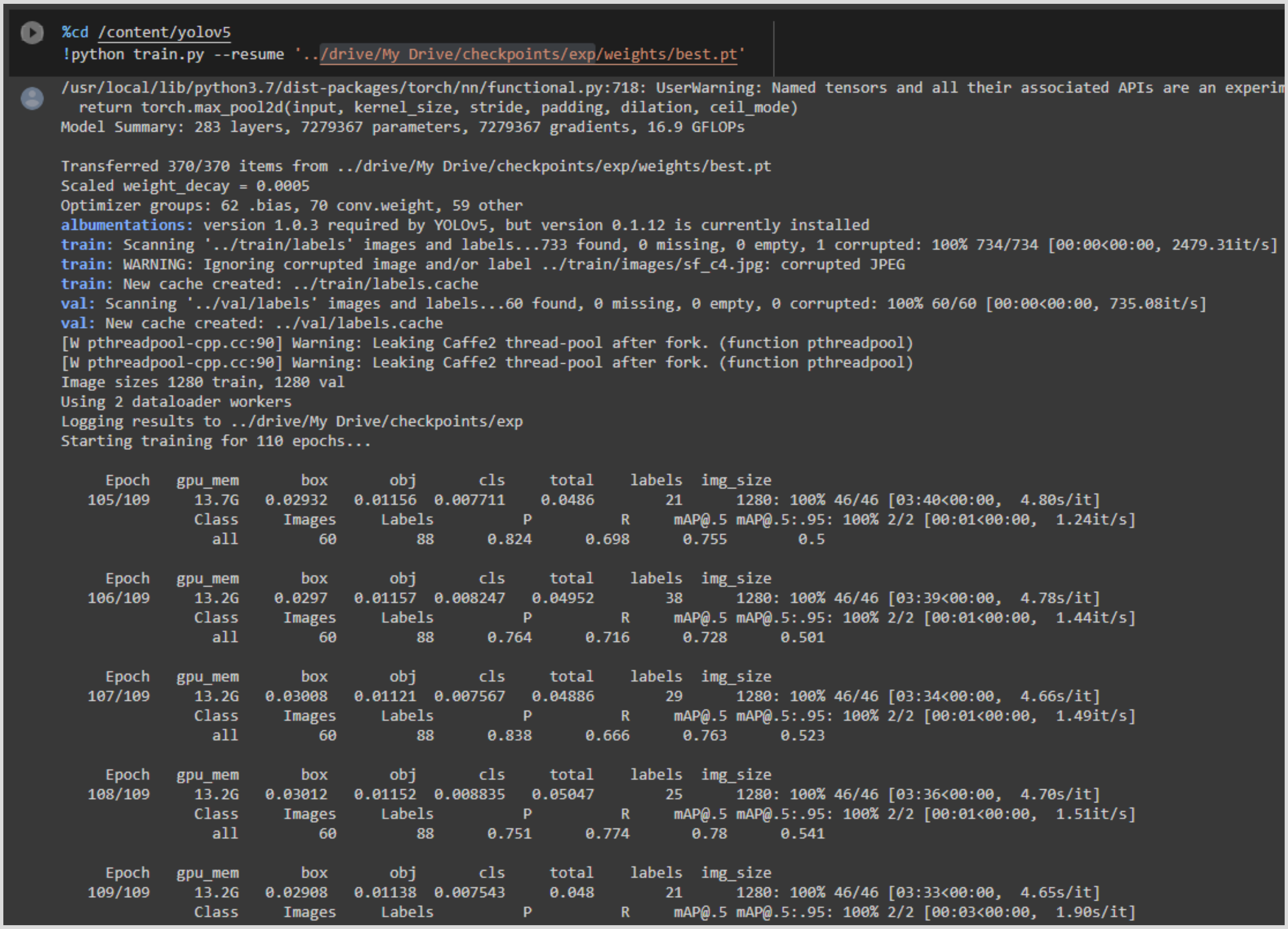
You cannot currently connect to a GPU due to usage limits in Colab. Learn more

If you are interested in priority access to GPUs and higher usage limits, you may want to check out Colab Pro.

so I switched to another account and did the rest of the training there

As I had saved the checkpoints

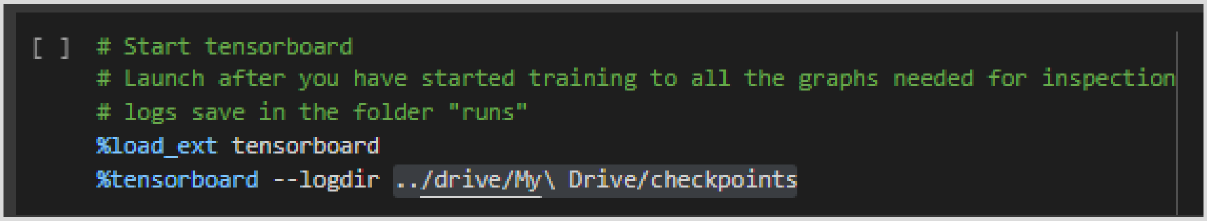
I resumed the training from where it had stopped with the following command



```
%cd /content/yolov5
!python train.py --resume '../drive/My Drive/checkpoints/exp/weights/best.pt'
```

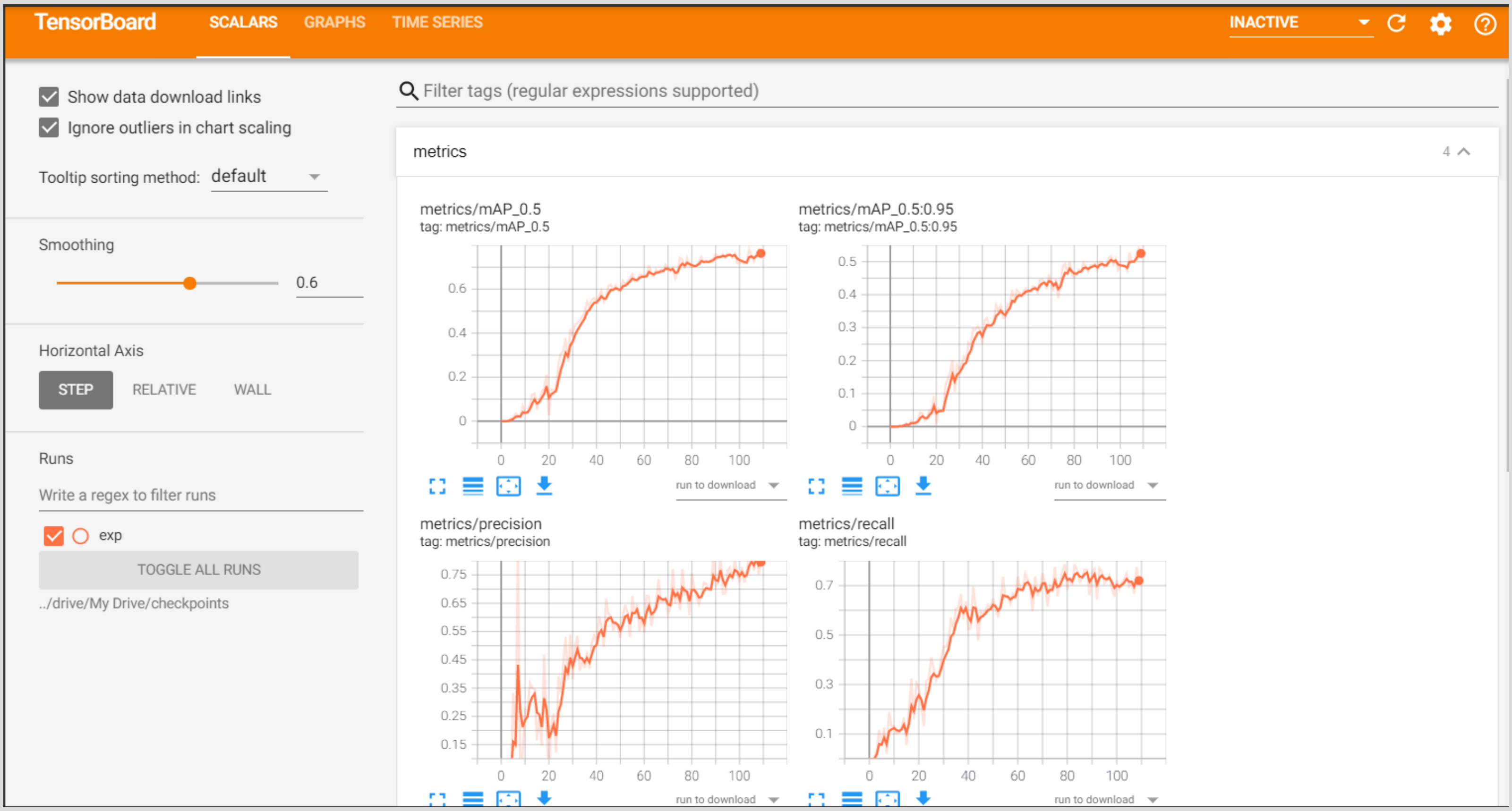
```
/usr/local/lib/python3.7/dist-packages/torch/nn/functional.py:718: UserWarning: Named tensors and all their associated APIs are an experim
  return torch.max_pool2d(input, kernel_size, stride, padding, dilation, ceil_mode)
Model Summary: 283 layers, 7279367 parameters, 7279367 gradients, 16.9 GFLOPs

Transferred 370/370 items from ../drive/My Drive/checkpoints/exp/weights/best.pt
Scaled weight_decay = 0.0005
Optimizer groups: 62 .bias, 70 conv.weight, 59 other
albumentations: version 1.0.3 required by YOLOv5, but version 0.1.12 is currently installed
train: Scanning '../train/labels' images and labels...733 found, 0 missing, 0 empty, 1 corrupted: 100% 734/734 [00:00<00:00, 2479.31it/s]
train: WARNING: Ignoring corrupted image and/or label ../train/images/sf_c4.jpg: corrupted JPEG
train: New cache created: ../train/labels.cache
val: Scanning '../val/labels' images and labels...60 found, 0 missing, 0 empty, 0 corrupted: 100% 60/60 [00:00<00:00, 735.08it/s]
val: New cache created: ../val/labels.cache
[W pthreadpool-cpp.cc:90] Warning: Leaking Caffe2 thread-pool after fork. (function pthreadpool)
[W pthreadpool-cpp.cc:90] Warning: Leaking Caffe2 thread-pool after fork. (function pthreadpool)
Image sizes 1280 train, 1280 val
Using 2 dataloader workers
Logging results to ../drive/My Drive/checkpoints/exp
Starting training for 110 epochs...

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
   105/109     13.7G   0.02932   0.01156  0.007711    0.0486        21      1280: 100% 46/46 [03:40<00:00,  4.80s/it]
               Class     Images     Labels          P          R     mAP@.5 mAP@.5:.95: 100% 2/2 [00:01<00:00,  1.24it/s]
                 all         60         88      0.824      0.698      0.755        0.5

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
   106/109     13.2G    0.0297   0.01157  0.008247   0.04952        38      1280: 100% 46/46 [03:39<00:00,  4.78s/it]
               Class     Images     Labels          P          R     mAP@.5 mAP@.5:.95: 100% 2/2 [00:01<00:00,  1.44it/s]
                 all         60         88      0.764      0.716      0.728      0.501

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
   107/109     13.2G   0.03008   0.01121  0.007567   0.04886        29      1280: 100% 46/46 [03:34<00:00,  4.66s/it]
               Class     Images     Labels          P          R     mAP@.5 mAP@.5:.95: 100% 2/2 [00:01<00:00,  1.49it/s]
                 all         60         88      0.838      0.666      0.763      0.523

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
   108/109     13.2G   0.03012   0.01152  0.008835   0.05047        25      1280: 100% 46/46 [03:36<00:00,  4.70s/it]
               Class     Images     Labels          P          R     mAP@.5 mAP@.5:.95: 100% 2/2 [00:01<00:00,  1.51it/s]
                 all         60         88      0.751      0.774       0.78      0.541

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
   109/109     13.2G   0.02908   0.01138  0.007543     0.048        21      1280: 100% 46/46 [03:33<00:00,  4.65s/it]
               Class     Images     Labels          P          R     mAP@.5 mAP@.5:.95: 100% 2/2 [00:03<00:00,  1.90s/it]
```

when training is done we can see the Tensorboard using the following command



```
[ ]  # Start tensorboard
     # Launch after you have started training to all the graphs needed for inspection
     # logs save in the folder "runs"
     %load_ext tensorboard
     %tensorboard --logdir ../drive/My\ Drive/checkpoints
```

