

```
!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
```

```

Collecting pyyaml==5.1
  Downloading PyYAML-5.1.tar.gz (274 kB)
    |████████████████████████████████████████| 274 kB 5.2 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/index.html
Collecting detectron2
  Downloading https://dl.fbaipublicfiles.com/detectron2/wheels/cu111/torch1.10/detectron2-0.1.1-cp37-cp37m-linux\_x86\_64.whl
    |████████████████████████████████████████| 7.0 MB 863 kB/s
Collecting yacs>=0.1.8
  Downloading yacs-0.1.8-py3-none-any.whl (14 kB)
Collecting black==21.4b2
  Downloading black-21.4b2-py3-none-any.whl (130 kB)
    |████████████████████████████████████████| 130 kB 5.3 MB/s
Requirement already satisfied: pydot in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: future in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: termcolor>=1.1 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: pycocotools>=2.0.2 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: tqdm>4.29.0 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting omegaconf>=2.1
  Downloading omegaconf-2.1.1-py3-none-any.whl (74 kB)
    |████████████████████████████████████████| 74 kB 3.0 MB/s
Requirement already satisfied: tensorboard in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting hydra-core>=1.1
  Downloading hydra_core-1.1.1-py3-none-any.whl (145 kB)
    |████████████████████████████████████████| 145 kB 41.5 MB/s
Requirement already satisfied: cloudpickle in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting fvcore<0.1.6,>=0.1.5
  Downloading fvcore-0.1.5.post20211023.tar.gz (49 kB)
    |████████████████████████████████████████| 49 kB 5.5 MB/s
Requirement already satisfied: Pillow>=7.1 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting iopath<0.1.10,>=0.1.7
  Downloading iopath-0.1.9-py3-none-any.whl (27 kB)
Requirement already satisfied: appdirs in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting pathspec<1,>=0.8.1
  Downloading pathspec-0.9.0-py2.py3-none-any.whl (31 kB)
Requirement already satisfied: toml>=0.10.1 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting mpy-extensions>=0.4.3
  Downloading mpy_extensions-0.4.3-py2.py3-none-any.whl (4.5 kB)
Collecting regex>=2020.1.8
  Downloading regex-2021.11.10-cp37-cp37m-manylinux_2_17_x86_64.manylinux2014_x86_64.whl
    |████████████████████████████████████████| 749 kB 41.2 MB/s
Requirement already satisfied: typing-extensions>=3.7.4 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Requirement already satisfied: click>=7.1.2 in /usr/local/lib/python3.7/dist-packages (from detectron2)
Collecting typed-ast>=1.4.2

```



```
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
VOCdevkit/VOC2007/SegmentationObject/009533.png
VOCdevkit/VOC2007/SegmentationObject/009550.png
VOCdevkit/VOC2007/SegmentationObject/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
```

```
!mv VOCdevkit datasets
```

Train model merge_from_file --> Choose model architecture (Retinanet)

Datasets.TRAIN ---> Training dataset (Pascal VOC)

model_zoo.get_checkpoint_url---> Weights initialization from pre-trained network

SOLVER.BASE_LR ---> learning rate

SOLVER.MAX_ITER ---> number of iterations

MODEL.RETINANET.BATCH_SIZE_PER_IMAGE ---> Batch_size

trainer.train() ---> start the training (Fine tuning the network)

```
from detectron2.engine import DefaultTrainer
```

```
cfg = get_cfg()
cfg.merge_from_file(model_zoo.get_config_file("COCO-Detection/retinanet_R_50_FPN_3x.yaml"))
cfg.OUTPUT_DIR = 'MyVOCTraining'
cfg.DATASETS.TRAIN = ("voc_2007_train",)
cfg.DATASETS.TEST = ()
cfg.DATALOADER.NUM_WORKERS = 1
cfg.MODEL.WEIGHTS = model_zoo.get_checkpoint_url("COCO-Detection/retinanet_R_50_FPN_3x.yaml")
cfg.SOLVER.IMS_PER_BATCH = 1
cfg.SOLVER.BASE_LR = 0.00025 # pick a good LR
cfg.SOLVER.MAX_ITER = 3000
cfg.MODEL.RETINANET.BATCH_SIZE_PER_IMAGE = 128
cfg.MODEL.RETINANET.NUM_CLASSES = 20
```

