Download and install Detectron2

```
!pip install pyyaml==5.1

import torch
TORCH_VERSION·=·".".join(torch.__version__.split(".")[:2])
CUDA_VERSION·=·torch.__version__.split("+")[-1]
print("torch: ", TORCH_VERSION, "; cuda: ", CUDA_VERSION)
# Install detectron2 that matches the above pytorch version
# See https://detectron2.readthedocs.io/tutorials/install.html for instructions
!pip install detectron2 -f https://dl.fbaipublicfiles.com/detectron2/wheels/$CUDA_VERSION/tor
# If there is not yet a detectron2 release that matches the given torch + CUDA version, you r
```

Saving...

```
Collecting pyyaml==5.1
  Downloading PyYAML-5.1.tar.gz (274 kB)
     |████████████████████████████████| 274 kB 3.9 MB/s
Building wheels for collected packages: pyyaml
  Building wheel for pyyaml (setup.py) ... done
  Created wheel for pyyaml: filename=PyYAML-5.1-cp37-cp37m-linux_x86_64.whl size=44092
  Stored in directory: /root/.cache/pip/wheels/77/f5/10/d00a2bd30928b972790053b5de0c703
Successfully built pyyaml
Installing collected packages: pyyaml
  Attempting uninstall: pyyaml
    Found existing installation: PyYAML 3.13
    Uninstalling PyYAML-3.13:
      Successfully uninstalled PyYAML-3.13
Successfully installed pyyaml-5.1
torch:  1.10 ; cuda:  cu111
Looking in links: https://dl.fbaipublicfiles.com/detectron2/wheels/cu111/torch1.10/inde
Collecting detectron2
  Downloading https://dl.fbaipublicfiles.com/detectron2/wheels/cu111/torch1.10/detectro
     |████████████████████████████████| 7.0 MB 575 kB/s
Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from
Requirement already satisfied: matplotlib in /usr/local/lib/python3.7/dist-packages (fr
Requirement already satisfied: pydot in /usr/local/lib/python3.7/dist-packages (from de
Collecting black==21.4b2
  Downloading black-21.4b2-py3-none-any.whl (130 kB)
     |████████████████████████████████| 130 kB 4.0 MB/s
Collecting iopath<0.1.10,>=0.1.7
  Downloading iopath-0.1.9-py3-none-any.whl (27 kB)
Collecting portalocker
  Downloading portalocker-2.3.2-py3-none-any.whl (15 kB)
Collecting regex>=2020.1.8
  Downloading regex-2021.11.10-cp37-cp37m-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (74 kB)
     |████████████████████████████████| 74 kB 3.3 MB/s
Requirement already satisfied: tqdm>4.29.0 in /usr/local/lib/python3.7/dist-packages (f
Collecting hydra-core>=1.1
  Downloading hydra_core-1.1.1-py3-none-any.whl (145 kB)
     |████████████████████████████████| 145 kB 18.9 MB/s
Requirement already satisfied: pycocotools>=2.0.2 in /usr/local/lib/python3.7/dist-pack
Requirement already satisfied: tensorboard in /usr/local/lib/python3.7/dist-packages (f
Collecting yacs>=0.1.8
  Downloading yacs-0.1.8-py3-none-any.whl (14 kB)
Collecting fvcore<0.1.6,>=0.1.5
  Downloading fvcore-0.1.5.post20211023.tar.gz (49 kB)
     |████████████████████████████████| 49 kB 6.3 MB/s