Tesnorboard output



Filter tags (regular expressions supported)

☑ Show data download links

☑ Ignore outliers in chart scaling

Tooltip sorting method: default

Smoothing 0.6

Horizontal Axis: STEP RELATIVE WALL

Runs

Write a regex to filter runs

☑ ○ exp

TOGGLE ALL RUNS

../drive/My Drive/checkpoints

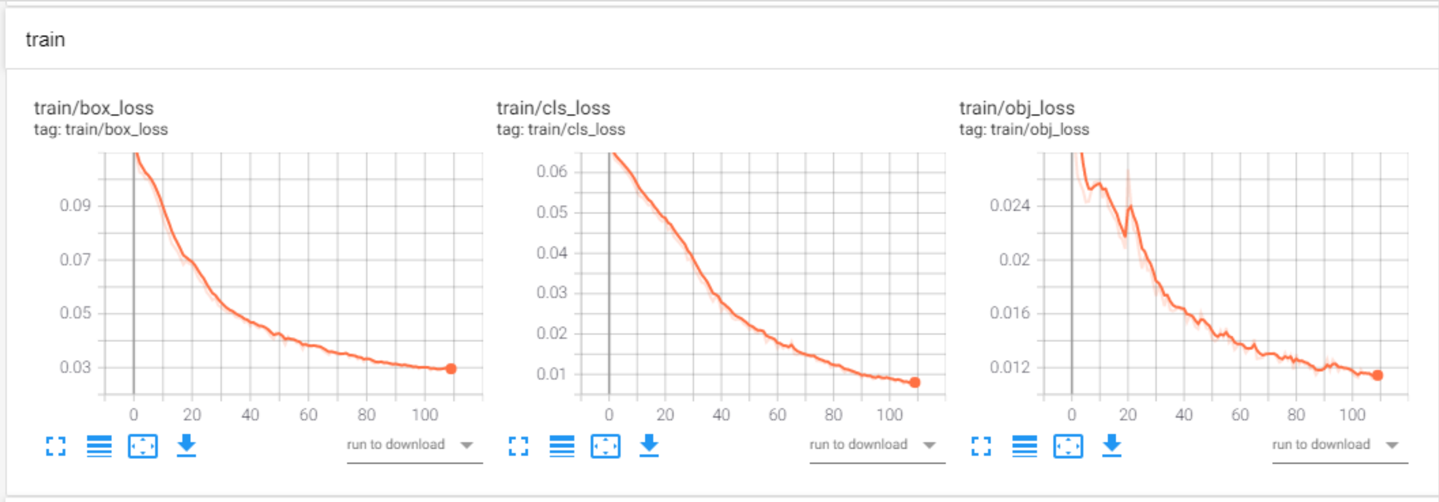
metrics 4

metrics/mAP_0.5
tag: metrics/mAP_0.5

metrics/mAP_0.5:0.95
tag: metrics/mAP_0.5:0.95

metrics/precision
tag: metrics/precision

metrics/recall
tag: metrics/recall

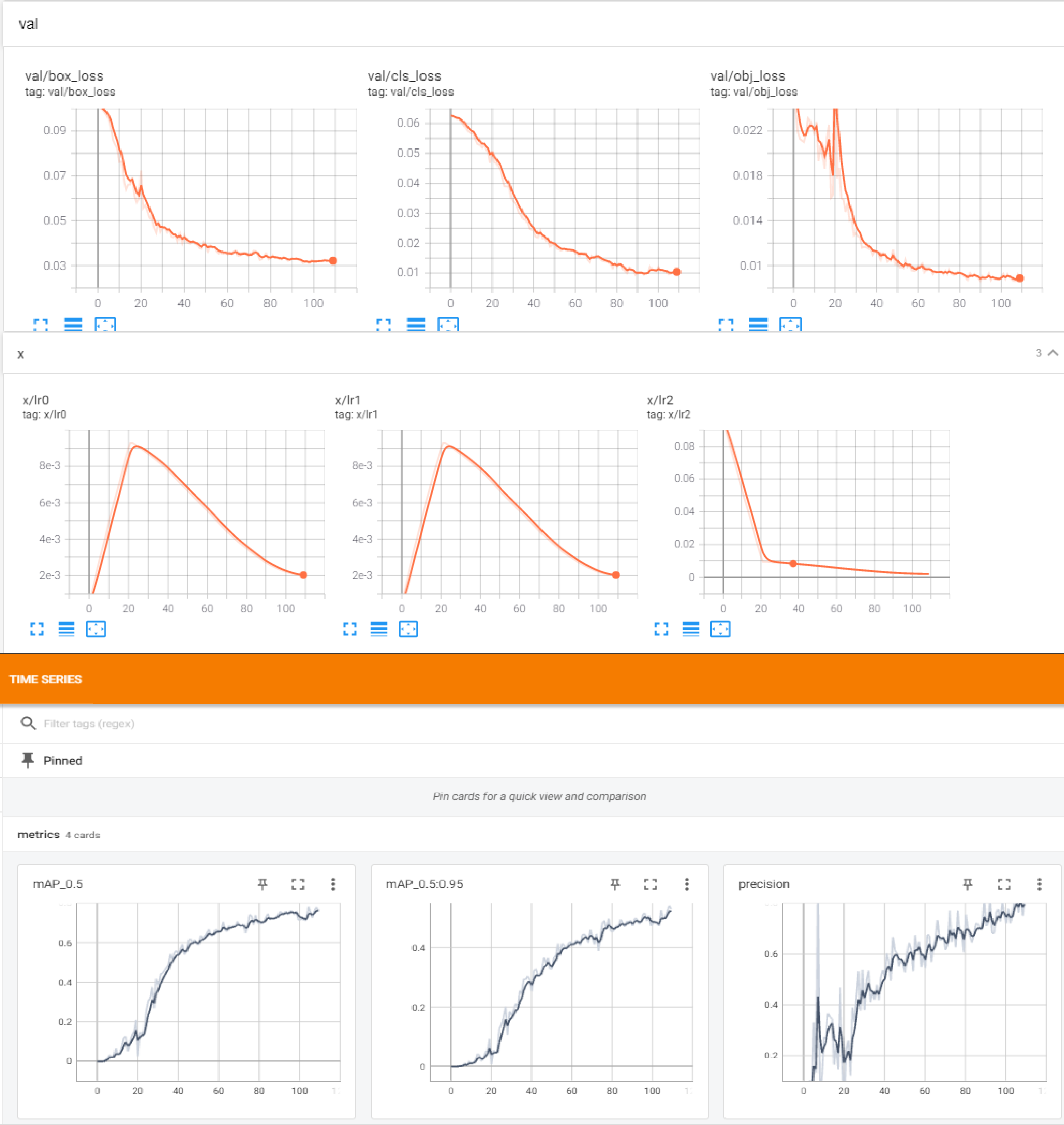


train

train/box_loss
tag: train/box_loss

train/cls_loss
tag: train/cls_loss

train/obj_loss
tag: train/obj_loss



val

val/box_loss
tag: val/box_loss

val/cls_loss
tag: val/cls_loss

val/obj_loss
tag: val/obj_loss

x

x/lr0
tag: x/lr0

x/lr1
tag: x/lr1

x/lr2
tag: x/lr2

TIME SERIES

Filter tags (regex)