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

```
[11/19 08:38:30 d2.utils.events]: eta: 0:12:45 iter: 1919 total_loss: 0.2129 loss
[11/19 08:38:44 d2.utils.events]: eta: 0:12:31 iter: 1939 total_loss: 0.2919 loss
[11/19 08:38:58 d2.utils.events]: eta: 0:12:17 iter: 1959 total_loss: 0.2379 loss
[11/19 08:39:12 d2.utils.events]: eta: 0:12:03 iter: 1979 total_loss: 0.2658 loss
[11/19 08:39:27 d2.utils.events]: eta: 0:11:49 iter: 1999 total_loss: 0.3016 loss
[11/19 08:39:41 d2.utils.events]: eta: 0:11:36 iter: 2019 total_loss: 0.2641 loss
[11/19 08:39:55 d2.utils.events]: eta: 0:11:21 iter: 2039 total_loss: 0.2338 loss
[11/19 08:40:08 d2.utils.events]: eta: 0:11:06 iter: 2059 total_loss: 0.2993 loss
[11/19 08:40:22 d2.utils.events]: eta: 0:10:53 iter: 2079 total_loss: 0.3463 loss
[11/19 08:40:36 d2.utils.events]: eta: 0:10:38 iter: 2099 total_loss: 0.3529 loss
[11/19 08:40:50 d2.utils.events]: eta: 0:10:22 iter: 2119 total_loss: 0.3833 loss
[11/19 08:41:04 d2.utils.events]: eta: 0:10:08 iter: 2139 total_loss: 0.2403 loss
[11/19 08:41:17 d2.utils.events]: eta: 0:09:53 iter: 2159 total_loss: 0.2012 loss
[11/19 08:41:31 d2.utils.events]: eta: 0:09:38 iter: 2179 total_loss: 0.2124 loss
[11/19 08:41:45 d2.utils.events]: eta: 0:09:23 iter: 2199 total_loss: 0.2053 loss
[11/19 08:41:58 d2.utils.events]: eta: 0:09:08 iter: 2219 total_loss: 0.241 loss
[11/19 08:42:11 d2.utils.events]: eta: 0:08:53 iter: 2239 total_loss: 0.2612 loss
[11/19 08:42:25 d2.utils.events]: eta: 0:08:39 iter: 2259 total_loss: 0.5605 loss
[11/19 08:42:39 d2.utils.events]: eta: 0:08:25 iter: 2279 total_loss: 0.1792 loss
[11/19 08:42:54 d2.utils.events]: eta: 0:08:11 iter: 2299 total_loss: 0.3125 loss
[11/19 08:43:08 d2.utils.events]: eta: 0:07:57 iter: 2319 total_loss: 0.3405 loss
[11/19 08:43:21 d2.utils.events]: eta: 0:07:43 iter: 2339 total_loss: 0.2876 loss
[11/19 08:43:35 d2.utils.events]: eta: 0:07:30 iter: 2359 total_loss: 0.3215 loss
[11/19 08:43:48 d2.utils.events]: eta: 0:07:15 iter: 2379 total_loss: 0.2784 loss
[11/19 08:44:02 d2.utils.events]: eta: 0:07:01 iter: 2399 total_loss: 0.4394 loss
[11/19 08:44:16 d2.utils.events]: eta: 0:06:47 iter: 2419 total_loss: 0.3345 loss
[11/19 08:44:30 d2.utils.events]: eta: 0:06:33 iter: 2439 total loss: 0.2747 loss
```

```

[11/19 08:44:43 d2.utils.events]: eta: 0:06:19 iter: 2459 total_loss: 0.3667 loss
