

```
In [8]: import os
import numpy as np
import torch
from PIL import Image

class PennFudanDataset(torch.utils.data.Dataset):
    def __init__(self, root, transforms):
        self.root = root
        self.transforms = transforms
        # load all image files, sorting them to
        # ensure that they are aligned
        self.imgs = list(sorted(os.listdir(os.path.join(root, "PNGImages"))))
        self.masks = list(sorted(os.listdir(os.path.join(root, "PedMasks"))))

    def __getitem__(self, idx):
        # load images and masks
        img_path = os.path.join(self.root, "PNGImages", self.imgs[idx])
        mask_path = os.path.join(self.root, "PedMasks", self.masks[idx])
        img = Image.open(img_path).convert("RGB")
        # note that we haven't converted the mask to RGB,
        # because each color corresponds to a different instance
        # with 0 being background
        mask = Image.open(mask_path)
        # convert the PIL Image into a numpy array
        mask = np.array(mask)
        # instances are encoded as different colors
        obj_ids = np.unique(mask)
        # first id is the background, so remove it
        obj_ids = obj_ids[1:]

        # split the color-encoded mask into a set
        # of binary masks
        masks = mask == obj_ids[:, None, None]

        # get bounding box coordinates for each mask
        num_objs = len(obj_ids)
        boxes = []
        for i in range(num_objs):
            pos = np.where(masks[i])
            xmin = np.min(pos[1])
            xmax = np.max(pos[1])
            ymin = np.min(pos[0])
            ymax = np.max(pos[0])
            boxes.append([xmin, ymin, xmax, ymax])

        # convert everything into a torch.Tensor
        boxes = torch.as_tensor(boxes, dtype=torch.float32)
        # there is only one class
        labels = torch.ones((num_objs, ), dtype=torch.int64)
        masks = torch.as_tensor(masks, dtype=torch.uint8)

        image_id = torch.tensor([idx])
        area = (boxes[:, 3] - boxes[:, 1]) * (boxes[:, 2] - boxes[:, 0])
        # suppose all instances are not crowd
        iscrowd = torch.zeros((num_objs, ), dtype=torch.int64)

        target = {}
        target["boxes"] = boxes
        target["labels"] = labels
        target["masks"] = masks
        target["image_id"] = image_id
        target["area"] = area
        target["iscrowd"] = iscrowd

        if self.transforms is not None:
            img, target = self.transforms(img, target)

        return img, target

    def __len__(self):
        return len(self.imgs)
```

```
In [9]: import torchvision
import torchvision
from torchvision.models.detection import FasterRCNN
from torchvision.models.detection.rpn import AnchorGenerator
from torchvision.models.detection.faster_rcnn import FastRCNNPredictor
from torchvision.models.detection.mask_rcnn import MaskRCNNPredictor

def get_model_instance_segmentation_option1(num_classes):
    # load an instance segmentation model pre-trained pre-trained on COCO
    model = torchvision.models.detection.maskrcnn_resnet50_fpn(pretrained=True)

    # get number of input features for the classifier
    in_features = model.roi_heads.box_predictor.cls_score.in_features

    # replace the pre-trained head with a new one
    model.roi_heads.box_predictor = FastRCNNPredictor(in_features, num_classes)

    # now get the number of input features for the mask classifier
    in_features_mask = model.roi_heads.mask_predictor.conv5_mask.in_channels
    hidden_layer = 256

    # and replace the mask predictor with a new one
    model.roi_heads.mask_predictor = MaskRCNNPredictor(in_features_mask,
                                                         hidden_layer,
                                                         num_classes)

    return model

def get_model_instance_segmentation_option2(num_classes):
    # load a pre-trained model for classification and return
    # only the features
    backbone = torchvision.models.mobilenet_v2(weights="DEFAULT").features

    # FasterRCNN needs to know the number of
    # output channels in a backbone. For mobilenet_v2, it's 1280
    # so we need to add it here
    backbone.out_channels = 1280
```

```

# let's make the RPN generate 5 x 3 anchors per spatial
# location, with 5 different sizes and 3 different aspect
# ratios. We have a Tuple[Tuple[int]] because each feature
# map could potentially have different sizes and
# aspect ratios
anchor_generator = AnchorGenerator(sizes=((32, 64, 128, 256, 512).),
                                  aspect_ratios=((0.5, 1.0, 2.0),))

# let's define what are the feature maps that we will
# use to perform the region of interest cropping, as well as
# the size of the crop after rescaling.
# if your backbone returns a Tensor, featmap_names is expected to
# be [0]. More generally, the backbone should return an
# OrderedDict[Tensor], and in featmap_names you can choose which
# feature maps to use.
roi_pooler = torchvision.ops.MultiScaleRoIAlign(featmap_names=['0'],
                                                output_size=7,
                                                sampling_ratio=2)

# put the pieces together inside a FasterRCNN model
model = FasterRCNN(backbone,
                   num_classes=2,
                   rpn_anchor_generator=anchor_generator,
                   box_roi_pool=roi_pooler)

return model

```

In [10]: `import transforms as T`

```

def get_transform(train):
    transforms = []
    transforms.append(T.PILToTensor())
    transforms.append(T.ConvertImageDtype(torch.float))
    if train:
        transforms.append(T.RandomHorizontalFlip(0.5))
    return T.Compose(transforms)

```

In [11]: `from engine import train_one_epoch, evaluate`

```

import utils
from PIL import Image
import torch
import torchvision.transforms as transforms
import requests
import utils
#%matplotlib inline
import matplotlib.pyplot as plt

# train on the GPU or on the CPU, if a GPU is not available
device = torch.device('cuda') if torch.cuda.is_available() else torch.device('cpu')

# our dataset has two classes only - background and person
num_classes = 2

# use our dataset and defined transformations
dataset = PennFudanDataset('/content/drive/MyDrive/Colab Notebooks/PennFudanPed', get_transform(train=True))
dataset_test = PennFudanDataset('/content/drive/MyDrive/Colab Notebooks/PennFudanPed', get_transform(train=False))

# split the dataset in train and test set
indices = torch.randperm(len(dataset)).tolist()
dataset = torch.utils.data.Subset(dataset, indices[:-50])
dataset_test = torch.utils.data.Subset(dataset_test, indices[-50:])

# define training and validation data loaders
data_loader = torch.utils.data.DataLoader(
    dataset, batch_size=2, shuffle=True, num_workers=0,
    collate_fn=utils.collate_fn)

data_loader_test = torch.utils.data.DataLoader(
    dataset_test, batch_size=1, shuffle=False, num_workers=0,
    collate_fn=utils.collate_fn)