Pinned

Pin cards for a quick view and comparison

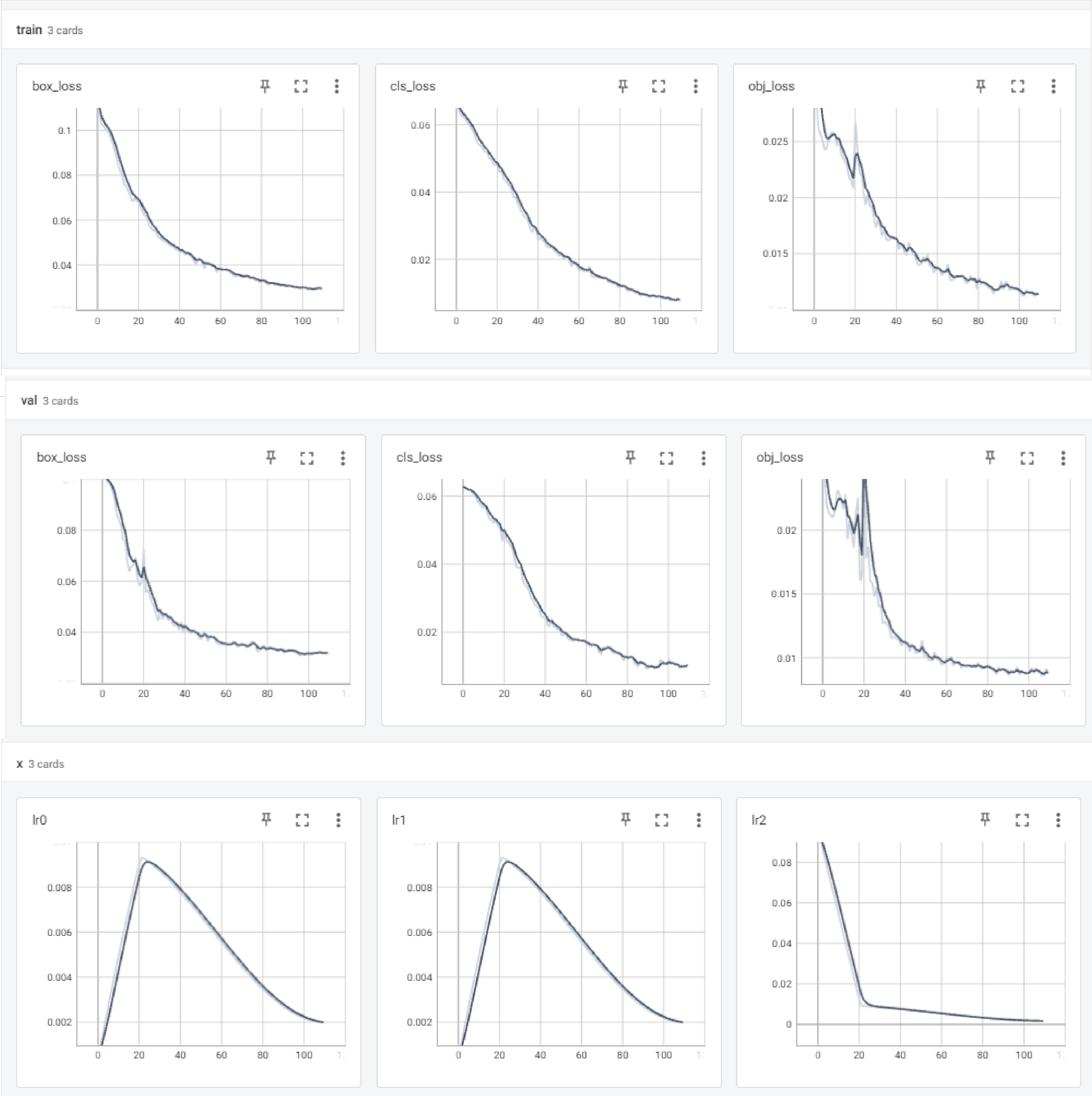
metrics 4 cards

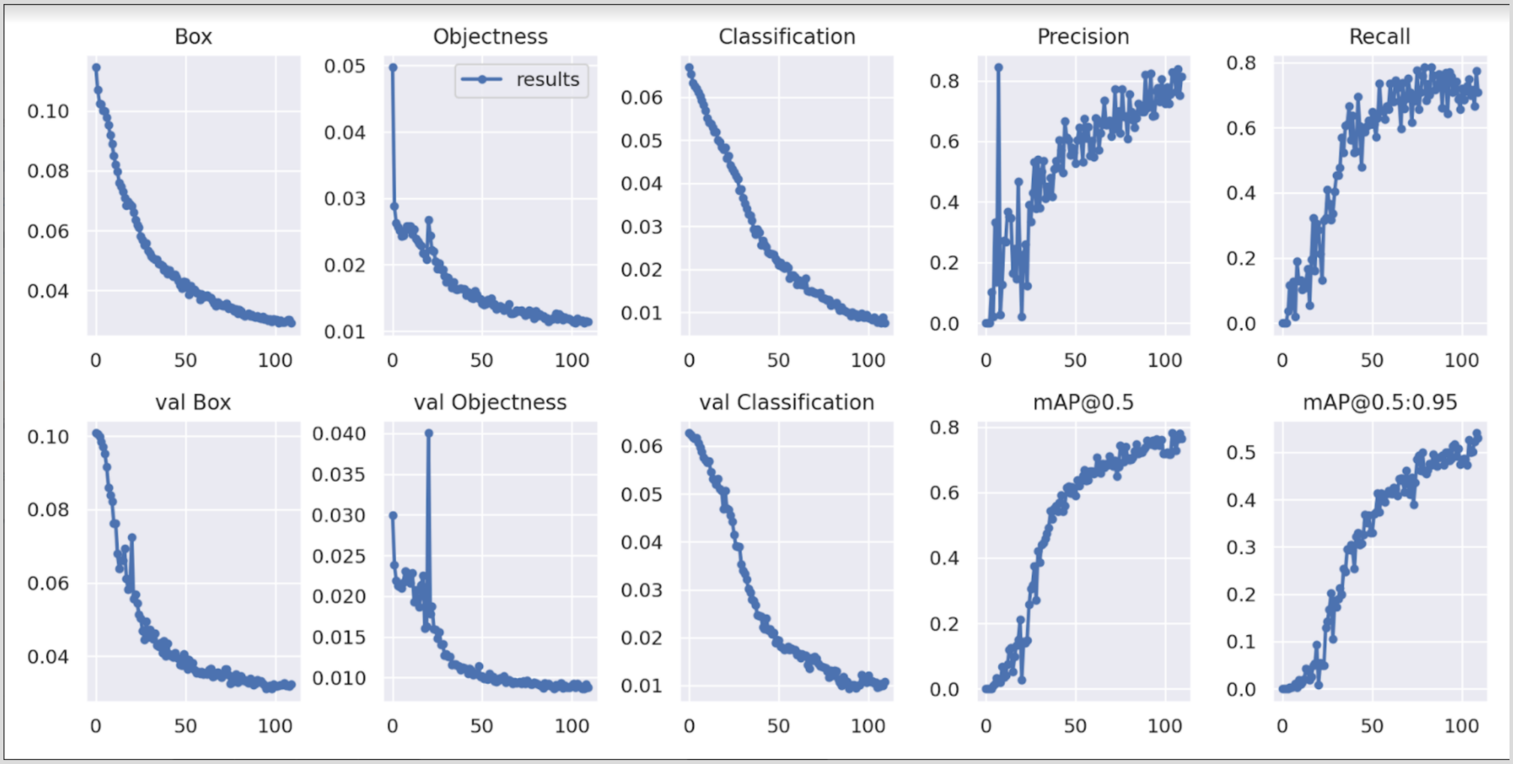
mAP_0.5

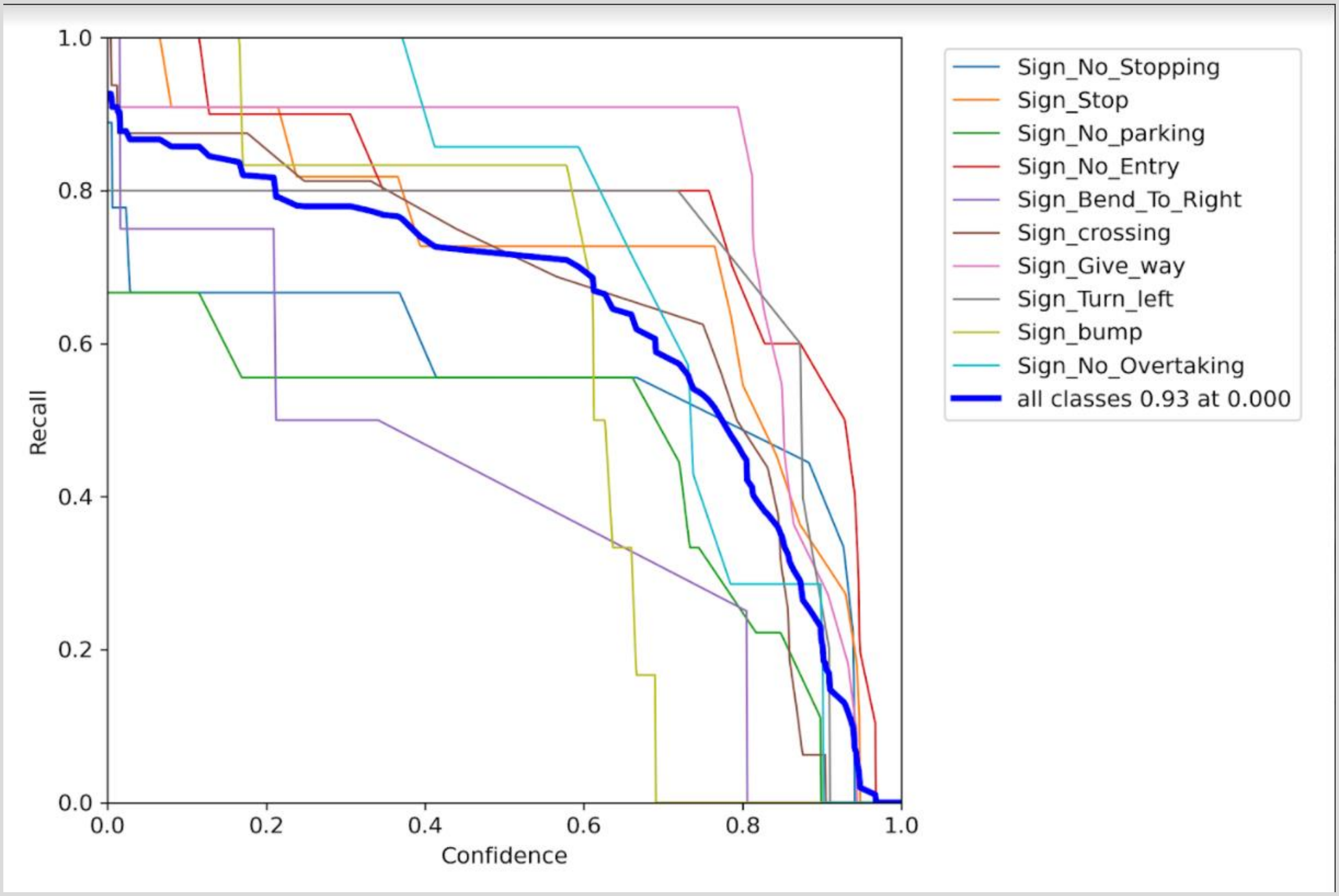
mAP_0.5:0.95

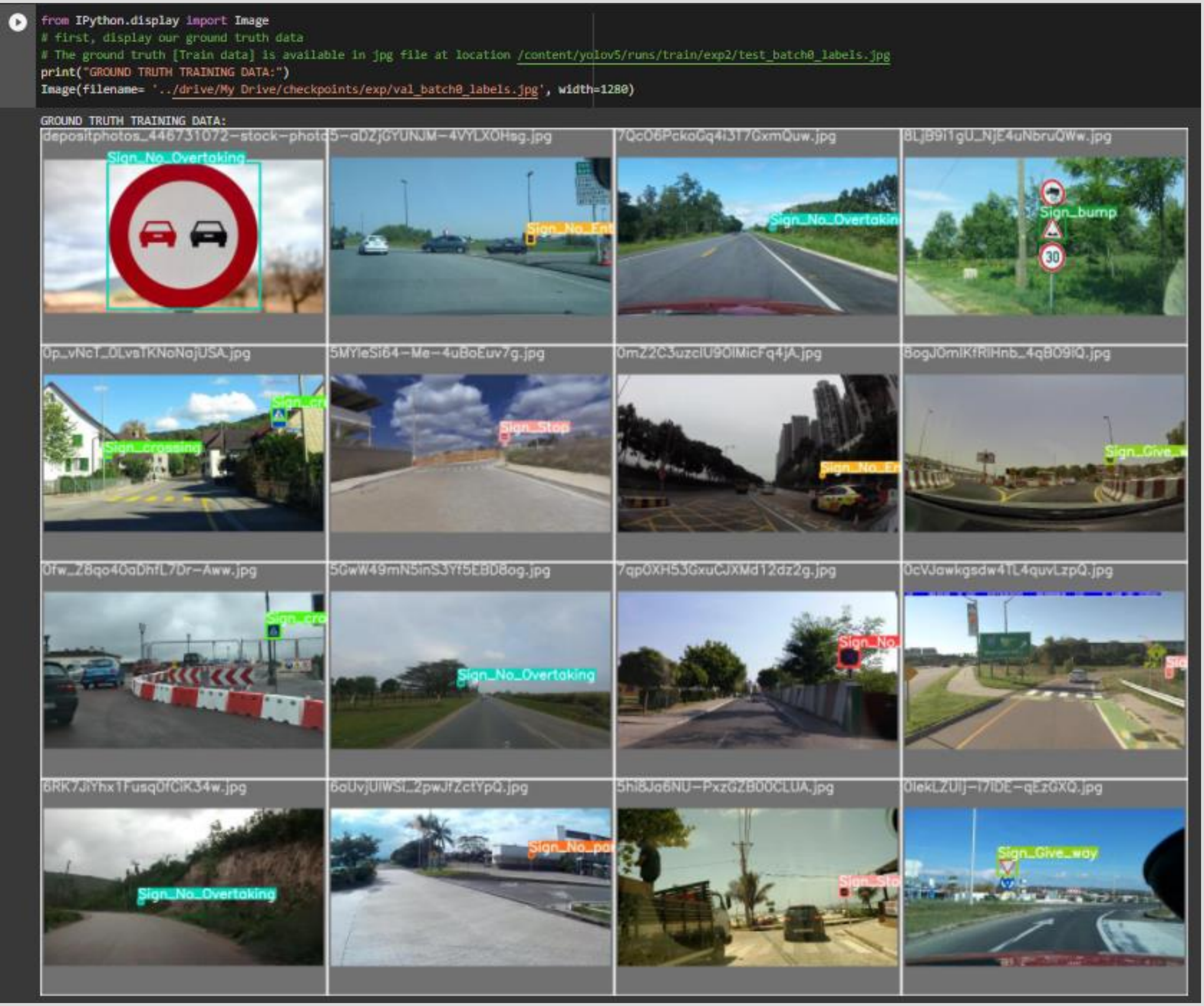
precision

time series Mohammad Nabizade Ardekani 96463168


train 3 cards
box_loss
0.1
0.08
0.06
0.04
0
20
40
60
80
100
cls_loss
0.06
0.04
0.02
0
20
40
60
80
100
obj_loss
0.025
0.02
0.015
0
20
40
60
80
100
val 3 cards
box_loss
0.08
0.06
0.04
0
20
40
60
80
100
cls_loss
0.06
0.04
0.02
0
20
40
60
80
100
obj_loss
0.02
0.015
0.01
0
20
40
60
80
100
x 3 cards
lr0
0.008
0.006
0.004
0.002
0
20
40
60
80
100
lr1
0.008
0.006
0.004
0.002
0
20
40
60
80
100
lr2
0.08
0.06
0.04
0.02
0
0
20
40
60
80
100