Requirement already satisfied: Pillow>=7.1 in /usr/local/lib/python3.7/dist-packages (f
Requirement already satisfied: future in /usr/local/lib/python3.7/dist-packages (from d
Requirement already satisfied: cloudpickle in /usr/local/lib/python3.7/dist-packages (f
Requirement already satisfied: termcolor>=1.1 in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: toml>=0.10.1 in /usr/local/lib/python3.7/dist-packages (
Requirement already satisfied: typing-extensions>=3.7.4 in /usr/local/lib/python3.7/dis
Collecting mypy-extensions>=0.4.3
  Downloading mypy_extensions-0.4.3-py2.py3-none-any.whl (4.5 kB)
Collecting typed-ast>=1.4.2
  Downloading typed_ast-1.5.0-cp37-cp37m-manylinux_2_5_x86_64.manylinux1_x86_64.manylin
     |████████████████████████████████| 843 kB 24.6 MB/s
Collecting pathspec<1,>=0.8.1
  Downloading pathspec-0.9.0-py2.py3-none-any.whl (31 kB)
Requirement already satisfied: appdirs in /usr/local/lib/python3.7/dist-packages (from
Requirement already satisfied: click>=7.1.2 in /usr/local/lib/python3.7/dist-packages (
Collecting regex>=2020.1.8
```

```
  Downloading regex-2021.11.10-cp37-cp37m-manylinux_2_17_x86_64.manylinux2014_x86_64.wh
     |████████████████████████████████| 749 kB 32.2 MB/s
Requirement already satisfied: numpy in /usr/local/lib/python3.7/dist-packages (from fv
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.7/dist-packages (f
Collecting antlr4-python3-runtime==4.8
  Downloading antlr4-python3-runtime-4.8.tar.gz (112 kB)
     |████████████████████████████████| 112 kB 58.1 MB/s
Requirement already satisfied: importlib-resources in /usr/local/lib/python3.7/dist-pac
Collecting portalocker
  Downloading portalocker-2.3.2-py2.py3-none-any.whl (15 kB)
Requirement already satisfied: cython>=0.27.3 in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: setuptools>=18.0 in /usr/local/lib/python3.7/dist-packag
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.7/dist-packages (
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in /usr/local/l
Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.7/dist-packages (from
Requirement already satisfied: zipp>=3.1.0 in /usr/local/lib/python3.7/dist-packages (f
Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.7/dist-packages (
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local/lib/pytho
Requirement already satisfied: protobuf>=3.6.0 in /usr/local/lib/python3.7/dist-package
Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.7/dist-p
Requirement already satisfied: werkzeug>=0.11.15 in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: wheel>=0.26 in /usr/local/lib/python3.7/dist-packages (f
Requirement already satisfied: requests<3,>=2.21.0 in /usr/local/lib/python3.7/dist-pac
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/local/lib/
```

```
import detectron2
```