[11/19 08:44:57 d2.utils.events]: eta: 0:06:05 iter: 2479 total_loss: 0.3027 loss
[11/19 08:45:11 d2.utils.events]: eta: 0:05:51 iter: 2499 total_loss: 0.2614 loss
[11/19 08:45:25 d2.utils.events]: eta: 0:05:37 iter: 2519 total_loss: 0.2301 loss
[11/19 08:45:39 d2.utils.events]: eta: 0:05:23 iter: 2539 total_loss: 0.1822 loss
[11/19 08:45:53 d2.utils.events]: eta: 0:05:09 iter: 2559 total_loss: 0.3974 loss
[11/19 08:46:06 d2.utils.events]: eta: 0:04:54 iter: 2579 total_loss: 0.2343 loss
[11/19 08:46:20 d2.utils.events]: eta: 0:04:40 iter: 2599 total_loss: 0.3002 loss
[11/19 08:46:34 d2.utils.events]: eta: 0:04:26 iter: 2619 total_loss: 0.2722 loss
[11/19 08:46:48 d2.utils.events]: eta: 0:04:12 iter: 2639 total_loss: 0.2824 loss
[11/19 08:47:02 d2.utils.events]: eta: 0:03:58 iter: 2659 total_loss: 0.2455 loss
[11/19 08:47:16 d2.utils.events]: eta: 0:03:44 iter: 2679 total_loss: 0.2653 loss
[11/19 08:47:31 d2.utils.events]: eta: 0:03:30 iter: 2699 total_loss: 0.3187 loss
[11/19 08:47:44 d2.utils.events]: eta: 0:03:16 iter: 2719 total_loss: 0.2147 loss
[11/19 08:47:58 d2.utils.events]: eta: 0:03:02 iter: 2739 total_loss: 0.1824 loss
[11/19 08:48:12 d2.utils.events]: eta: 0:02:48 iter: 2759 total_loss: 0.2686 loss
[11/19 08:48:26 d2.utils.events]: eta: 0:02:34 iter: 2779 total_loss: 0.2997 loss
[11/19 08:48:40 d2.utils.events]: eta: 0:02:20 iter: 2799 total_loss: 0.3184 loss
[11/19 08:48:54 d2.utils.events]: eta: 0:02:06 iter: 2819 total_loss: 0.1596 loss
[11/19 08:49:08 d2.utils.events]: eta: 0:01:52 iter: 2839 total_loss: 0.1926 loss
[11/19 08:49:22 d2.utils.events]: eta: 0:01:38 iter: 2859 total_loss: 0.1622 loss
[11/19 08:49:35 d2.utils.events]: eta: 0:01:24 iter: 2879 total_loss: 0.2785 loss
[11/19 08:49:50 d2.utils.events]: eta: 0:01:10 iter: 2899 total_loss: 0.2378 loss
[11/19 08:50:03 d2.utils.events]: eta: 0:00:56 iter: 2919 total_loss: 0.379 loss
[11/19 08:50:17 d2.utils.events]: eta: 0:00:42 iter: 2939 total_loss: 0.168 loss
[11/19 08:50:31 d2.utils.events]: eta: 0:00:28 iter: 2959 total_loss: 0.2576 loss
[11/19 08:50:45 d2.utils.events]: eta: 0:00:14 iter: 2979 total_loss: 0.2265 loss
[11/19 08:50:59 d2.utils.events]: eta: 0:00:00 iter: 2999 total_loss: 0.3146 loss
[11/19 08:51:00 d2.engine.hooks]: Overall training speed: 2998 iterations in 0:34:56
[11/19 08:51:00 d2.engine.hooks]: Total training time: 0:34:59 (0:00:03 on hooks)