```

In [12]: `from google.colab import drive`
`drive.mount('/content/drive')`

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

In [13]: `#MODEL_OPTION1`

```

# get the model using our helper function
model_option1 = get_model_instance_segmentation_option1(num_classes)

# move model to the right device
model_option1.to(device)

# construct an optimizer for option1
params = [p for p in model_option1.parameters() if p.requires_grad]
optimizer = torch.optim.SGD(params, lr=0.005,
                             momentum=0.9, weight_decay=0.0005)

# and a learning rate scheduler for the same
lr_scheduler = torch.optim.lr_scheduler.StepLR(optimizer,
                                                step_size=3,
                                                gamma=0.1)

# let's train it for 10 epochs
num_epochs = 10
print ("MODEL OPTION 1")

for epoch in range(num_epochs):
    print("Model 1 Epoch: {}".format(epoch))
    # train for one epoch, printing every 10 iterations
    train_one_epoch(model_option1, optimizer, data_loader, device, epoch, print_freq=10)
    # update the learning rate
    lr_scheduler.step()
    # evaluate on the test dataset
    evaluate(model_option1, data_loader_test, device=device)

print ("\n")
print("That's it! Model 1")

```

```
/usr/local/lib/python3.9/dist-packages/torchvision/models/_utils.py:208: UserWarning: The parameter 'pretrained' is deprecated since 0.13 and may be removed in the future, please use 'weights' instead.
  warnings.warn(
/usr/local/lib/python3.9/dist-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight enum or 'None' for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `weights=MaskRCNN_ResNet50_FPN_Weights.COCO_V1`. You can also use `weights=MaskRCNN_ResNet50_FPN_Weights.DEFAULT` to get the most up-to-date weights.
  warnings.warn(msg)
```

```

MODEL OPTION 1
Model 1 Epoch: 0
Epoch: [0] [ 0/60] eta: 0:01:56 lr: 0.000090 loss: 5.8660 (5.8660) loss_classifier: 0.7740 (0.7740) loss_box_reg: 0.3408 (0.3408) loss_mask: 4.7247 (4.7247) loss_ob
jctness: 0.0241 (0.0241) loss_rpn_box_reg: 0.0023 (0.0023) time: 1.9364 data: 1.3563 max mem: 2579
Epoch: [0] [10/60] eta: 0:01:33 lr: 0.000936 loss: 2.3789 (3.1197) loss_classifier: 0.5083 (0.4910) loss_box_reg: 0.3408 (0.2984) loss_mask: 1.4818 (2.3071) loss_ob
jctness: 0.0192 (0.0185) loss_rpn_box_reg: 0.0028 (0.0047) time: 1.8733 data: 1.3209 max mem: 3528
Epoch: [0] [20/60] eta: 0:01:14 lr: 0.001783 loss: 0.9242 (2.0173) loss_classifier: 0.2323 (0.3516) loss_box_reg: 0.3054 (0.2896) loss_mask: 0.4465 (1.3515) loss_ob
jctness: 0.0192 (0.0187) loss_rpn_box_reg: 0.0030 (0.0059) time: 1.8659 data: 1.3193 max mem: 3528
Epoch: [0] [30/60] eta: 0:00:56 lr: 0.002629 loss: 0.5756 (1.5340) loss_classifier: 0.0937 (0.2659) loss_box_reg: 0.2108 (0.2590) loss_mask: 0.2391 (0.9873) loss_ob
jctness: 0.0099 (0.0160) loss_rpn_box_reg: 0.0059 (0.0058) time: 1.9024 data: 1.3500 max mem: 3554
Epoch: [0] [40/60] eta: 0:00:39 lr: 0.003476 loss: 0.4931 (1.2783) loss_classifier: 0.0713 (0.2166) loss_box_reg: 0.2089 (0.2468) loss_mask: 0.2166 (0.7948) loss_ob
jctness: 0.0081 (0.0141) loss_rpn_box_reg: 0.0059 (0.0059) time: 2.0443 data: 1.4791 max mem: 3554
Epoch: [0] [50/60] eta: 0:00:19 lr: 0.004323 loss: 0.4307 (1.1157) loss_classifier: 0.0552 (0.1853) loss_box_reg: 0.1454 (0.2312) loss_mask: 0.1952 (0.6806) loss_ob
jctness: 0.0045 (0.0122) loss_rpn_box_reg: 0.0057 (0.0065) time: 2.0565 data: 1.4892 max mem: 3559
Epoch: [0] [59/60] eta: 0:00:01 lr: 0.005000 loss: 0.3701 (0.9989) loss_classifier: 0.0367 (0.1630) loss_box_reg: 0.1329 (0.2163) loss_mask: 0.1797 (0.6026) loss_ob
jctness: 0.0016 (0.0106) loss_rpn_box_reg: 0.0056 (0.0063) time: 1.9448 data: 1.3731 max mem: 3742
Epoch: [0] Total time: 0:01:57 (1.9522 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1674 (0.1674) evaluator_time: 0.0149 (0.0149) time: 0.1996 data: 0.0165 max mem: 3742
Test: [49/50] eta: 0:00:00 model_time: 0.1023 (0.1111) evaluator_time: 0.0067 (0.0120) time: 0.1457 data: 0.0200 max mem: 3742
Test: Total time: 0:00:07 (0.1417 s / it)
Averaged stats: model_time: 0.1023 (0.1111) evaluator_time: 0.0067 (0.0120)
Accumulating evaluation results...
DONE (t=0.03s).
Accumulating evaluation results...
DONE (t=0.03s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.593
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.968
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.766
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.381
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.499
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.604
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.260
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.660
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.660
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.500
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.633
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.666
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.611
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.972
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.762
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.330
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.337