Saving...

```
setup_logger

# import some common libraries
import numpy as np
import os, json, cv2, random
from google.colab.patches import cv2_imshow

# import some common detectron2 utilities
from detectron2 import model_zoo
from detectron2.engine import DefaultPredictor
from detectron2.config import get_cfg
from detectron2.utils.visualizer import Visualizer
from detectron2.data import MetadataCatalog, DatasetCatalog
from detectron2.evaluation import PascalVOCDetectionEvaluator
```

```
  Building wheel for antlr4-python3-runtime (setup.py) ... done
```

Download the Pascal VOC dataset

```
  Attempting uninstall: regex
```

```
!wget http://host.robots.ox.ac.uk/pascal/VOC/voc2007/VOCtrainval_06-Nov-2007.tar
!tar -xvf VOCtrainval_06-Nov-2007.tar
```

```
VOCdevkit/VOC2007/SegmentationObject/008722.png
VOCdevkit/VOC2007/SegmentationObject/008747.png
VOCdevkit/VOC2007/SegmentationObject/008764.png
VOCdevkit/VOC2007/SegmentationObject/008801.png
VOCdevkit/VOC2007/SegmentationObject/008815.png
```

```
VOCdevkit/VOC2007/SegmentationObject/008927.png
VOCdevkit/VOC2007/SegmentationObject/008932.png
VOCdevkit/VOC2007/SegmentationObject/008944.png
VOCdevkit/VOC2007/SegmentationObject/008948.png
VOCdevkit/VOC2007/SegmentationObject/008973.png
VOCdevkit/VOC2007/SegmentationObject/008980.png
VOCdevkit/VOC2007/SegmentationObject/009015.png
VOCdevkit/VOC2007/SegmentationObject/009068.png
VOCdevkit/VOC2007/SegmentationObject/009209.png
VOCdevkit/VOC2007/SegmentationObject/009221.png
VOCdevkit/VOC2007/SegmentationObject/009245.png
VOCdevkit/VOC2007/SegmentationObject/009251.png
VOCdevkit/VOC2007/SegmentationObject/009252.png
VOCdevkit/VOC2007/SegmentationObject/009295.png
VOCdevkit/VOC2007/SegmentationObject/009323.png

VOCdevkit/VOC2007/SegmentationObject/009327.png
VOCdevkit/VOC2007/SegmentationObject/009331.png
VOCdevkit/VOC2007/SegmentationObject/009348.png
VOCdevkit/VOC2007/SegmentationObject/009392.png
VOCdevkit/VOC2007/SegmentationObject/009413.png
VOCdevkit/VOC2007/SegmentationObject/009419.png
VOCdevkit/VOC2007/SegmentationObject/009422.png
VOCdevkit/VOC2007/SegmentationObject/009446.png
VOCdevkit/VOC2007/SegmentationObject/009458.png
VOCdevkit/VOC2007/SegmentationObject/009464.png
VOCdevkit/VOC2007/SegmentationObject/009527.png
                                    Object/009533.png
                                    Object/009550.png
                                    Object/009562.png
VOCdevkit/VOC2007/SegmentationObject/009580.png
VOCdevkit/VOC2007/SegmentationObject/009597.png
VOCdevkit/VOC2007/SegmentationObject/009605.png
VOCdevkit/VOC2007/SegmentationObject/009618.png
VOCdevkit/VOC2007/SegmentationObject/009649.png
VOCdevkit/VOC2007/SegmentationObject/009654.png
VOCdevkit/VOC2007/SegmentationObject/009655.png
VOCdevkit/VOC2007/SegmentationObject/009684.png
VOCdevkit/VOC2007/SegmentationObject/009687.png
VOCdevkit/VOC2007/SegmentationObject/009691.png
VOCdevkit/VOC2007/SegmentationObject/009706.png
VOCdevkit/VOC2007/SegmentationObject/009709.png
VOCdevkit/VOC2007/SegmentationObject/009724.png