```

```

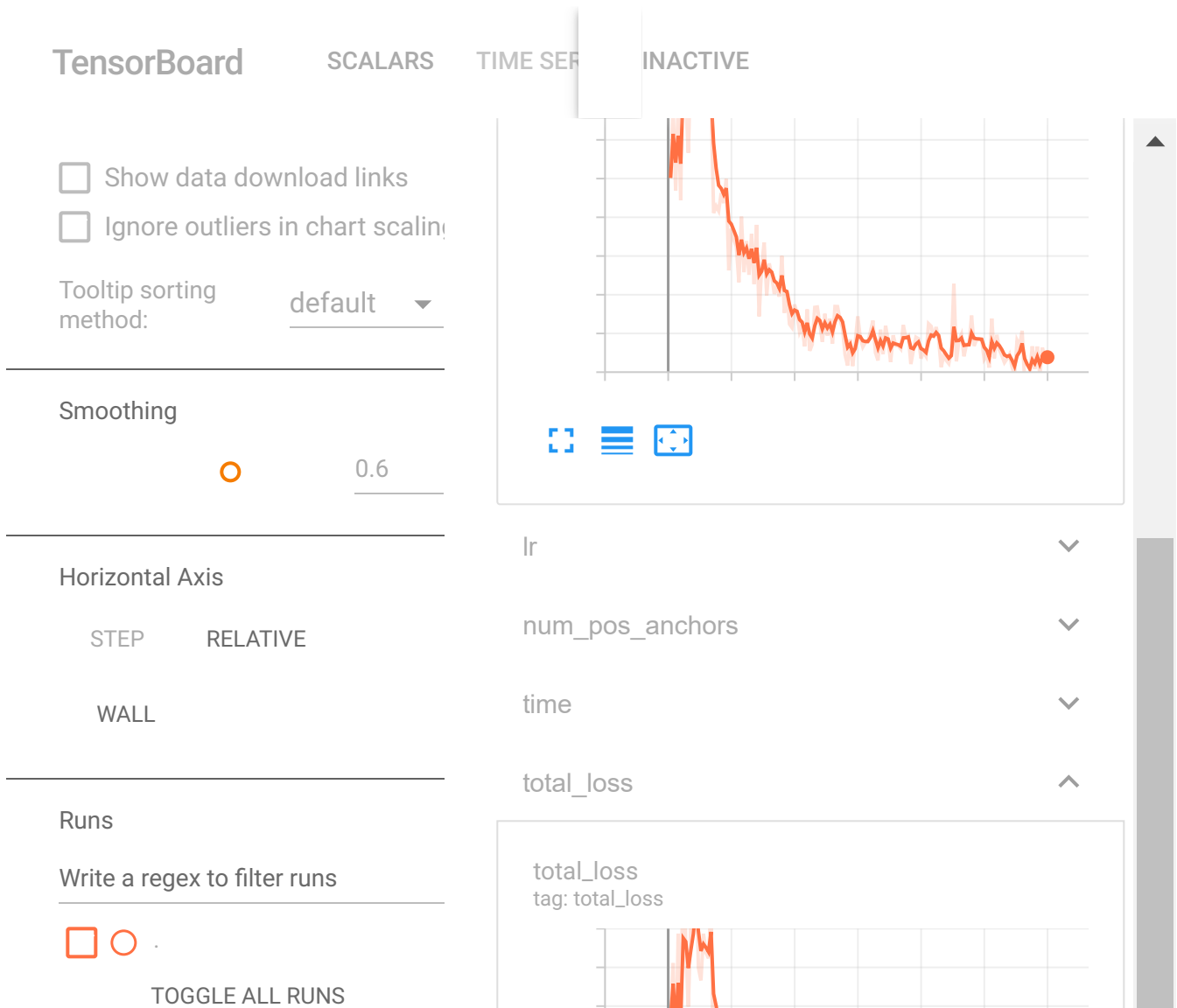
import torch
torch.save(trainer.model.state_dict(), os.path.join("/content/drive/MyDrive/CSCI/", "mymodel_
#model = torch.load("MyCustom/path/mymodel.pth")