Box
Objectness
results
Classification
Precision
Recall
val Box
val Objectness
val Classification
mAP@0.5
mAP@0.5:0.95
0
50
100


Recall
Confidence
0.0
0.2
0.4
0.6
0.8
1.0
Sign_No_Stopping
Sign_Stop
Sign_No_parking
Sign_No_Entry
Sign_Bend_To_Right
Sign_crossing
Sign_Give_way
Sign_Turn_left
Sign_bump
Sign_No_Overtaking
all classes 0.93 at 0.000

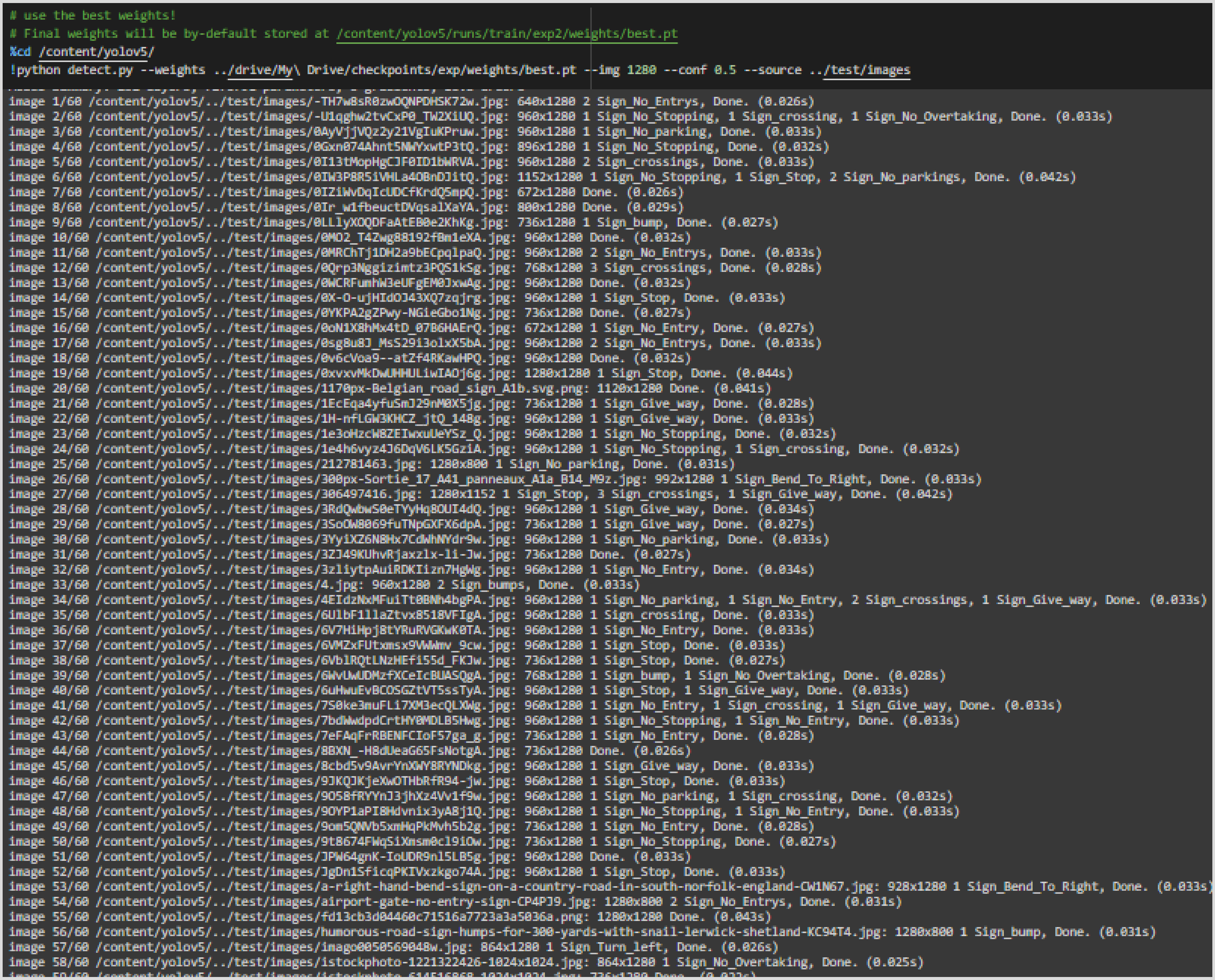


```
from IPython.display import Image
# first, display our ground truth data
# The ground truth [Train data] is available in jpg file at location /content/yolov5/runs/train/exp2/test_batch0_labels.jpg
print("GROUND TRUTH TRAINING DATA:")
Image(filename= '../drive/My Drive/checkpoints/exp/val_batch0_labels.jpg', width=1280)
```

```
GROUND TRUTH TRAINING DATA:
```

depositphotos_446731072-stock-photo
Sign_No_Overtaking
5-aDZjGYUNJM-4VYLXOHsg.jpg
Sign_No_Ent
7QcO6PckoGq4i317GxmQuw.jpg
Sign_No_Overtakin
8LjB9i1gU_NjE4uNbruQWw.jpg
Sign_bump
0p_vNcT_0LvsTKNoNqjUSA.jpg
Sign_cr
Sign_crossing
5MYleSi64-Me-4uBoEuv7g.jpg
Sign_Stop
0mZ2C3uzclU90lMicFq4jA.jpg
Sign_No_En
8ogJ0mIKfRIHnb_4qB09lQ.jpg
Sign_Give_
0fw_Z8qo40aDhfL7Dr-Aww.jpg
Sign_cro
5GwW49mN5inS3Yf5EBD8og.jpg
Sign_No_Overtaking
7qp0XH53GxuCJXMd12dz2g.jpg
Sign_No
0cVJawkgsdw4TL4quvLzpQ.jpg
Sig
6RK7JiYhx1FusqOfCiK34w.jpg
Sign_No_Overtaking
6aUvjUlWSi_2pwJfZctYpQ.jpg
Sign_No_pa
5hi8Ja6NU-PxzGZB00CLUA.jpg
Sign_Sto
0lekLZUIj-i7IDE-qEzGXQ.jpg
Sign_Give_way

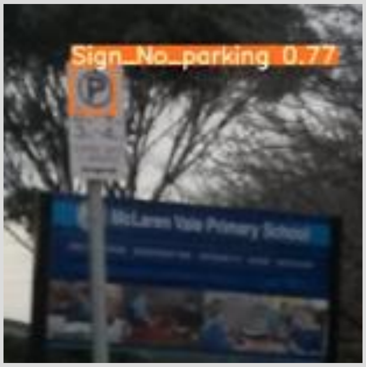
Now we can use our test images

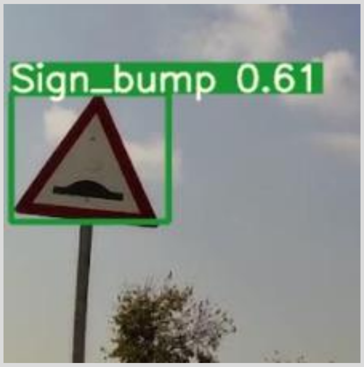


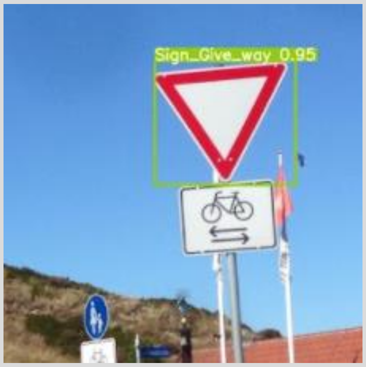
```
# use the best weights!
# Final weights will be by-default stored at /content/yolov5/runs/train/exp2/weights/best.pt
%cd /content/yolov5/
!python detect.py --weights ../drive/My\ Drive/checkpoints/exp/weights/best.pt --img 1280 --conf 0.5 --source ../test/images
```