VOCdevkit/VOC2007/SegmentationObject/009756.png
VOCdevkit/VOC2007/SegmentationObject/009764.png
VOCdevkit/VOC2007/SegmentationObject/009794.png
VOCdevkit/VOC2007/SegmentationObject/009807.png
VOCdevkit/VOC2007/SegmentationObject/009832.png
VOCdevkit/VOC2007/SegmentationObject/009841.png
VOCdevkit/VOC2007/SegmentationObject/009897.png
VOCdevkit/VOC2007/SegmentationObject/009911.png
VOCdevkit/VOC2007/SegmentationObject/009923.png
VOCdevkit/VOC2007/SegmentationObject/009938.png
VOCdevkit/VOC2007/SegmentationObject/009947.png
VOCdevkit/VOC2007/SegmentationObject/009950.png
```

Change the name of the directory

```
!mv VOCdevkit datasets
```

Train the model(fine-tune)

Here we fine tune the faste RCNN_R_50_FPN_3x model on Pascal VOC DATASET. We initialize the pre-trained weights with model_zoo.get_checkpoint_url. We set the iterations to be 3000 and batch size=128. There are 2501 images spread acroos 20 class categories.

```
from detectron2.engine import DefaultTrainer

cfg = get_cfg()
cfg.merge_from_file(model_zoo.get_config_file("COCO-Detection/faster_rcnn_R_50_FPN_3x.yaml"))
cfg.OUTPUT_DIR = 'MyVOCTraining'
cfg.DATASETS.TRAIN = ("voc_2007_train",)
cfg.DATASETS.TEST = ()
cfg.DATALOADER.NUM_WORKERS = 1
                              heckpoint_url("COCO-Detection/faster_rcnn_R_50_FPN_3x.yaml
cfg.SOLVER.BASE_LR = 0.00025 # pick a good LR
cfg.SOLVER.MAX_ITER = 3000
cfg.MODEL.ROI_HEADS.BATCH_SIZE_PER_IMAGE = 128
cfg.MODEL.ROI_HEADS.NUM_CLASSES = 20

os.makedirs(cfg.OUTPUT_DIR, exist_ok=True)
trainer = DefaultTrainer(cfg)
trainer.resume_or_load(resume=False)
trainer.train()
```

```
[11/18 06:37:46 d2.utils.events]:  eta: 0:10:35  iter: 1919  total_loss: 0.7112  los
[11/18 06:37:57 d2.utils.events]:  eta: 0:10:22  iter: 1939  total_loss: 0.7895  los
[11/18 06:38:09 d2.utils.events]:  eta: 0:10:11  iter: 1959  total_loss: 0.5811  los
[11/18 06:38:21 d2.utils.events]:  eta: 0:09:59  iter: 1979  total_loss: 0.6208  los
[11/18 06:38:33 d2.utils.events]:  eta: 0:09:47  iter: 1999  total_loss: 0.7151  los
[11/18 06:38:44 d2.utils.events]:  eta: 0:09:35  iter: 2019  total_loss: 0.6365  los
[11/18 06:38:56 d2.utils.events]:  eta: 0:09:24  iter: 2039  total_loss: 0.698  loss
[11/18 06:39:08 d2.utils.events]:  eta: 0:09:13  iter: 2059  total_loss: 0.6405  los
[11/18 06:39:20 d2.utils.events]:  eta: 0:09:01  iter: 2079  total_loss: 0.5423  los
[11/18 06:39:32 d2.utils.events]:  eta: 0:08:49  iter: 2099  total_loss: 0.687  loss
[11/18 06:39:44 d2.utils.events]:  eta: 0:08:37  iter: 2119  total_loss: 0.5238  los
[11/18 06:39:56 d2.utils.events]:  eta: 0:08:26  iter: 2139  total_loss: 0.6449  los
[11/18 06:40:08 d2.utils.events]:  eta: 0:08:15  iter: 2159  total_loss: 0.6209  los
[11/18 06:40:20 d2.utils.events]:  eta: 0:08:03  iter: 2179  total_loss: 0.3862  los
[11/18 06:40:32 d2.utils.events]:  eta: 0:07:51  iter: 2199  total_loss: 0.6152  los
[11/18 06:40:44 d2.utils.events]:  eta: 0:07:38  iter: 2219  total_loss: 0.797  loss
[11/18 06:40:55 d2.utils.events]:  eta: 0:07:25  iter: 2239  total_loss: 0.6151  los
```