```

```

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

```



```
# 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.RETINANET.SCORE_THRESH_TEST=0.5 # set a custom testing threshold
predictor = DefaultPredictor(cfg)
```

▼ Evaluation

Run the evaluation on validation (test) dataset and report the scoring metric. We are interested in AP50 score.

```
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))
```



```
[11/19 09:04:13 d2.evaluation.evaluator]: Inference done 1724/2510. Dataloading: 0.0 ▲
[11/19 09:04:18 d2.evaluation.evaluator]: Inference done 1739/2510. Dataloading: 0.0
[11/19 09:04:23 d2.evaluation.evaluator]: Inference done 1753/2510. Dataloading: 0.0
[11/19 09:04:29 d2.evaluation.evaluator]: Inference done 1768/2510. Dataloading: 0.0
[11/19 09:04:34 d2.evaluation.evaluator]: Inference done 1783/2510. Dataloading: 0.0
[11/19 09:04:44 d2.evaluation.evaluator]: Inference done 1813/2510. Dataloading: 0.0
[11/19 09:04:49 d2.evaluation.evaluator]: Inference done 1827/2510. Dataloading: 0.0
[11/19 09:04:55 d2.evaluation.evaluator]: Inference done 1842/2510. Dataloading: 0.0
[11/19 09:05:00 d2.evaluation.evaluator]: Inference done 1857/2510. Dataloading: 0.0
[11/19 09:05:05 d2.evaluation.evaluator]: Inference done 1872/2510. Dataloading: 0.0
[11/19 09:05:10 d2.evaluation.evaluator]: Inference done 1886/2510. Dataloading: 0.0
[11/19 09:05:15 d2.evaluation.evaluator]: Inference done 1900/2510. Dataloading: 0.0
[11/19 09:05:20 d2.evaluation.evaluator]: Inference done 1915/2510. Dataloading: 0.0
[11/19 09:05:26 d2.evaluation.evaluator]: Inference done 1930/2510. Dataloading: 0.0
[11/19 09:05:31 d2.evaluation.evaluator]: Inference done 1944/2510. Dataloading: 0.0
[11/19 09:05:36 d2.evaluation.evaluator]: Inference done 1959/2510. Dataloading: 0.0
[11/19 09:05:41 d2.evaluation.evaluator]: Inference done 1974/2510. Dataloading: 0.0
[11/19 09:05:46 d2.evaluation.evaluator]: Inference done 1989/2510. Dataloading: 0.0
[11/19 09:05:52 d2.evaluation.evaluator]: Inference done 2004/2510. Dataloading: 0.0
[11/19 09:05:57 d2.evaluation.evaluator]: Inference done 2019/2510. Dataloading: 0.0
[11/19 09:06:02 d2.evaluation.evaluator]: Inference done 2034/2510. Dataloading: 0.0
[11/19 09:06:07 d2.evaluation.evaluator]: Inference done 2049/2510. Dataloading: 0.0
[11/19 09:06:13 d2.evaluation.evaluator]: Inference done 2064/2510. Dataloading: 0.0
[11/19 09:06:18 d2.evaluation.evaluator]: Inference done 2079/2510. Dataloading: 0.0
[11/19 09:06:23 d2.evaluation.evaluator]: Inference done 2094/2510. Dataloading: 0.0
[11/19 09:06:28 d2.evaluation.evaluator]: Inference done 2108/2510. Dataloading: 0.0
[11/19 09:06:33 d2.evaluation.evaluator]: Inference done 2123/2510. Dataloading: 0.0
[11/19 09:06:38 d2.evaluation.evaluator]: Inference done 2137/2510. Dataloading: 0.0
[11/19 09:06:44 d2.evaluation.evaluator]: Inference done 2152/2510. Dataloading: 0.0