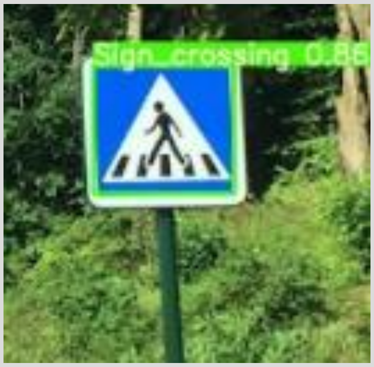
```
image 1/60 /content/yolov5/../test/images/-TH7w8sR0zwOQNPDHSK72w.jpg: 640x1280 2 Sign_No_Entrys, Done. (0.026s)
image 2/60 /content/yolov5/../test/images/-U1qghw2tvCxP0_TW2XiUQ.jpg: 960x1280 1 Sign_No_Stopping, 1 Sign_crossing, 1 Sign_No_Overtaking, Done. (0.033s)
image 3/60 /content/yolov5/../test/images/0AyVjjVQz2y21VgIuKPruw.jpg: 960x1280 1 Sign_No_parking, Done. (0.033s)
image 4/60 /content/yolov5/../test/images/0Gxn074Ahnt5NWYxwtP3tQ.jpg: 896x1280 1 Sign_No_Stopping, Done. (0.032s)
image 5/60 /content/yolov5/../test/images/0I13tMopHgCJF0ID1bWRVA.jpg: 960x1280 2 Sign_crossings, Done. (0.033s)
image 6/60 /content/yolov5/../test/images/0IW3P8R5iVHLa4OBnDJitQ.jpg: 1152x1280 1 Sign_No_Stopping, 1 Sign_Stop, 2 Sign_No_parkings, Done. (0.042s)
image 7/60 /content/yolov5/../test/images/0IZiWvDqIcUDCfKrdQ5mpQ.jpg: 672x1280 Done. (0.026s)
image 8/60 /content/yolov5/../test/images/0Ir_w1fbeuctDVqsalXaYA.jpg: 800x1280 Done. (0.029s)
image 9/60 /content/yolov5/../test/images/0LLlyXOQDFaAtEB0e2KhKg.jpg: 736x1280 1 Sign_bump, Done. (0.027s)
image 10/60 /content/yolov5/../test/images/0MO2_T4Zwg88192fBm1eXA.jpg: 960x1280 Done. (0.032s)
image 11/60 /content/yolov5/../test/images/0MRChTj1DH2a9bECpqlpaQ.jpg: 960x1280 2 Sign_No_Entrys, Done. (0.033s)
image 12/60 /content/yolov5/../test/images/0Qrp3Nggizimtz3PQS1kSg.jpg: 768x1280 3 Sign_crossings, Done. (0.028s)
image 13/60 /content/yolov5/../test/images/0WCRFumhW3eUFgEM0JxwAg.jpg: 960x1280 Done. (0.032s)
image 14/60 /content/yolov5/../test/images/0X-O-ujHIdOJ43XQ7zqjrg.jpg: 960x1280 1 Sign_Stop, Done. (0.033s)
image 15/60 /content/yolov5/../test/images/0YKPA2gZPwy-NGieGbo1Ng.jpg: 736x1280 Done. (0.027s)
image 16/60 /content/yolov5/../test/images/0oN1X8hMx4tD_07B6HAErQ.jpg: 672x1280 1 Sign_No_Entry, Done. (0.027s)
image 17/60 /content/yolov5/../test/images/0sg8u8J_MsS29i3olxX5bA.jpg: 960x1280 2 Sign_No_Entrys, Done. (0.033s)
image 18/60 /content/yolov5/../test/images/0v6cVoa9--atZf4RKawHPQ.jpg: 960x1280 Done. (0.032s)
image 19/60 /content/yolov5/../test/images/0xvxvMkDwUHHULiwIAOj6g.jpg: 1280x1280 1 Sign_Stop, Done. (0.044s)
image 20/60 /content/yolov5/../test/images/1170px-Belgian_road_sign_A1b.svg.png: 1120x1280 Done. (0.041s)
image 21/60 /content/yolov5/../test/images/1EcEqa4yfuSmJ29nM0X5jg.jpg: 736x1280 1 Sign_Give_way, Done. (0.028s)
image 22/60 /content/yolov5/../test/images/1H-nfLGW3KHCZ_jtQ_148g.jpg: 960x1280 1 Sign_Give_way, Done. (0.033s)
image 23/60 /content/yolov5/../test/images/1e3oHzcW8ZEIwxuUeYSz_Q.jpg: 960x1280 1 Sign_No_Stopping, Done. (0.032s)
image 24/60 /content/yolov5/../test/images/1e4h6vyz4J6DqV6LK5GziA.jpg: 960x1280 1 Sign_No_Stopping, 1 Sign_crossing, Done. (0.032s)
image 25/60 /content/yolov5/../test/images/212781463.jpg: 1280x800 1 Sign_No_parking, Done. (0.031s)
image 26/60 /content/yolov5/../test/images/300px-Sortie_17_A41_panneaux_A1a_B14_M9z.jpg: 992x1280 1 Sign_Bend_To_Right, Done. (0.033s)
image 27/60 /content/yolov5/../test/images/306497416.jpg: 1280x1152 1 Sign_Stop, 3 Sign_crossings, 1 Sign_Give_way, Done. (0.042s)
image 28/60 /content/yolov5/../test/images/3RdQwbwS0eTYyHq8OUI4dQ.jpg: 960x1280 1 Sign_Give_way, Done. (0.034s)
image 29/60 /content/yolov5/../test/images/3SoOW8069fuTNpGXFX6dpA.jpg: 736x1280 1 Sign_Give_way, Done. (0.027s)
image 30/60 /content/yolov5/../test/images/3Yy1XZ6N8Hx7CdWhNYdr9w.jpg: 960x1280 1 Sign_No_parking, Done. (0.033s)
image 31/60 /content/yolov5/../test/images/3ZJ49KUhvRjaxzlx-li-Jw.jpg: 736x1280 Done. (0.027s)
image 32/60 /content/yolov5/../test/images/3zliytpAuiRDKIizn7HgWg.jpg: 960x1280 1 Sign_No_Entry, Done. (0.034s)
image 33/60 /content/yolov5/../test/images/4.jpg: 960x1280 2 Sign_bumps, Done. (0.033s)
image 34/60 /content/yolov5/../test/images/4EIdzNxMFuiTt0BNh4bgPA.jpg: 960x1280 1 Sign_No_parking, 1 Sign_No_Entry, 2 Sign_crossings, 1 Sign_Give_way, Done. (0.033s)
image 35/60 /content/yolov5/../test/images/6UlbF1llaZtvx8518VFIgA.jpg: 960x1280 1 Sign_crossing, Done. (0.033s)
image 36/60 /content/yolov5/../test/images/6V7HiHpj8tYRuRVGKwK0TA.jpg: 960x1280 1 Sign_No_Entry, Done. (0.033s)
image 37/60 /content/yolov5/../test/images/6VMZxFUtxmsx9VWWmv_9cw.jpg: 960x1280 1 Sign_Stop, Done. (0.033s)
image 38/60 /content/yolov5/../test/images/6VblRQtLNzHEfi55d_FKJw.jpg: 736x1280 1 Sign_Stop, Done. (0.027s)
image 39/60 /content/yolov5/../test/images/6WvUwUDMzfXCeIcBUASQgA.jpg: 768x1280 1 Sign_bump, 1 Sign_No_Overtaking, Done. (0.028s)
image 40/60 /content/yolov5/../test/images/6uHwuEvBCOSGZtVT5ssTyA.jpg: 960x1280 1 Sign_Stop, 1 Sign_Give_way, Done. (0.033s)
image 41/60 /content/yolov5/../test/images/7S0ke3muFLi7XM3ecQLXWg.jpg: 960x1280 1 Sign_No_Entry, 1 Sign_crossing, 1 Sign_Give_way, Done. (0.033s)
image 42/60 /content/yolov5/../test/images/7bdWwdpdCrtHY0MDLB5Hwg.jpg: 960x1280 1 Sign_No_Stopping, 1 Sign_No_Entry, Done. (0.033s)
image 43/60 /content/yolov5/../test/images/7eFAqFrRBENFCIoF57ga_g.jpg: 736x1280 1 Sign_No_Entry, Done. (0.028s)
image 44/60 /content/yolov5/../test/images/8BXN_-H8dUeaG65FsNotgA.jpg: 736x1280 Done. (0.026s)
image 45/60 /content/yolov5/../test/images/8cbd5v9AvrYnXWY8RYNDkg.jpg: 960x1280 1 Sign_Give_way, Done. (0.033s)
image 46/60 /content/yolov5/../test/images/9JKQJKjeXwOTHbRfR94-jw.jpg: 960x1280 1 Sign_Stop, Done. (0.033s)
image 47/60 /content/yolov5/../test/images/9O58fRYYnJ3jhXz4Vv1f9w.jpg: 960x1280 1 Sign_No_parking, 1 Sign_crossing, Done. (0.032s)
image 48/60 /content/yolov5/../test/images/9OYP1aPI8Hdvnix3yA8j1Q.jpg: 960x1280 1 Sign_No_Stopping, 1 Sign_No_Entry, Done. (0.033s)
image 49/60 /content/yolov5/../test/images/9om5QNVb5xmHqPkMvh5b2g.jpg: 736x1280 1 Sign_No_Entry, Done. (0.028s)
image 50/60 /content/yolov5/../test/images/9t8674FWqSiXmsm0cl9iOw.jpg: 736x1280 1 Sign_No_Stopping, Done. (0.027s)
image 51/60 /content/yolov5/../test/images/JPW64gnK-IoUDR9nl5LB5g.jpg: 960x1280 Done. (0.033s)
image 52/60 /content/yolov5/../test/images/JgDn1SficqPKIVxzkgo74A.jpg: 960x1280 1 Sign_Stop, Done. (0.033s)
image 53/60 /content/yolov5/../test/images/a-right-hand-bend-sign-on-a-country-road-in-south-norfolk-england-CW1N67.jpg: 928x1280 1 Sign_Bend_To_Right, Done. (0.033s)
image 54/60 /content/yolov5/../test/images/airport-gate-no-entry-sign-CP4PJ9.jpg: 1280x800 2 Sign_No_Entrys, Done. (0.031s)
image 55/60 /content/yolov5/../test/images/fd13cb3d04460c71516a7723a3a5036a.png: 1280x1280 Done. (0.043s)
image 56/60 /content/yolov5/../test/images/humorous-road-sign-humps-for-300-yards-with-snail-lerwick-shetland-KC94T4.jpg: 1280x800 1 Sign_bump, Done. (0.031s)
image 57/60 /content/yolov5/../test/images/imago0050569048w.jpg: 864x1280 1 Sign_Turn_left, Done. (0.026s)
image 58/60 /content/yolov5/../test/images/istockphoto-1221322426-1024x1024.jpg: 864x1280 1 Sign_No_Overtaking, Done. (0.025s)
image 59/60 /content/yolov5/../test/images/istockphoto-614516868-1024x1024.jpg: 736x1280 Done. (0.022s)
```

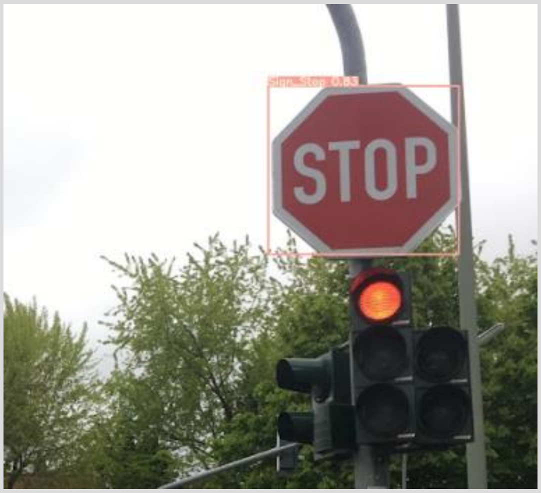
Output:

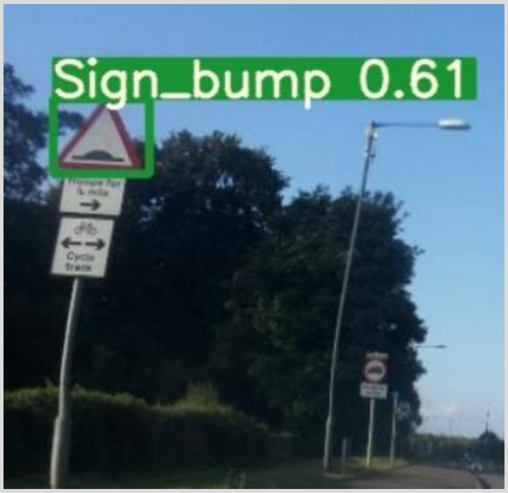

Sign_No_parking 0.77
McLaren Vale Primary School

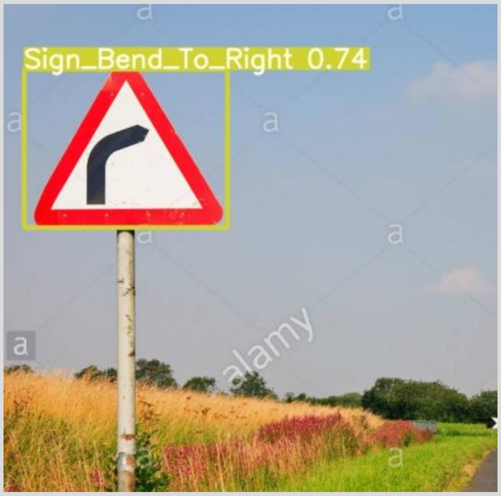

Sign_bump 0.61

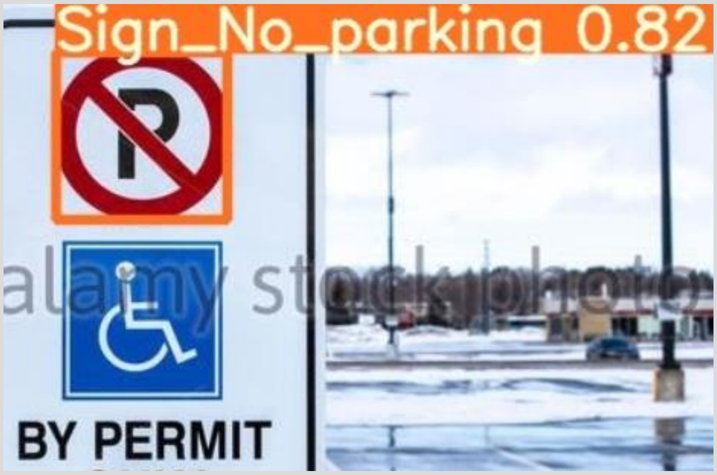

Sign_Give_way 0.95

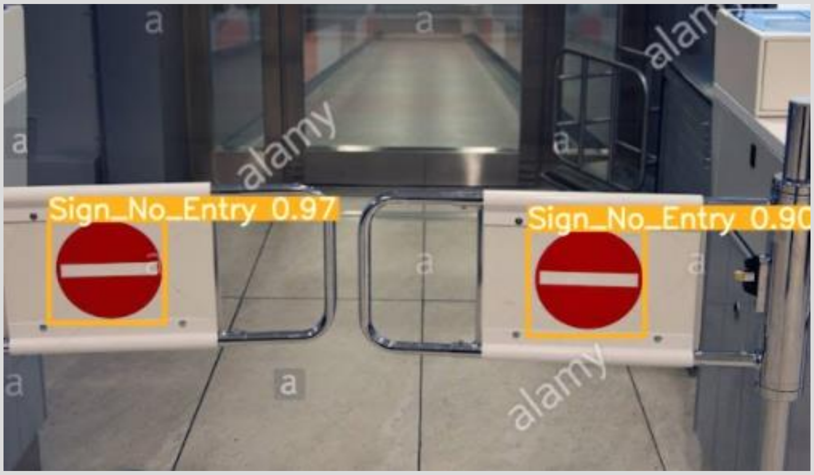

Sign_crossing 0.86

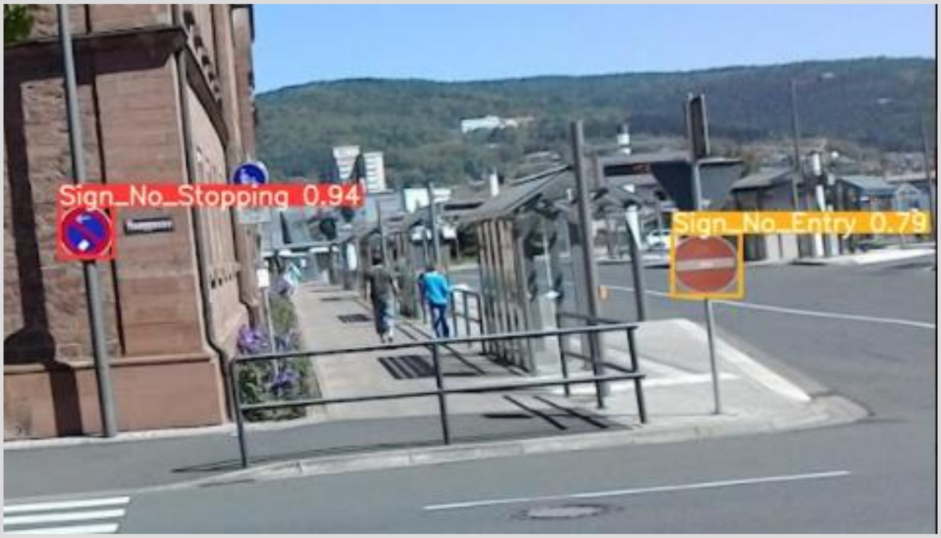

Sign_Stop 0.83
STOP

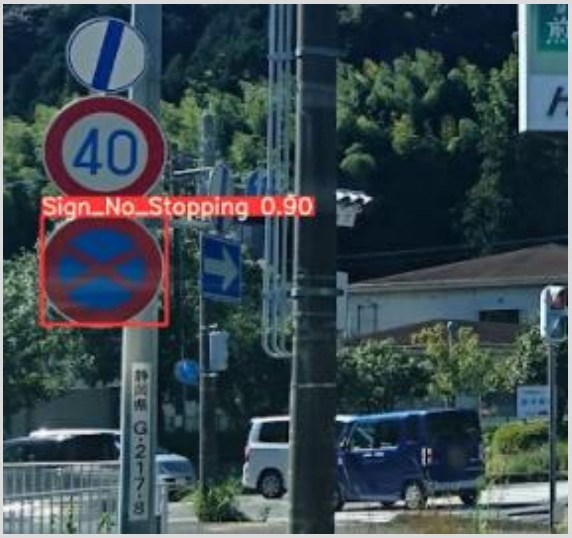

Sign_bump 0.61
Cycle track