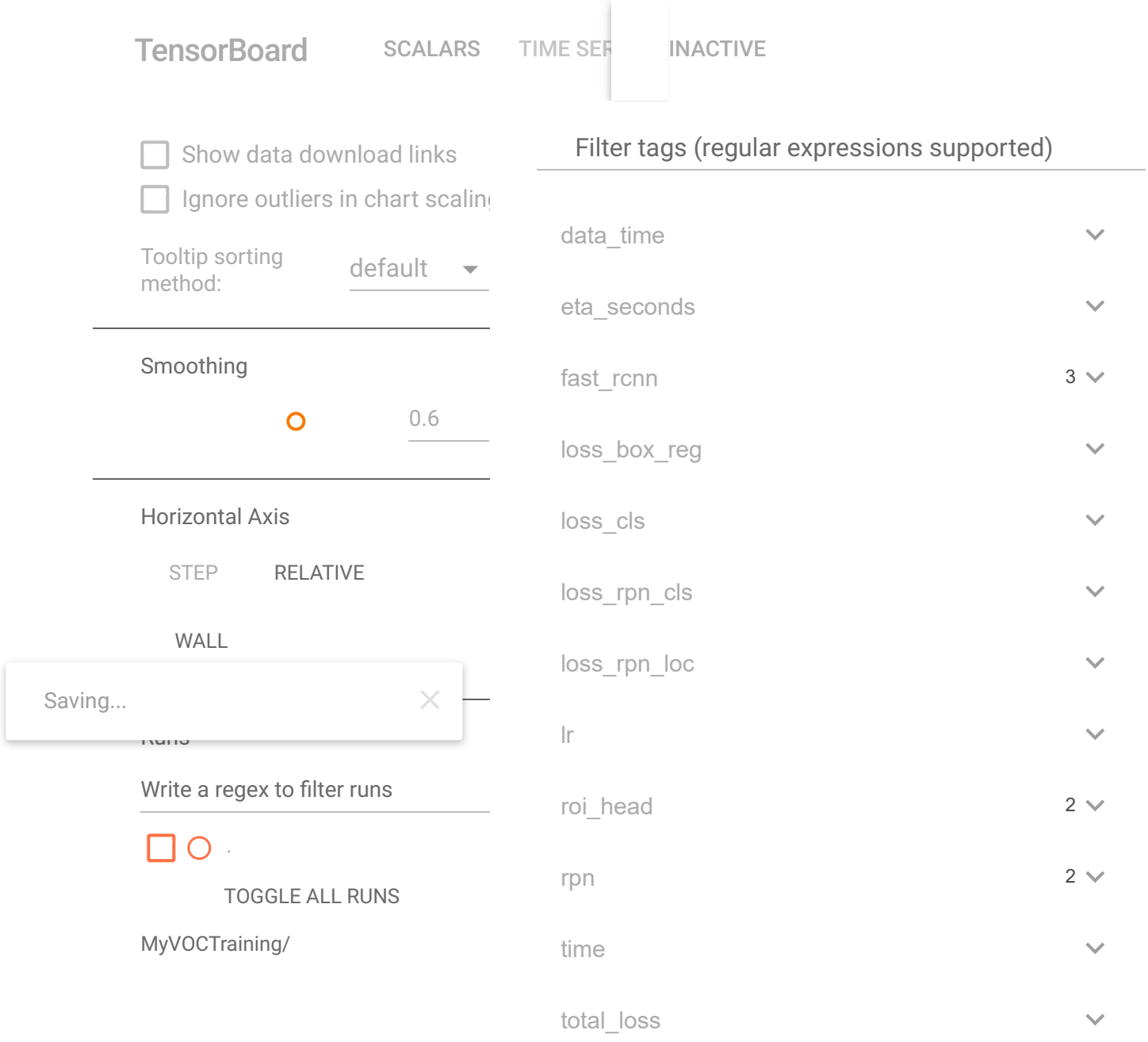
```
[11/18 06:41:07 d2.utils.events]:  eta: 0:07:12  iter: 2259  total_loss: 0.6083  los
[11/18 06:41:19 d2.utils.events]:  eta: 0:07:02  iter: 2279  total_loss: 0.6301  los
[11/18 06:41:31 d2.utils.events]:  eta: 0:06:49  iter: 2299  total_loss: 0.708  loss
[11/18 06:41:42 d2.utils.events]:  eta: 0:06:36  iter: 2319  total_loss: 0.5252  los
[11/18 06:41:54 d2.utils.events]:  eta: 0:06:25  iter: 2339  total_loss: 0.5639  los
[11/18 06:42:07 d2.utils.events]:  eta: 0:06:13  iter: 2359  total_loss: 0.5079  los
[11/18 06:42:19 d2.utils.events]:  eta: 0:06:03  iter: 2379  total_loss: 0.6573  los
[11/18 06:42:31 d2.utils.events]:  eta: 0:05:51  iter: 2399  total_loss: 0.5649  los
[11/18 06:42:42 d2.utils.events]:  eta: 0:05:39  iter: 2419  total_loss: 0.6078  los
[11/18 06:42:54 d2.utils.events]:  eta: 0:05:28  iter: 2439  total_loss: 0.4373  los
[11/18 06:43:05 d2.utils.events]:  eta: 0:05:16  iter: 2459  total_loss: 0.6313  los
[11/18 06:43:16 d2.utils.events]:  eta: 0:05:03  iter: 2479  total_loss: 0.7464  los
[11/18 06:43:28 d2.utils.events]:  eta: 0:04:53  iter: 2499  total_loss: 0.4901  los
[11/18 06:43:39 d2.utils.events]:  eta: 0:04:41  iter: 2519  total_loss: 0.6166  los
[11/18 06:43:51 d2.utils.events]:  eta: 0:04:29  iter: 2539  total_loss: 0.5616  los
[11/18 06:44:03 d2.utils.events]:  eta: 0:04:18  iter: 2559  total_loss: 0.4983  los
[11/18 06:44:14 d2.utils.events]:  eta: 0:04:06  iter: 2579  total_loss: 0.6512  los
[11/18 06:44:26 d2.utils.events]:  eta: 0:03:55  iter: 2599  total_loss: 0.5212  los
[11/18 06:44:38 d2.utils.events]:  eta: 0:03:43  iter: 2619  total_loss: 0.3897  los
[11/18 06:44:50 d2.utils.events]:  eta: 0:03:31  iter: 2639  total_loss: 0.5705  los