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.626
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.272
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.658
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.663
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.533
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.678
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.665
Model 1 Epoch: 1
Epoch: [1] [ 0/60] eta: 0:00:35 lr: 0.005000 loss: 0.4237 (0.4237) loss_classifier: 0.0566 (0.0566) loss_box_reg: 0.1427 (0.1427) loss_mask: 0.2189 (0.2189) loss_ob
jctness: 0.0003 (0.0003) loss_rpn_box_reg: 0.0052 (0.0052) time: 0.5921 data: 0.0361 max mem: 3742
Epoch: [1] [10/60] eta: 0:00:31 lr: 0.005000 loss: 0.3257 (0.3524) loss_classifier: 0.0435 (0.0462) loss_box_reg: 0.1320 (0.1303) loss_mask: 0.1620 (0.1690) loss_ob
jctness: 0.0017 (0.0024) loss_rpn_box_reg: 0.0031 (0.0045) time: 0.6349 data: 0.0409 max mem: 3742
Epoch: [1] [20/60] eta: 0:00:25 lr: 0.005000 loss: 0.3009 (0.3246) loss_classifier: 0.0401 (0.0439) loss_box_reg: 0.1076 (0.1142) loss_mask: 0.1506 (0.1588) loss_ob
jctness: 0.0018 (0.0025) loss_rpn_box_reg: 0.0040 (0.0053) time: 0.6325 data: 0.0400 max mem: 3742
Epoch: [1] [30/60] eta: 0:00:18 lr: 0.005000 loss: 0.2838 (0.3094) loss_classifier: 0.0400 (0.0424) loss_box_reg: 0.0880 (0.1051) loss_mask: 0.1452 (0.1543) loss_ob
jctness: 0.0012 (0.0023) loss_rpn_box_reg: 0.0053 (0.0054) time: 0.6196 data: 0.0378 max mem: 3742
Epoch: [1] [40/60] eta: 0:00:12 lr: 0.005000 loss: 0.2544 (0.2860) loss_classifier: 0.0311 (0.0379) loss_box_reg: 0.0549 (0.0915) loss_mask: 0.1316 (0.1493) loss_ob
jctness: 0.0008 (0.0021) loss_rpn_box_reg: 0.0033 (0.0052) time: 0.6021 data: 0.0364 max mem: 3742
Epoch: [1] [50/60] eta: 0:00:06 lr: 0.005000 loss: 0.2330 (0.2792) loss_classifier: 0.0262 (0.0377) loss_box_reg: 0.0546 (0.0882) loss_mask: 0.1263 (0.1461) loss_ob
jctness: 0.0007 (0.0022) loss_rpn_box_reg: 0.0032 (0.0049) time: 0.6087 data: 0.0352 max mem: 3742
Epoch: [1] [59/60] eta: 0:00:00 lr: 0.005000 loss: 0.2324 (0.2717) loss_classifier: 0.0275 (0.0368) loss_box_reg: 0.0553 (0.0841) loss_mask: 0.1263 (0.1440) loss_ob
jctness: 0.0004 (0.0020) loss_rpn_box_reg: 0.0032 (0.0049) time: 0.6104 data: 0.0345 max mem: 3742
Epoch: [1] Total time: 0:00:36 (0.6159 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:10 model_time: 0.1657 (0.1657) evaluator_time: 0.0120 (0.0120) time: 0.2010 data: 0.0225 max mem: 3742
Test: [49/50] eta: 0:00:00 model_time: 0.0985 (0.1064) evaluator_time: 0.0037 (0.0055) time: 0.1263 data: 0.0167 max mem: 3742
Test: Total time: 0:00:06 (0.1297 s / it)
Averaged stats: model_time: 0.0985 (0.1064) evaluator_time: 0.0037 (0.0055)
Accumulating evaluation results...
DONE (t=0.01s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.768
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.982
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.942
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.363
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.618
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.785
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.336
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.808
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.808
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.500
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.733
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.822
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.741
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.982
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.926
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.370
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.506
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.759
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.321
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.770
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.770
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.600
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.689
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.781
Model 1 Epoch: 2
Epoch: [2] [ 0/60] eta: 0:00:43 lr: 0.005000 loss: 0.2319 (0.2319) loss_classifier: 0.0396 (0.0396) loss_box_reg: 0.0734 (0.0734) loss_mask: 0.1158 (0.1158) loss_ob
jctness: 0.0003 (0.0003) loss_rpn_box_reg: 0.0029 (0.0029) time: 0.7233 data: 0.0464 max mem: 3742
Epoch: [2] [10/60] eta: 0:00:30 lr: 0.005000 loss: 0.2233 (0.2445) loss_classifier: 0.0276 (0.0330) loss_box_reg: 0.0562 (0.0700) loss_mask: 0.1351 (0.1349) loss_ob
jctness: 0.0006 (0.0012) loss_rpn_box_reg: 0.0046 (0.0054) time: 0.6173 data: 0.0452 max mem: 3742
Epoch: [2] [20/60] eta: 0:00:23 lr: 0.005000 loss: 0.1867 (0.2278) loss_classifier: 0.0240 (0.0292) loss_box_reg: 0.0483 (0.0615) loss_mask: 0.1240 (0.1324) loss_ob
jctness: 0.0004 (0.0009) loss_rpn_box_reg: 0.0029 (0.0038) time: 0.5888 data: 0.0386 max mem: 3742
Epoch: [2] [30/60] eta: 0:00:18 lr: 0.005000 loss: 0.2387 (0.2389) loss_classifier: 0.0289 (0.0308) loss_box_reg: 0.0599 (0.0674) loss_mask: 0.1259 (0.1353) loss_ob
jctness: 0.0004 (0.0012) loss_rpn_box_reg: 0.0026 (0.0042) time: 0.6107 data: 0.0351 max mem: 3742