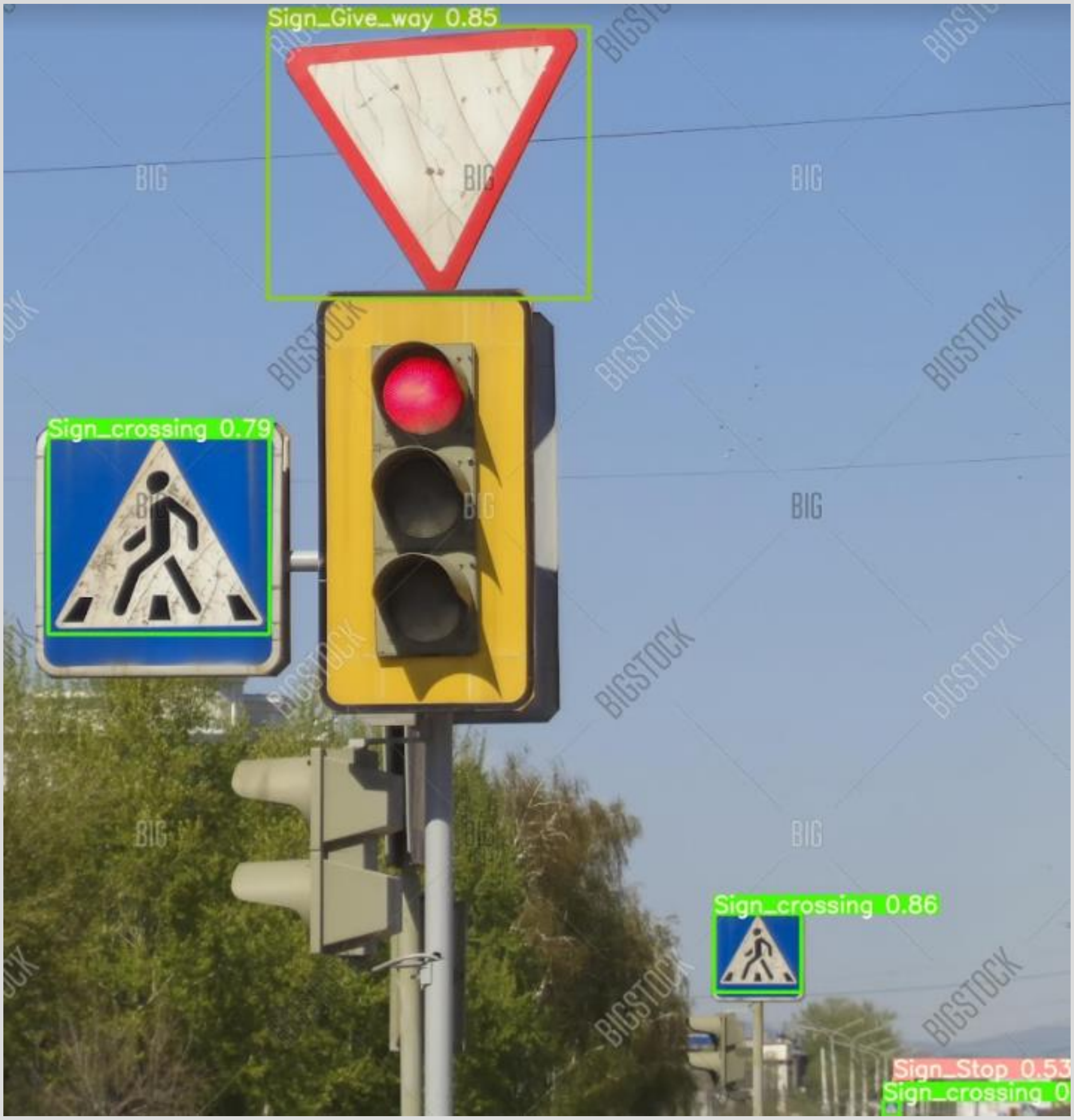

Sign_Bend_To_Right 0.74
alamy

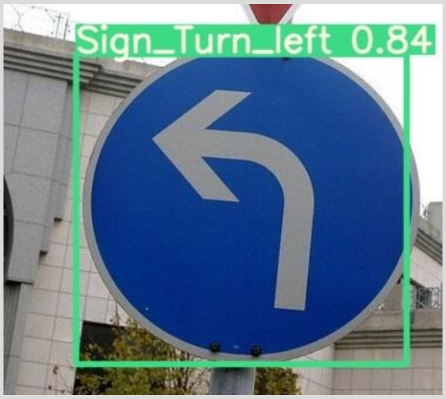

Sign_No_parking 0.82
alamy stock photo
BY PERMIT

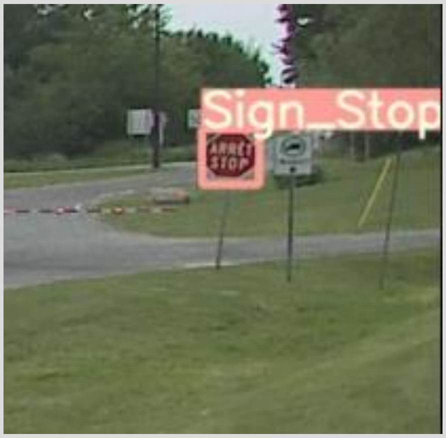

Sign_No_Entry 0.97
Sign_No_Entry 0.90
alamy





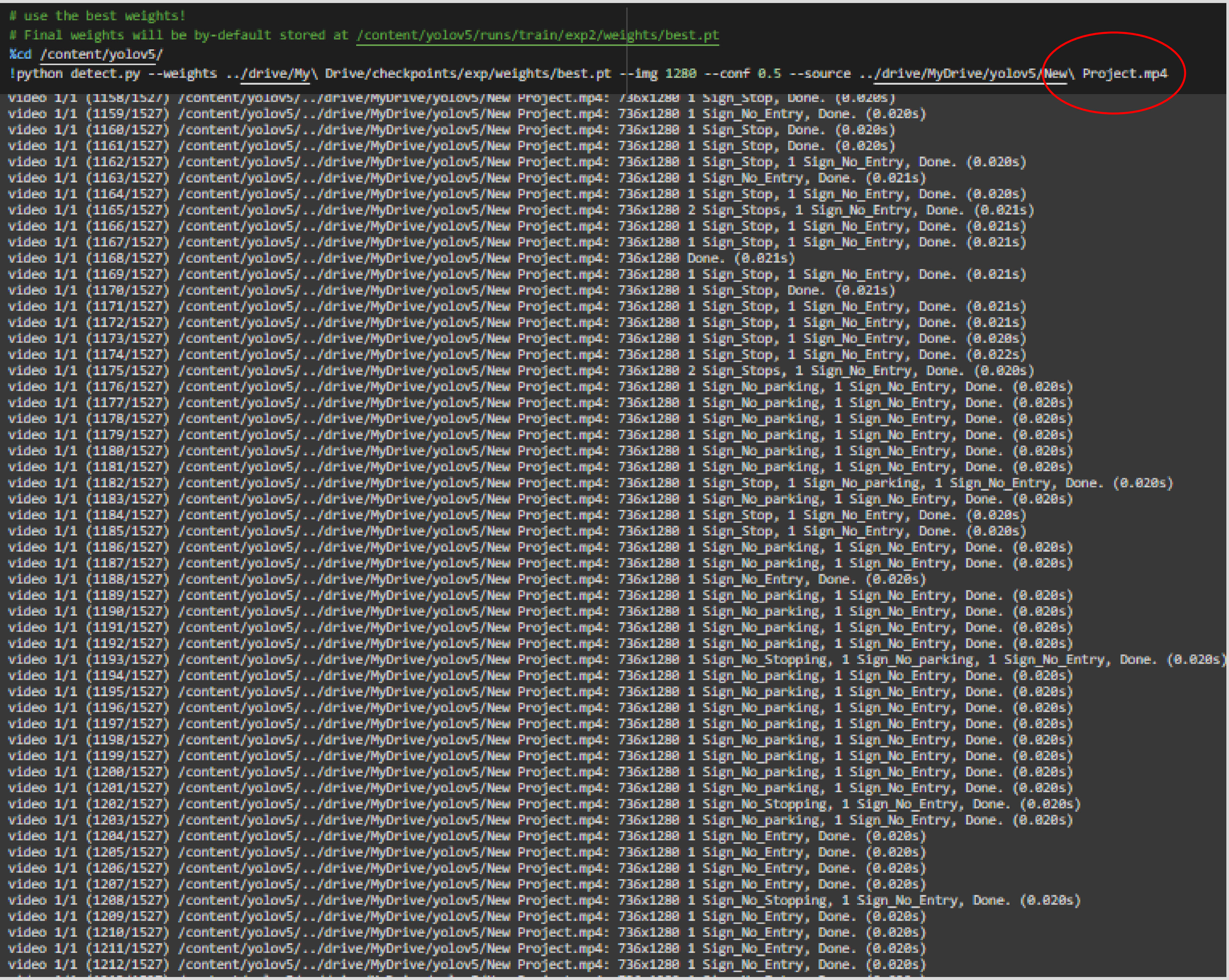






Mohammad Nabizade Ardekani 96463168

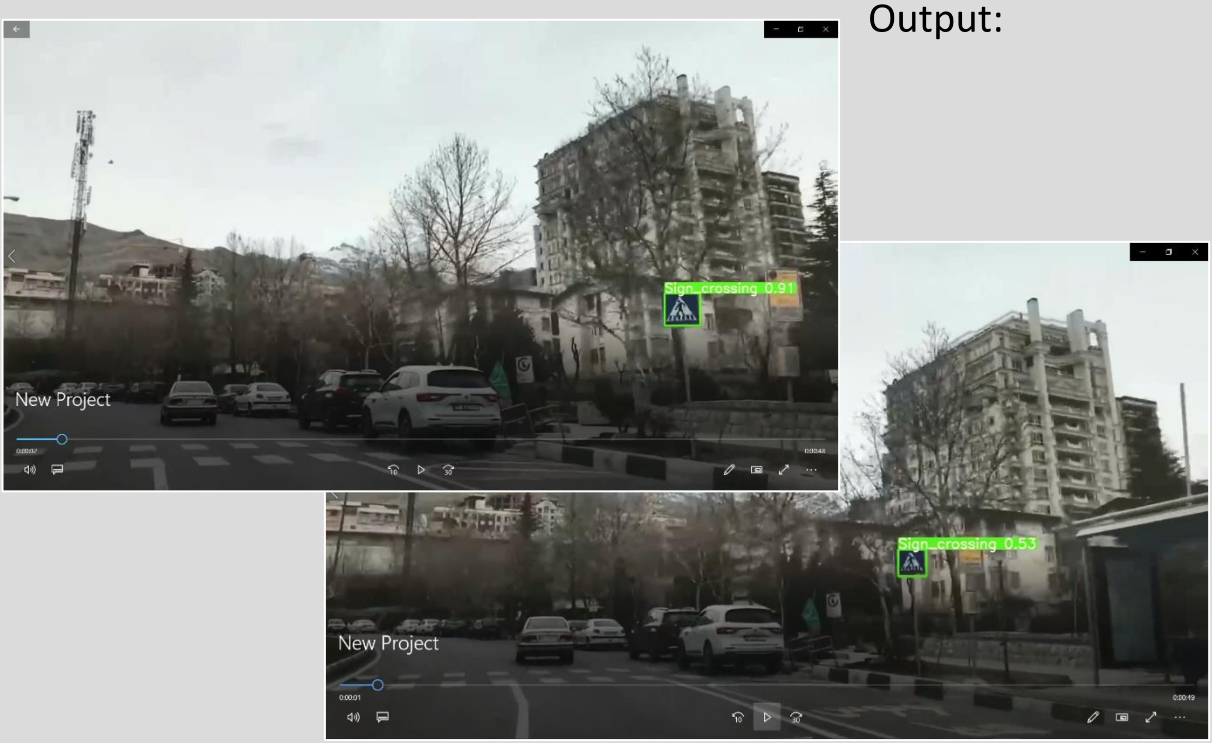
We can also test video using the following comand