[11/18 06:45:02 d2.utils.events]:  eta: 0:03:19  iter: 2659  total_loss: 0.5146  los
[11/18 06:45:13 d2.utils.events]:  eta: 0:03:06  iter: 2679  total_loss: 0.7561  los
[11/18 06:45:25 d2.utils.events]:  eta: 0:02:55  iter: 2699  total_loss: 0.7156  los
[11/18 06:45:36 d2.utils.events]:  eta: 0:02:43  iter: 2719  total_loss: 0.6985  los
[11/18 06:45:48 d2.utils.events]:  eta: 0:02:31  iter: 2739  total_loss: 0.3467  los
[11/18 06:46:00 d2.utils.events]:  eta: 0:02:20  iter: 2759  total_loss: 0.3687  los
[11/18 06:46:12 d2.utils.events]:  eta: 0:02:08  iter: 2779  total_loss: 0.4156  los
[11/18 06:46:24 d2.utils.events]:  eta: 0:01:56  iter: 2799  total_loss: 0.5704  los
[11/18 06:46:35 d2.utils.events]:  eta: 0:01:45  iter: 2819  total_loss: 0.4447  los
[11/18 06:46:47 d2.utils.events]:  eta: 0:01:33  iter: 2839  total_loss: 0.4934  los
[11/18 06:46:59 d2.utils.events]:  eta: 0:01:22  iter: 2859  total_loss: 0.5397  los
[11/18 06:47:11 d2.utils.events]:  eta: 0:01:10  iter: 2879  total_loss: 0.533  loss
[11/18 06:47:23 d2.utils.events]:  eta: 0:00:58  iter: 2899  total_loss: 0.4431  los
[11/18 06:47:35 d2.utils.events]:  eta: 0:00:46  iter: 2919  total_loss: 0.4875  los
[11/18 06:47:46 d2.utils.events]:  eta: 0:00:35  iter: 2939  total_loss: 0.5706  los
[11/18 06:47:57 d2.utils.events]:  eta: 0:00:23  iter: 2959  total_loss: 0.5635  los
[11/18 06:48:08 d2.utils.events]:  eta: 0:00:11  iter: 2979  total_loss: 0.568  loss
[11/18 06:48:21 d2.utils.events]:  eta: 0:00:00  iter: 2999  total_loss: 0.667  loss
[11/18 06:48:24 d2.engine.hooks]: Overall training speed: 2998 iterations in 0:29:16
[11/18 06:48:24 d2.engine.hooks]: Total training time: 0:29:22 (0:00:05 on hooks)
```