Epoch: [2] [40/60] eta: 0:00:12 lr: 0.005000 loss: 0.2450 (0.2316) loss_classifier: 0.0295 (0.0310) loss_box_reg: 0.0661 (0.0635) loss_mask: 0.1324 (0.1319) loss_ob

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jectness: 0.0007 (0.0012) loss_rpn_box_reg: 0.0047 (0.0041) time: 0.6250 data: 0.0382 max mem: 3748
Epoch: [2] [50/60] eta: 0:00:06 lr: 0.005000 loss: 0.2110 (0.2333) loss_classifier: 0.0314 (0.0322) loss_box_reg: 0.0511 (0.0652) loss_mask: 0.1215 (0.1306) loss_ob
jectness: 0.0004 (0.0011) loss_rpn_box_reg: 0.0037 (0.0042) time: 0.5832 data: 0.0360 max mem: 3748
Epoch: [2] [59/60] eta: 0:00:00 lr: 0.005000 loss: 0.2345 (0.2314) loss_classifier: 0.0341 (0.0316) loss_box_reg: 0.0635 (0.0641) loss_mask: 0.1213 (0.1306) loss_ob
jectness: 0.0003 (0.0010) loss_rpn_box_reg: 0.0034 (0.0041) time: 0.5916 data: 0.0374 max mem: 3748
Epoch: [2] Total time: 0:00:36 (0.6053 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1700 (0.1700) evaluator_time: 0.0067 (0.0067) time: 0.1945 data: 0.0171 max mem: 3748
Test: [49/50] eta: 0:00:00 model_time: 0.0988 (0.1064) evaluator_time: 0.0035 (0.0054) time: 0.1285 data: 0.0173 max mem: 3748
Test: Total time: 0:00:06 (0.1296 s / it)
Averaged stats: model_time: 0.0988 (0.1064) evaluator_time: 0.0035 (0.0054)
Accumulating evaluation results...
DONE (t=0.02s).
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.788
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.982
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.945
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.374
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.612
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.805
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.343
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.828
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.828
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.533
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.842
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.731
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.983
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.897
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.400
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.542
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.744
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.322
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.766
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.768
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.633
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.744
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.773
Model 1 Epoch: 3
Epoch: [3] [ 0/60] eta: 0:00:36 lr: 0.000500 loss: 0.2125 (0.2125) loss_classifier: 0.0267 (0.0267) loss_box_reg: 0.0480 (0.0480) loss_mask: 0.1368 (0.1368) loss_ob
jectness: 0.0001 (0.0001) loss_rpn_box_reg: 0.0009 (0.0009) time: 0.6009 data: 0.0399 max mem: 3748
Epoch: [3] [10/60] eta: 0:00:30 lr: 0.000500 loss: 0.2125 (0.2237) loss_classifier: 0.0285 (0.0297) loss_box_reg: 0.0511 (0.0574) loss_mask: 0.1352 (0.1306) loss_ob
jectness: 0.0006 (0.0014) loss_rpn_box_reg: 0.0041 (0.0047) time: 0.6178 data: 0.0428 max mem: 3748
Epoch: [3] [20/60] eta: 0:00:23 lr: 0.000500 loss: 0.1779 (0.1978) loss_classifier: 0.0258 (0.0269) loss_box_reg: 0.0359 (0.0461) loss_mask: 0.1114 (0.1203) loss_ob
jectness: 0.0005 (0.0010) loss_rpn_box_reg: 0.0027 (0.0035) time: 0.5927 data: 0.0367 max mem: 3748
Epoch: [3] [30/60] eta: 0:00:18 lr: 0.000500 loss: 0.1763 (0.1988) loss_classifier: 0.0246 (0.0268) loss_box_reg: 0.0328 (0.0486) loss_mask: 0.1049 (0.1188) loss_ob
jectness: 0.0005 (0.0010) loss_rpn_box_reg: 0.0024 (0.0036) time: 0.6036 data: 0.0373 max mem: 3748
Epoch: [3] [40/60] eta: 0:00:12 lr: 0.000500 loss: 0.1909 (0.1962) loss_classifier: 0.0260 (0.0266) loss_box_reg: 0.0494 (0.0467) loss_mask: 0.1148 (0.1185) loss_ob
jectness: 0.0004 (0.0010) loss_rpn_box_reg: 0.0030 (0.0033) time: 0.6157 data: 0.0384 max mem: 3748
Epoch: [3] [50/60] eta: 0:00:06 lr: 0.000500 loss: 0.1962 (0.1967) loss_classifier: 0.0260 (0.0270) loss_box_reg: 0.0474 (0.0466) loss_mask: 0.1155 (0.1185) loss_ob
jectness: 0.0004 (0.0011) loss_rpn_box_reg: 0.0021 (0.0035) time: 0.6055 data: 0.0383 max mem: 3748
Epoch: [3] [59/60] eta: 0:00:00 lr: 0.000500 loss: 0.1837 (0.1939) loss_classifier: 0.0250 (0.0267) loss_box_reg: 0.0397 (0.0455) loss_mask: 0.1110 (0.1174) loss_ob
jectness: 0.0005 (0.0011) loss_rpn_box_reg: 0.0028 (0.0034) time: 0.6071 data: 0.0379 max mem: 3748
Epoch: [3] Total time: 0:00:36 (0.6063 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:10 model_time: 0.1773 (0.1773) evaluator_time: 0.0087 (0.0087) time: 0.2051 data: 0.0183 max mem: 3748
Test: [49/50] eta: 0:00:00 model_time: 0.0974 (0.1074) evaluator_time: 0.0032 (0.0066) time: 0.1257 data: 0.0172 max mem: 3748
Test: Total time: 0:00:06 (0.1344 s / it)
Averaged stats: model_time: 0.0974 (0.1074) evaluator_time: 0.0032 (0.0066)
Accumulating evaluation results...
DONE (t=0.01s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.808
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.987
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.949
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.384
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.627