[11/19 09:06:49 d2.evaluation.evaluator]: Inference done 2167/2510. Dataloading: 0.0
[11/19 09:06:54 d2.evaluation.evaluator]: Inference done 2182/2510. Dataloading: 0.0
[11/19 09:06:59 d2.evaluation.evaluator]: Inference done 2196/2510. Dataloading: 0.0
[11/19 09:07:04 d2.evaluation.evaluator]: Inference done 2210/2510. Dataloading: 0.0
[11/19 09:07:09 d2.evaluation.evaluator]: Inference done 2225/2510. Dataloading: 0.0
[11/19 09:07:14 d2.evaluation.evaluator]: Inference done 2240/2510. Dataloading: 0.0
[11/19 09:07:20 d2.evaluation.evaluator]: Inference done 2255/2510. Dataloading: 0.0
[11/19 09:07:25 d2.evaluation.evaluator]: Inference done 2270/2510. Dataloading: 0.0
[11/19 09:07:30 d2.evaluation.evaluator]: Inference done 2285/2510. Dataloading: 0.0
[11/19 09:07:35 d2.evaluation.evaluator]: Inference done 2300/2510. Dataloading: 0.0

[11/19 09:07:41 d2.evaluation.evaluator]: Inference done 2315/2510. Dataloading: 0.0
[11/19 09:07:46 d2.evaluation.evaluator]: Inference done 2330/2510. Dataloading: 0.0
[11/19 09:07:51 d2.evaluation.evaluator]: Inference done 2345/2510. Dataloading: 0.0
[11/19 09:07:56 d2.evaluation.evaluator]: Inference done 2360/2510. Dataloading: 0.0
[11/19 09:08:01 d2.evaluation.evaluator]: Inference done 2375/2510. Dataloading: 0.0
[11/19 09:08:07 d2.evaluation.evaluator]: Inference done 2390/2510. Dataloading: 0.0
[11/19 09:08:12 d2.evaluation.evaluator]: Inference done 2405/2510. Dataloading: 0.0
[11/19 09:08:17 d2.evaluation.evaluator]: Inference done 2420/2510. Dataloading: 0.0
[11/19 09:08:23 d2.evaluation.evaluator]: Inference done 2435/2510. Dataloading: 0.0
[11/19 09:08:28 d2.evaluation.evaluator]: Inference done 2450/2510. Dataloading: 0.0
[11/19 09:08:33 d2.evaluation.evaluator]: Inference done 2465/2510. Dataloading: 0.0
[11/19 09:08:38 d2.evaluation.evaluator]: Inference done 2480/2510. Dataloading: 0.0
[11/19 09:08:43 d2.evaluation.evaluator]: Inference done 2495/2510. Dataloading: 0.0
[11/19 09:08:49 d2.evaluation.evaluator]: Inference done 2510/2510. Dataloading: 0.0
[11/19 09:08:49 d2.evaluation.evaluator]: Total inference time: 0:14:39.457851 (0.35
[11/19 09:08:49 d2.evaluation.evaluator]: Total inference pure compute time: 0:14:32
[11/19 09:08:49 d2.evaluation.pascal_voc_evaluation]: Evaluating voc_2007_val using
OrderedDict([('bbox', {'AP': 50.65258500959214, 'AP50': 66.79858874773524, 'AP75': 5
```


▼ Predictions

`predictor(im)`---> Forward pass test image through our trained network

`Visualizer` ---> View the predictions of objects in image

`detectron2.data.MetadataCatalog.get` ---> Dictionary containing class of objects reference

`v.draw_instance_predictions` ---> Draw the output predictions on the image.

`cv2_imshow` ---> display the output image

```
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/tut
    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])
```

```
[11/19 09:20:19 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
```



✓ 2s completed at 1:20 AM