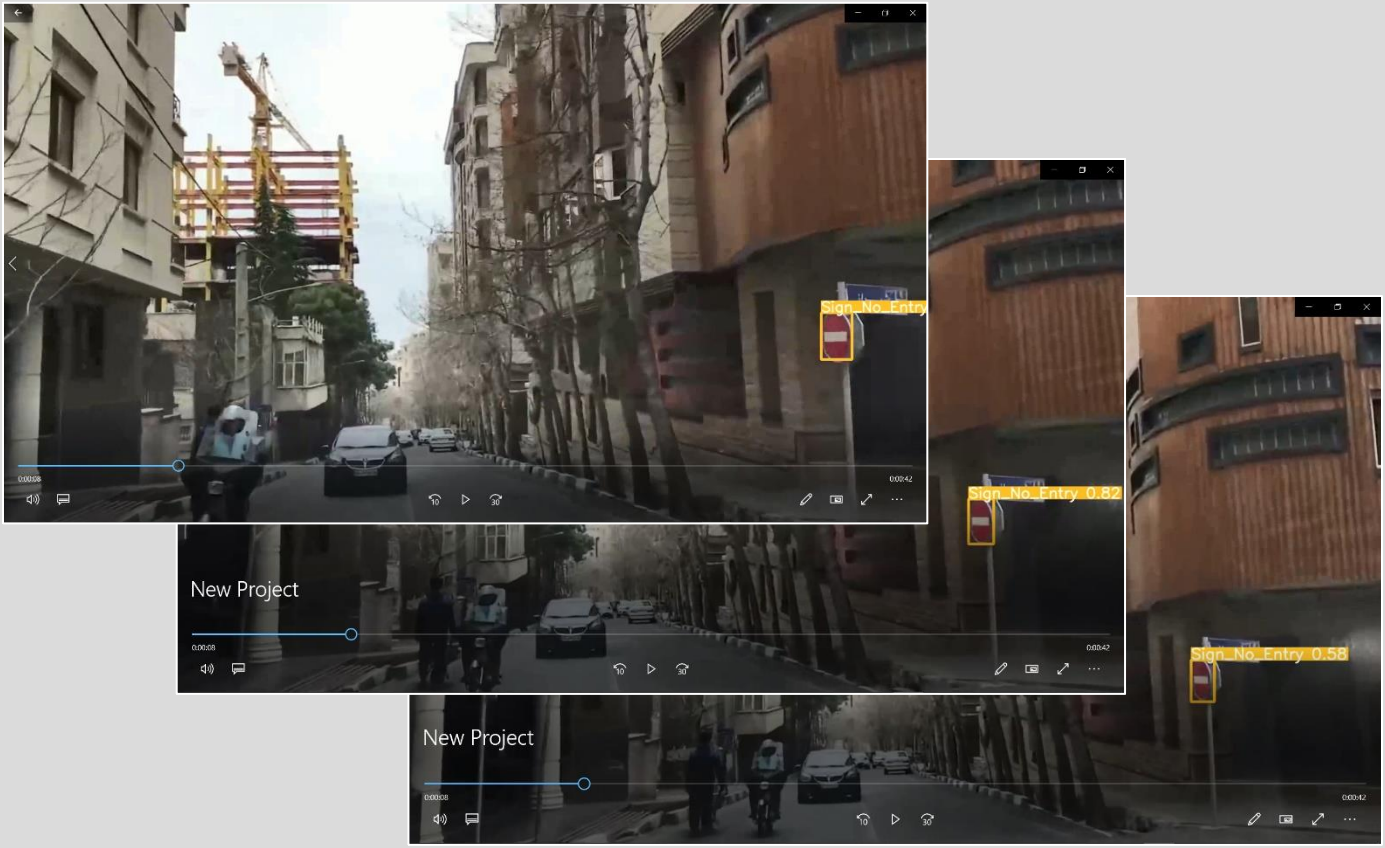


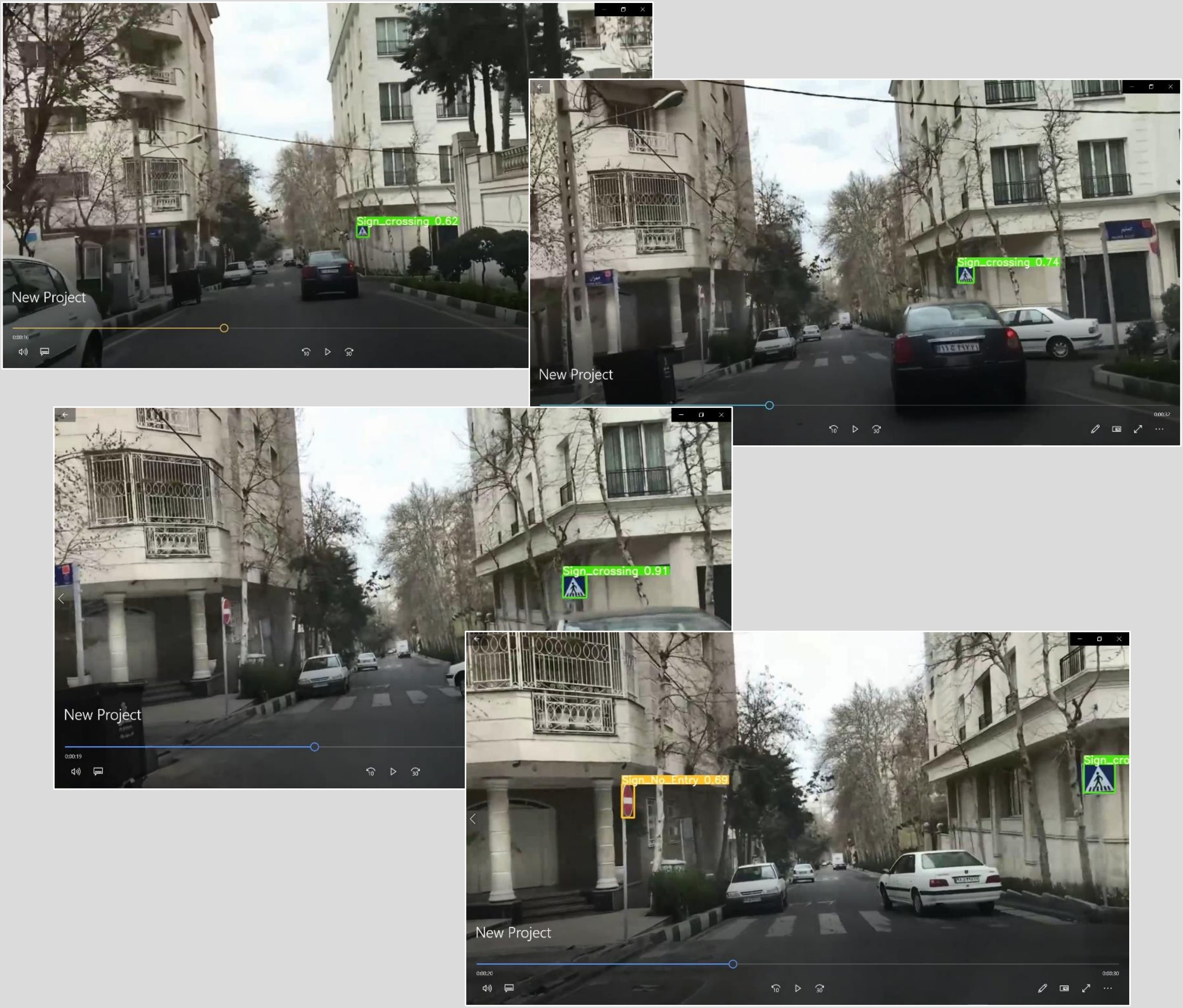
```
# use the best weights!
# Final weights will be by-default stored at /content/yolov5/runs/train/exp2/weights/best.pt
%cd /content/yolov5/
!python detect.py --weights ../drive/My\ Drive/checkpoints/exp/weights/best.pt --img 1280 --conf 0.5 --source ../drive/MyDrive/yolov5/New\ Project.mp4
```

```
video 1/1 (1158/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, Done. (0.020s)
video 1/1 (1159/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1160/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, Done. (0.020s)
video 1/1 (1161/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, Done. (0.020s)
video 1/1 (1162/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1163/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1164/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1165/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 2 Sign_Stops, 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1166/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1167/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1168/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 Done. (0.021s)
video 1/1 (1169/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1170/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, Done. (0.021s)
video 1/1 (1171/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1172/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.021s)
video 1/1 (1173/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1174/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.022s)
video 1/1 (1175/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 2 Sign_Stops, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1176/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1177/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1178/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1179/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1180/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1181/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1182/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1183/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1184/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1185/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_Stop, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1186/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1187/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1188/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1189/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1190/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1191/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1192/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1193/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Stopping, 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1194/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1195/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1196/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1197/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1198/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1199/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1200/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1201/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1202/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Stopping, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1203/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_parking, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1204/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1205/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1206/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1207/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1208/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Stopping, 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1209/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1210/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1211/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
video 1/1 (1212/1527) /content/yolov5/../drive/MyDrive/yolov5/New Project.mp4: 736x1280 1 Sign_No_Entry, Done. (0.020s)
```

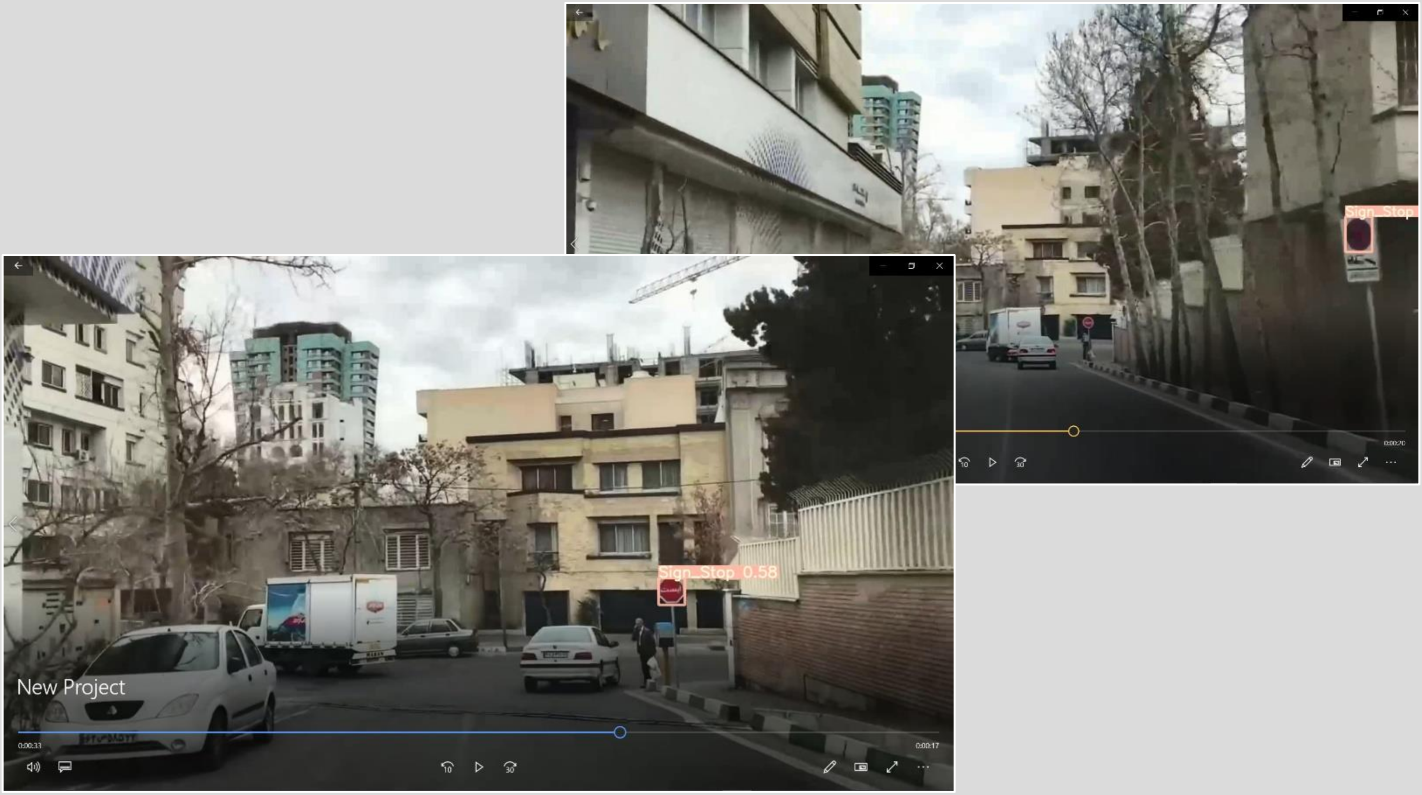
Output:

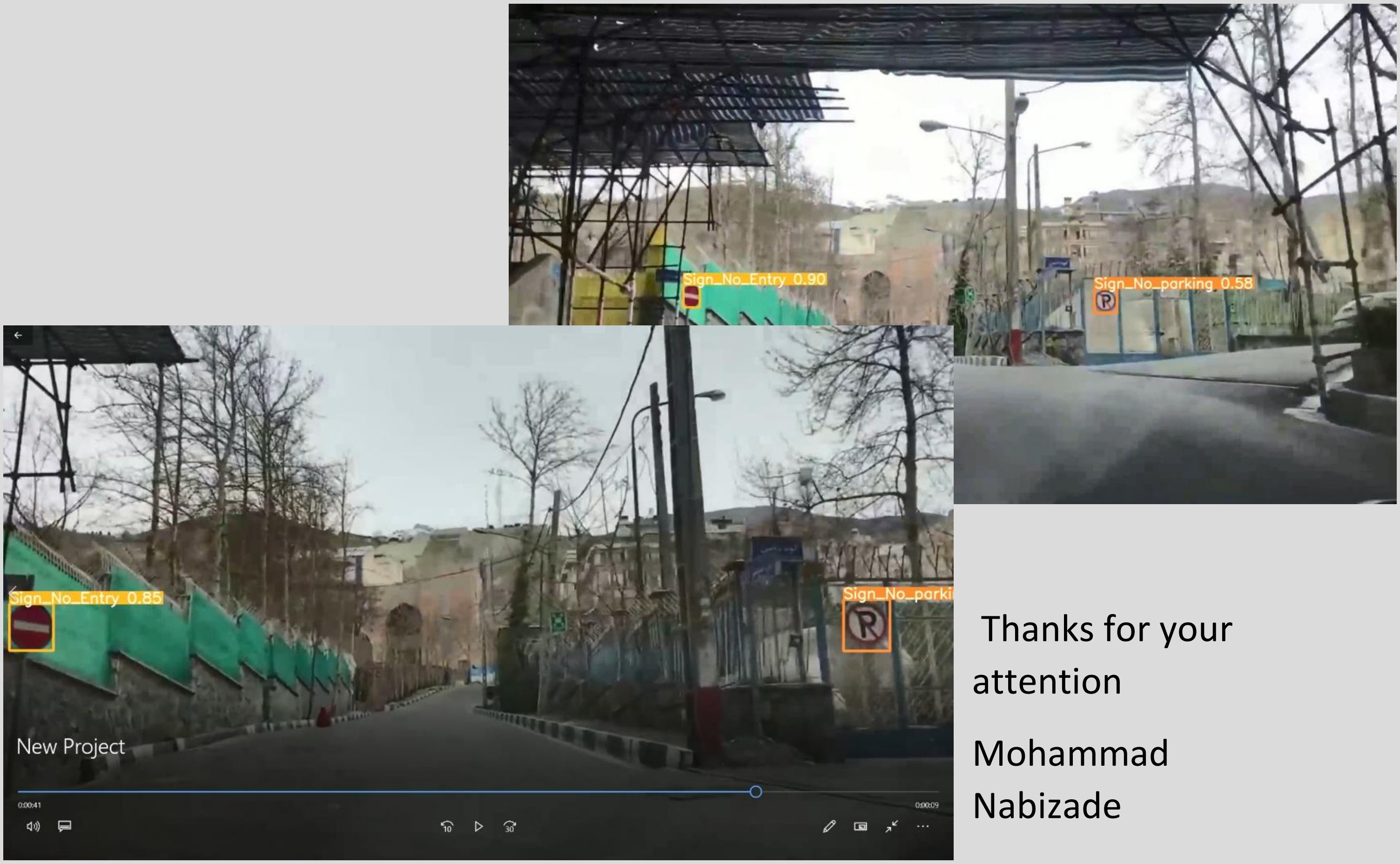

Sign_crossing 0.91
New Project
Sign_crossing 0.53
New Project


Sign_No_Entry
Sign_No_Entry 0.82
New Project
Sign_No_Entry 0.58
New Project



Mohammad Nabizade Ardekani 96463168





Thanks for your attention

Mohammad Nabizade

Mohammad Nabizade Ardekani 96463168