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.826
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.352
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.840
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.840
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.533
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.855
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.741
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.978
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.878
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.396
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.531
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.755
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.328
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.772
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.772
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.778
Model 1 Epoch: 4
Epoch: [4] [ 0/60] eta: 0:00:29 lr: 0.000500 loss: 0.1836 (0.1836) loss_classifier: 0.0257 (0.0257) loss_box_reg: 0.0415 (0.0415) loss_mask: 0.1111 (0.1111) loss_ob
jectness: 0.0040 (0.0040) loss_rpn_box_reg: 0.0013 (0.0013) time: 0.4944 data: 0.0278 max mem: 3748
Epoch: [4] [10/60] eta: 0:00:28 lr: 0.000500 loss: 0.1576 (0.1762) loss_classifier: 0.0249 (0.0266) loss_box_reg: 0.0334 (0.0379) loss_mask: 0.1037 (0.1091) loss_ob
jectness: 0.0009 (0.0012) loss_rpn_box_reg: 0.0009 (0.0013) time: 0.5626 data: 0.0343 max mem: 3748
Epoch: [4] [20/60] eta: 0:00:23 lr: 0.000500 loss: 0.1803 (0.1852) loss_classifier: 0.0242 (0.0269) loss_box_reg: 0.0369 (0.0417) loss_mask: 0.1173 (0.1138) loss_ob
jectness: 0.0003 (0.0008) loss_rpn_box_reg: 0.0018 (0.0020) time: 0.5829 data: 0.0385 max mem: 3748
Epoch: [4] [30/60] eta: 0:00:17 lr: 0.000500 loss: 0.1872 (0.1918) loss_classifier: 0.0242 (0.0262) loss_box_reg: 0.0403 (0.0427) loss_mask: 0.1211 (0.1197) loss_ob
jectness: 0.0003 (0.0008) loss_rpn_box_reg: 0.0024 (0.0025) time: 0.6006 data: 0.0399 max mem: 3748
Epoch: [4] [40/60] eta: 0:00:11 lr: 0.000500 loss: 0.1794 (0.1886) loss_classifier: 0.0227 (0.0258) loss_box_reg: 0.0361 (0.0418) loss_mask: 0.1128 (0.1175) loss_ob
jectness: 0.0006 (0.0008) loss_rpn_box_reg: 0.0024 (0.0027) time: 0.6085 data: 0.0374 max mem: 3748
Epoch: [4] [50/60] eta: 0:00:05 lr: 0.000500 loss: 0.1797 (0.1870) loss_classifier: 0.0268 (0.0263) loss_box_reg: 0.0384 (0.0411) loss_mask: 0.1041 (0.1159) loss_ob
jectness: 0.0007 (0.0012) loss_rpn_box_reg: 0.0022 (0.0027) time: 0.6102 data: 0.0356 max mem: 3748
Epoch: [4] [59/60] eta: 0:00:00 lr: 0.000500 loss: 0.1908 (0.1876) loss_classifier: 0.0295 (0.0266) loss_box_reg: 0.0431 (0.0418) loss_mask: 0.1082 (0.1150) loss_ob
jectness: 0.0008 (0.0013) loss_rpn_box_reg: 0.0022 (0.0029) time: 0.6307 data: 0.0368 max mem: 3748
Epoch: [4] Total time: 0:00:36 (0.6054 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1630 (0.1630) evaluator_time: 0.0052 (0.0052) time: 0.1859 data: 0.0170 max mem: 3748
Test: [49/50] eta: 0:00:00 model_time: 0.0977 (0.1057) evaluator_time: 0.0028 (0.0049) time: 0.1254 data: 0.0165 max mem: 3748
Test: Total time: 0:00:06 (0.1282 s / it)

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Averaged stats: model_time: 0.0977 (0.1057) evaluator_time: 0.0028 (0.0049)
Accumulating evaluation results...
DONE (t=0.01s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.826
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.987
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.950
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.413
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.650
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.843
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.357
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.857
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.857
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.872
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.752
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.987
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.901
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.385
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.523
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.331
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.780
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.780
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.788
Model 1 Epoch: 5
Epoch: [5] [ 0/60] eta: 0:00:28 lr: 0.000500 loss: 0.1180 (0.1180) loss_classifier: 0.0121 (0.0121) loss_box_reg: 0.0125 (0.0125) loss_mask: 0.0923 (0.0923) loss_ob
jctness: 0.0000 (0.0000) loss_rpn_box_reg: 0.0011 (0.0011) time: 0.4785 data: 0.0294 max mem: 3748
Epoch: [5] [10/60] eta: 0:00:30 lr: 0.000500 loss: 0.1657 (0.1810) loss_classifier: 0.0221 (0.0235) loss_box_reg: 0.0321 (0.0388) loss_mask: 0.1072 (0.1156) loss_ob
jctness: 0.0003 (0.0005) loss_rpn_box_reg: 0.0021 (0.0026) time: 0.6149 data: 0.0409 max mem: 3748
Epoch: [5] [20/60] eta: 0:00:23 lr: 0.000500 loss: 0.1657 (0.1786) loss_classifier: 0.0221 (0.0248) loss_box_reg: 0.0321 (0.0373) loss_mask: 0.1064 (0.1133) loss_ob
jctness: 0.0003 (0.0006) loss_rpn_box_reg: 0.0021 (0.0025) time: 0.5997 data: 0.0365 max mem: 3748