Saving...

Display the Quantitative results using TensorBoard

```
# Look at training curves in tensorboard:
%reload_ext tensorboard
%tensorboard --logdir MyVOCTraining/
```

```
The tensorboard extension is already loaded. To reload it, use:
  %reload_ext tensorboard
```



Evaluation

We load our trained model and define our predictor function (something like a forward pass with torch_no_grad). I have kept the the threshold value to be 0.7 for displaying prediction with confidence greater than 70%.

```
# Inference should use the config with parameters that are used in training
```

```
# cfg now already contains everything we've set previously. We changed it a little bit for ir
cfg.MODEL.WEIGHTS = os.path.join(cfg.OUTPUT_DIR, "model_final.pth")  # path to the model we j
cfg.MODEL.ROI_HEADS.SCORE_THRESH_TEST = 0.7   # set a custom testing threshold
predictor = DefaultPredictor(cfg)
```

Evaluation

We forward pass the test dataset through our trained model and print the inference report. We achieve Average Precision50 score of 67.16159.

```
from detectron2.evaluation import PascalVOCDetectionEvaluator, inference_on_dataset
from detectron2.data import build_detection_test_loader
evaluator = PascalVOCDetectionEvaluator("voc_2007_val")
val_loader = build_detection_test_loader(cfg, "voc_2007_val")
print(inference_on_dataset(predictor.model, val_loader, evaluator))
```

```
[11/18 07:29:16 d2.evaluation.evaluator]: Inference done 1606/2510. Dataloading: 0.0
[11/18 07:29:21 d2.evaluation.evaluator]: Inference done 1621/2510. Dataloading: 0.0
[11/18 07:29:26 d2.evaluation.evaluator]: Inference done 1636/2510. Dataloading: 0.0
[11/18 07:29:31 d2.evaluation.evaluator]: Inference done 1651/2510. Dataloading: 0.0
[11/18 07:29:36 d2.evaluation.evaluator]: Inference done 1666/2510. Dataloading: 0.0
[11/18 07:29:41 d2.evaluation.evaluator]: Inference done 1682/2510. Dataloading: 0.0
[11/18 07:29:46 d2.evaluation.evaluator]: Inference done 1698/2510. Dataloading: 0.0
[11/18 07:29:52 d2.evaluation.evaluator]: Inference done 1714/2510. Dataloading: 0.0
[11/18 07:29:57 d2.evaluation.evaluator]: Inference done 1729/2510. Dataloading: 0.0
[11/18 07:30:02 d2.evaluation.evaluator]: Inference done 1744/2510. Dataloading: 0.0
[11/18 07:30:07 d2.evaluation.evaluator]: Inference done 1759/2510. Dataloading: 0.0
[11/18 07:30:13 d2.evaluation.evaluator]: Inference done 1775/2510. Dataloading: 0.0
[11/18 07:30:18 d2.evaluation.evaluator]: Inference done 1790/2510. Dataloading: 0.0
[11/18 07:30:23 d2.evaluation.evaluator]: Inference done 1805/2510. Dataloading: 0.0
[11/18 07:30:28 d2.evaluation.evaluator]: Inference done 1820/2510. Dataloading: 0.0
[11/18 07:30:33 d2.evaluation.evaluator]: Inference done 1835/2510. Dataloading: 0.0
[11/18 07:30:38 d2.evaluation.evaluator]: Inference done 1851/2510. Dataloading: 0.0
[11/18 07:30:43 d2.evaluation.evaluator]: Inference done 1866/2510. Dataloading: 0.0
[11/18 07:30:48 d2.evaluation.evaluator]: Inference done 1881/2510. Dataloading: 0.0
[11/18 07:30:53 d2.evaluation.evaluator]: Inference done 1896/2510. Dataloading: 0.0
[11/18 07:30:59 d2.evaluation.evaluator]: Inference done 1912/2510. Dataloading: 0.0
[11/18 07:31:04 d2.evaluation.evaluator]: Inference done 1928/2510. Dataloading: 0.0
[11/18 07:31:09 d2.evaluation.evaluator]: Inference done 1943/2510. Dataloading: 0.0
[11/18 07:31:14 d2.evaluation.evaluator]: Inference done 1958/2510. Dataloading: 0.0
[11/18 07:31:19 d2.evaluation.evaluator]: Inference done 1973/2510. Dataloading: 0.0
[11/18 07:31:24 d2.evaluation.evaluator]: Inference done 1988/2510. Dataloading: 0.0
[11/18 07:31:30 d2.evaluation.evaluator]: Inference done 2004/2510. Dataloading: 0.0
[11/18 07:31:35 d2.evaluation.evaluator]: Inference done 2019/2510. Dataloading: 0.0
[11/18 07:31:40 d2.evaluation.evaluator]: Inference done 2035/2510. Dataloading: 0.0
[11/18 07:31:45 d2.evaluation.evaluator]: Inference done 2050/2510. Dataloading: 0.0
[11/18 07:31:50 d2.evaluation.evaluator]: Inference done 2065/2510. Dataloading: 0.0
[11/18 07:31:55 d2.evaluation.evaluator]: Inference done 2080/2510. Dataloading: 0.0
[11/18 07:32:00 d2.evaluation.evaluator]: Inference done 2095/2510. Dataloading: 0.0
[11/18 07:32:05 d2.evaluation.evaluator]: Inference done 2110/2510. Dataloading: 0.0
[11/18 07:32:10 d2.evaluation.evaluator]: Inference done 2126/2510. Dataloading: 0.0
```