Epoch: [5] [30/60] eta: 0:00:18 lr: 0.000500 loss: 0.1862 (0.1854) loss_classifier: 0.0262 (0.0254) loss_box_reg: 0.0383 (0.0392) loss_mask: 0.1127 (0.1176) loss_ob
jctness: 0.0003 (0.0006) loss_rpn_box_reg: 0.0027 (0.0027) time: 0.5969 data: 0.0366 max mem: 3748
Epoch: [5] [40/60] eta: 0:00:12 lr: 0.000500 loss: 0.1862 (0.1862) loss_classifier: 0.0262 (0.0256) loss_box_reg: 0.0368 (0.0403) loss_mask: 0.1148 (0.1170) loss_ob
jctness: 0.0004 (0.0006) loss_rpn_box_reg: 0.0028 (0.0027) time: 0.6123 data: 0.0406 max mem: 3748
Epoch: [5] [50/60] eta: 0:00:06 lr: 0.000500 loss: 0.1724 (0.1849) loss_classifier: 0.0255 (0.0256) loss_box_reg: 0.0304 (0.0402) loss_mask: 0.1068 (0.1159) loss_ob
jctness: 0.0004 (0.0006) loss_rpn_box_reg: 0.0022 (0.0027) time: 0.6083 data: 0.0412 max mem: 3748
Epoch: [5] [59/60] eta: 0:00:00 lr: 0.000500 loss: 0.1579 (0.1812) loss_classifier: 0.0213 (0.0250) loss_box_reg: 0.0283 (0.0389) loss_mask: 0.1046 (0.1140) loss_ob
jctness: 0.0004 (0.0006) loss_rpn_box_reg: 0.0021 (0.0027) time: 0.6049 data: 0.0379 max mem: 3748
Epoch: [5] Total time: 0:00:36 (0.6040 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1698 (0.1698) evaluator_time: 0.0062 (0.0062) time: 0.1938 data: 0.0171 max mem: 3748
Test: [49/50] eta: 0:00:00 model_time: 0.0985 (0.1068) evaluator_time: 0.0040 (0.0067) time: 0.1281 data: 0.0181 max mem: 3748
Test: Total time: 0:00:06 (0.1331 s / it)
Averaged stats: model_time: 0.0985 (0.1068) evaluator_time: 0.0040 (0.0067)
Accumulating evaluation results...
DONE (t=0.02s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.830
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.988
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.950
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.413
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.652
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.848
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.361
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.859
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.859
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.874
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.752
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.979
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.892
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.385
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.546
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.333
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.782
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.782
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.790
Model 1 Epoch: 6
Epoch: [6] [ 0/60] eta: 0:00:43 lr: 0.000050 loss: 0.1812 (0.1812) loss_classifier: 0.0300 (0.0300) loss_box_reg: 0.0430 (0.0430) loss_mask: 0.1058 (0.1058) loss_ob
jctness: 0.0002 (0.0002) loss_rpn_box_reg: 0.0022 (0.0022) time: 0.7193 data: 0.0380 max mem: 3748
Epoch: [6] [10/60] eta: 0:00:29 lr: 0.000050 loss: 0.1659 (0.1628) loss_classifier: 0.0232 (0.0218) loss_box_reg: 0.0334 (0.0313) loss_mask: 0.1058 (0.1075) loss_ob
jctness: 0.0002 (0.0005) loss_rpn_box_reg: 0.0014 (0.0016) time: 0.5810 data: 0.0329 max mem: 3748
Epoch: [6] [20/60] eta: 0:00:24 lr: 0.000050 loss: 0.1659 (0.1718) loss_classifier: 0.0220 (0.0237) loss_box_reg: 0.0270 (0.0344) loss_mask: 0.1067 (0.1108) loss_ob
jctness: 0.0002 (0.0007) loss_rpn_box_reg: 0.0021 (0.0023) time: 0.5953 data: 0.0363 max mem: 3748
Epoch: [6] [30/60] eta: 0:00:18 lr: 0.000050 loss: 0.1665 (0.1756) loss_classifier: 0.0245 (0.0252) loss_box_reg: 0.0295 (0.0366) loss_mask: 0.1018 (0.1108) loss_ob
jctness: 0.0003 (0.0006) loss_rpn_box_reg: 0.0021 (0.0024) time: 0.6139 data: 0.0381 max mem: 3748
Epoch: [6] [40/60] eta: 0:00:12 lr: 0.000050 loss: 0.1640 (0.1768) loss_classifier: 0.0218 (0.0244) loss_box_reg: 0.0311 (0.0360) loss_mask: 0.1035 (0.1134) loss_ob
jctness: 0.0003 (0.0005) loss_rpn_box_reg: 0.0020 (0.0025) time: 0.6043 data: 0.0376 max mem: 3748
Epoch: [6] [50/60] eta: 0:00:06 lr: 0.000050 loss: 0.1698 (0.1787) loss_classifier: 0.0218 (0.0248) loss_box_reg: 0.0318 (0.0373) loss_mask: 0.1164 (0.1136) loss_ob
jctness: 0.0003 (0.0006) loss_rpn_box_reg: 0.0019 (0.0024) time: 0.6026 data: 0.0370 max mem: 3748
Epoch: [6] [59/60] eta: 0:00:00 lr: 0.000050 loss: 0.1795 (0.1817) loss_classifier: 0.0246 (0.0254) loss_box_reg: 0.0394 (0.0381) loss_mask: 0.1164 (0.1148) loss_ob
jctness: 0.0005 (0.0008) loss_rpn_box_reg: 0.0025 (0.0026) time: 0.6173 data: 0.0388 max mem: 3748
Epoch: [6] Total time: 0:00:36 (0.6076 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1704 (0.1704) evaluator_time: 0.0053 (0.0053) time: 0.1924 data: 0.0160 max mem: 3748
Test: [49/50] eta: 0:00:00 model_time: 0.0999 (0.1063) evaluator_time: 0.0045 (0.0061) time: 0.1340 data: 0.0207 max mem: 3748
Test: Total time: 0:00:06 (0.1314 s / it)
Averaged stats: model_time: 0.0999 (0.1063) evaluator_time: 0.0045 (0.0061)
Accumulating evaluation results...
DONE (t=0.02s).
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.829
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.988
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.950
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.413
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.652

```

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Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.847
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.361
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.859
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.859
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.874
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.752
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.978
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.892
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.385
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.546
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.766
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.331
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.781
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.781
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.789
Model 1 Epoch: 7
Epoch: [7] [ 0/60] eta: 0:00:44 lr: 0.000050 loss: 0.1408 (0.1408) loss_classifier: 0.0232 (0.0232) loss_box_reg: 0.0253 (0.0253) loss_mask: 0.0902 (0.0902) loss_ob
jctness: 0.0004 (0.0004) loss_rpn_box_reg: 0.0017 (0.0017) time: 0.7354 data: 0.0668 max mem: 3748
Epoch: [7] [10/60] eta: 0:00:30 lr: 0.000050 loss: 0.1746 (0.1848) loss_classifier: 0.0262 (0.0266) loss_box_reg: 0.0324 (0.0415) loss_mask: 0.1022 (0.1133) loss_ob
jctness: 0.0003 (0.0007) loss_rpn_box_reg: 0.0017 (0.0026) time: 0.6174 data: 0.0494 max mem: 3748
Epoch: [7] [20/60] eta: 0:00:24 lr: 0.000050 loss: 0.1710 (0.1811) loss_classifier: 0.0247 (0.0256) loss_box_reg: 0.0276 (0.0371) loss_mask: 0.1077 (0.1152) loss_ob
jctness: 0.0003 (0.0006) loss_rpn_box_reg: 0.0017 (0.0026) time: 0.6016 data: 0.0415 max mem: 3748
Epoch: [7] [30/60] eta: 0:00:18 lr: 0.000050 loss: 0.1710 (0.1803) loss_classifier: 0.0246 (0.0247) loss_box_reg: 0.0276 (0.0382) loss_mask: 0.1095 (0.1138) loss_ob
jctness: 0.0004 (0.0010) loss_rpn_box_reg: 0.0023 (0.0027) time: 0.5976 data: 0.0362 max mem: 3748
Epoch: [7] [40/60] eta: 0:00:12 lr: 0.000050 loss: 0.1876 (0.1803) loss_classifier: 0.0246 (0.0251) loss_box_reg: 0.0425 (0.0383) loss_mask: 0.1071 (0.1133) loss_ob
jctness: 0.0005 (0.0010) loss_rpn_box_reg: 0.0024 (0.0026) time: 0.6119 data: 0.0368 max mem: 3748
Epoch: [7] [50/60] eta: 0:00:06 lr: 0.000050 loss: 0.1731 (0.1800) loss_classifier: 0.0230 (0.0252) loss_box_reg: 0.0323 (0.0372) loss_mask: 0.1144 (0.1143) loss_ob
jctness: 0.0003 (0.0009) loss_rpn_box_reg: 0.0020 (0.0025) time: 0.6093 data: 0.0351 max mem: 3748
Epoch: [7] [59/60] eta: 0:00:00 lr: 0.000050 loss: 0.1665 (0.1781) loss_classifier: 0.0218 (0.0247) loss_box_reg: 0.0281 (0.0369) loss_mask: 0.1071 (0.1130) loss_ob
jctness: 0.0003 (0.0009) loss_rpn_box_reg: 0.0021 (0.0026) time: 0.5948 data: 0.0325 max mem: 3748
Epoch: [7] Total time: 0:00:36 (0.6048 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1646 (0.1646) evaluator_time: 0.0053 (0.0053) time: 0.1884 data: 0.0178 max mem: 3748
Test: [49/50] eta: 0:00:00 model_time: 0.0976 (0.1067) evaluator_time: 0.0040 (0.0063) time: 0.1302 data: 0.0191 max mem: 3748
Test: Total time: 0:00:06 (0.1327 s / it)
Averaged stats: model_time: 0.0976 (0.1067) evaluator_time: 0.0040 (0.0063)
Accumulating evaluation results...
DONE (t=0.01s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.829
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.988
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.950
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.413
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.641
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.847
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.361
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.859
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.859
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.874
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.754
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.978
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.887
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.385
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.546
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.769
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.333
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.784
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.784
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.756
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.792
Model 1 Epoch: 8
Epoch: [8] [ 0/60] eta: 0:00:31 lr: 0.000050 loss: 0.1698 (0.1698) loss_classifier: 0.0236 (0.0236) loss_box_reg: 0.0266 (0.0266) loss_mask: 0.1169 (0.1169) loss_ob
jctness: 0.0003 (0.0003) loss_rpn_box_reg: 0.0024 (0.0024) time: 0.5304 data: 0.0425 max mem: 3748
Epoch: [8] [10/60] eta: 0:00:29 lr: 0.000050 loss: 0.1698 (0.1759) loss_classifier: 0.0217 (0.0220) loss_box_reg: 0.0330 (0.0352) loss_mask: 0.1169 (0.1159) loss_ob
jctness: 0.0003 (0.0008) loss_rpn_box_reg: 0.0018 (0.0020) time: 0.5902 data: 0.0359 max mem: 3748
Epoch: [8] [20/60] eta: 0:00:24 lr: 0.000050 loss: 0.1806 (0.1819) loss_classifier: 0.0219 (0.0245) loss_box_reg: 0.0330 (0.0391) loss_mask: 0.1092 (0.1150) loss_ob
jctness: 0.0003 (0.0010) loss_rpn_box_reg: 0.0018 (0.0024) time: 0.6041 data: 0.0398 max mem: 3748
Epoch: [8] [30/60] eta: 0:00:18 lr: 0.000050 loss: 0.1670 (0.1746) loss_classifier: 0.0226 (0.0235) loss_box_reg: 0.0266 (0.0363) loss_mask: 0.1026 (0.1115) loss_ob
jctness: 0.0002 (0.0009) loss_rpn_box_reg: 0.0025 (0.0024) time: 0.6140 data: 0.0411 max mem: 3748
Epoch: [8] [40/60] eta: 0:00:12 lr: 0.000050 loss: 0.1483 (0.1742) loss_classifier: 0.0201 (0.0235) loss_box_reg: 0.0257 (0.0365) loss_mask: 0.1026 (0.1111) loss_ob
jctness: 0.0002 (0.0008) loss_rpn_box_reg: 0.0017 (0.0024) time: 0.6188 data: 0.0392 max mem: 3748
Epoch: [8] [50/60] eta: 0:00:06 lr: 0.000050 loss: 0.1573 (0.1716) loss_classifier: 0.0160 (0.0228) loss_box_reg: 0.0240 (0.0349) loss_mask: 0.1080 (0.1108) loss_ob
jctness: 0.0002 (0.0007) loss_rpn_box_reg: 0.0018 (0.0024) time: 0.5940 data: 0.0368 max mem: 3748
Epoch: [8] [59/60] eta: 0:00:00 lr: 0.000050 loss: 0.1598 (0.1730) loss_classifier: 0.0234 (0.0240) loss_box_reg: 0.0267 (0.0351) loss_mask: 0.1055 (0.1107) loss_ob
jctness: 0.0004 (0.0008) loss_rpn_box_reg: 0.0021 (0.0025) time: 0.5995 data: 0.0352 max mem: 4110
Epoch: [8] Total time: 0:00:36 (0.6078 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1705 (0.1705) evaluator_time: 0.0090 (0.0090) time: 0.1971 data: 0.0168 max mem: 4110
Test: [49/50] eta: 0:00:00 model_time: 0.0985 (0.1068) evaluator_time: 0.0040 (0.0052) time: 0.1266 data: 0.0168 max mem: 4110
Test: Total time: 0:00:06 (0.1301 s / it)
Averaged stats: model_time: 0.0985 (0.1068) evaluator_time: 0.0040 (0.0052)
Accumulating evaluation results...
DONE (t=0.01s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.829
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.988
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.950
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.413
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.641
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.847
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.361
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.860
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.860
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.875
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.754
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.978
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.899

```