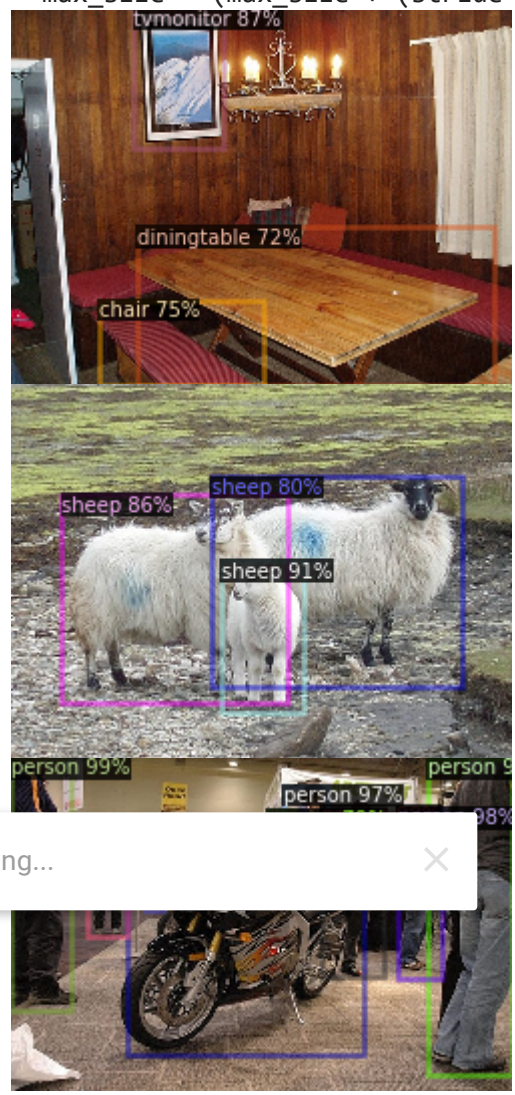
```
[11/18 07:32:16 d2.evaluation.evaluator]: Inference done 2142/2510. Dataloading: 0.0
[11/18 07:32:21 d2.evaluation.evaluator]: Inference done 2158/2510. Dataloading: 0.0
[11/18 07:32:26 d2.evaluation.evaluator]: Inference done 2174/2510. Dataloading: 0.0
[11/18 07:32:31 d2.evaluation.evaluator]: Inference done 2189/2510. Dataloading: 0.0

[11/18 07:32:37 d2.evaluation.evaluator]: Inference done 2205/2510. Dataloading: 0.0
[11/18 07:32:42 d2.evaluation.evaluator]: Inference done 2220/2510. Dataloading: 0.0
[11/18 07:32:47 d2.evaluation.evaluator]: Inference done 2236/2510. Dataloading: 0.0
[11/18 07:32:52 d2.evaluation.evaluator]: Inference done 2252/2510. Dataloading: 0.0
[11/18 07:32:57 d2.evaluation.evaluator]: Inference done 2268/2510. Dataloading: 0.0
[11/18 07:33:02 d2.evaluation.evaluator]: Inference done 2283/2510. Dataloading: 0.0
[11/18 07:33:08 d2.evaluation.evaluator]: Inference done 2299/2510. Dataloading: 0.0
[11/18 07:33:13 d2.evaluation.evaluator]: Inference done 2315/2510. Dataloading: 0.0
[11/18 07:33:18 d2.evaluation.evaluator]: Inference done 2330/2510. Dataloading: 0.0
[11/18 07:33:23 d2.evaluation.evaluator]: Inference done 2346/2510. Dataloading: 0.0
[11/18 07:33:28 d2.evaluation.evaluator]: Inference done 2361/2510. Dataloading: 0.0
[11/18 07:33:33 d2.evaluation.evaluator]: Inference done 2376/2510. Dataloading: 0.0
[11/18 07:33:38 d2.evaluation.evaluator]: Inference done 2391/2510. Dataloading: 0.0
[11/18 07:33:44 d2.evaluation.evaluator]: Inference done 2407/2510. Dataloading: 0.0
[11/18 07:33:49 d2.evaluation.evaluator]: Inference done 2422/2510. Dataloading: 0.0
[11/18 07:33:54 d2.evaluation.evaluator]: Inference done 2438/2510. Dataloading: 0.0
[11/18 07:33:59 d2.evaluation.evaluator]: Inference done 2454/2510. Dataloading: 0.0
[11/18 07:34:04 d2.evaluation.evaluator]: Inference done 2469/2510. Dataloading: 0.0
[11/18 07:34:09 d2.evaluation.evaluator]: Inference done 2484/2510. Dataloading: 0.0
```

Saving...

We now display few images and predictions of objects in each image as per our trained model.

```
dataset_dicts = detectron2.data.get_detection_dataset_dicts('voc_2007_val')
for d in random.sample(dataset_dicts, 3):
    im = cv2.imread(d["file_name"])
    outputs = predictor(im)  # format is documented at https://detectron2.readthedocs.io/tutc
    v = Visualizer(im[:, :, ::-1],
                   detectron2.data.MetadataCatalog.get('voc_2007_val'),
                   scale=0.5,
                   )
    out = v.draw_instance_predictions(outputs["instances"].to("cpu"))
    cv2_imshow(out.get_image()[:, :, ::-1])
```

```
[11/18 08:54:22 d2.data.build]: Removed 0 images with no usable annotations. 2510 image
/usr/local/lib/python3.7/dist-packages/detectron2/structures/image_list.py:88: UserWarn
  max_size = (max_size + (stride - 1)) // stride * stride
```



Saving...

✓ 3s completed at 12:54 AM