```

Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.385
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.539
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.769
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.331
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.783
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.783
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.744
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.791
Model 1 Epoch: 9
Epoch: [9] [ 0/60] eta: 0:00:36 lr: 0.000005 loss: 0.1867 (0.1867) loss_classifier: 0.0263 (0.0263) loss_box_reg: 0.0442 (0.0442) loss_mask: 0.1138 (0.1138) loss_obejectness: 0.0003 (0.0003) loss_rpn_box_reg: 0.0021 (0.0021) time: 0.6014 data: 0.0356 max mem: 4110
Epoch: [9] [10/60] eta: 0:00:30 lr: 0.000005 loss: 0.1539 (0.1587) loss_classifier: 0.0241 (0.0209) loss_box_reg: 0.0286 (0.0302) loss_mask: 0.1004 (0.1047) loss_obejectness: 0.0004 (0.0008) loss_rpn_box_reg: 0.0020 (0.0021) time: 0.6057 data: 0.0414 max mem: 4110
Epoch: [9] [20/60] eta: 0:00:23 lr: 0.000005 loss: 0.1513 (0.1632) loss_classifier: 0.0174 (0.0212) loss_box_reg: 0.0232 (0.0310) loss_mask: 0.1020 (0.1082) loss_obejectness: 0.0003 (0.0006) loss_rpn_box_reg: 0.0019 (0.0021) time: 0.5890 data: 0.0369 max mem: 4110
Epoch: [9] [30/60] eta: 0:00:17 lr: 0.000005 loss: 0.1691 (0.1729) loss_classifier: 0.0248 (0.0228) loss_box_reg: 0.0368 (0.0339) loss_mask: 0.1126 (0.1133) loss_obejectness: 0.0004 (0.0007) loss_rpn_box_reg: 0.0023 (0.0023) time: 0.5811 data: 0.0346 max mem: 4110
Epoch: [9] [40/60] eta: 0:00:12 lr: 0.000005 loss: 0.1996 (0.1778) loss_classifier: 0.0282 (0.0243) loss_box_reg: 0.0393 (0.0364) loss_mask: 0.1126 (0.1139) loss_obejectness: 0.0004 (0.0007) loss_rpn_box_reg: 0.0023 (0.0025) time: 0.6141 data: 0.0396 max mem: 4110
Epoch: [9] [50/60] eta: 0:00:05 lr: 0.000005 loss: 0.1686 (0.1771) loss_classifier: 0.0267 (0.0235) loss_box_reg: 0.0333 (0.0359) loss_mask: 0.1075 (0.1146) loss_obejectness: 0.0004 (0.0008) loss_rpn_box_reg: 0.0020 (0.0023) time: 0.6066 data: 0.0383 max mem: 4110
Epoch: [9] [59/60] eta: 0:00:00 lr: 0.000005 loss: 0.1673 (0.1787) loss_classifier: 0.0214 (0.0241) loss_box_reg: 0.0308 (0.0371) loss_mask: 0.1094 (0.1142) loss_obejectness: 0.0005 (0.0008) loss_rpn_box_reg: 0.0021 (0.0025) time: 0.6094 data: 0.0357 max mem: 4110
Epoch: [9] Total time: 0:00:36 (0.6017 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:09 model_time: 0.1697 (0.1697) evaluator_time: 0.0051 (0.0051) time: 0.1918 data: 0.0162 max mem: 4110
Test: [49/50] eta: 0:00:00 model_time: 0.0994 (0.1072) evaluator_time: 0.0041 (0.0064) time: 0.1346 data: 0.0209 max mem: 4110
Test: Total time: 0:00:06 (0.1336 s / it)
Averaged stats: model_time: 0.0994 (0.1072) evaluator_time: 0.0041 (0.0064)
Accumulating evaluation results...
DONE (t=0.01s).
Accumulating evaluation results...
DONE (t=0.01s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.829
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.988
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.950
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.413
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.641
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.847
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.361
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.860
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.860
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.767
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.875
IoU metric: segm
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.751
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.978
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.899
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.385
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.539
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.766
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.330
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.780
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.780
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.567
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.744
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.789

```

That's it! Model 1

In [14]: `#MODEL_OPTION2`

```

model_option2 = get_model_instance_segmentation_option2(num_classes)
model_option2.to(device)

# construct an optimizer for option2
params = [p for p in model_option2.parameters() if p.requires_grad]
optimizer = torch.optim.SGD(params, lr=0.005,
momentum=0.9, weight_decay=0.0005)

# and a learning rate scheduler for the same
lr_scheduler = torch.optim.lr_scheduler.StepLR(optimizer,
step_size=3,
gamma=0.1)

print ("MODEL OPTION 2")

for epoch in range(num_epochs):

    print("Model 2 Epoch: {}".format(epoch))

    # train for one epoch, printing every 10 iterations
    train_one_epoch(model_option2, optimizer, data_loader, device, epoch, print_freq=10)

    # update the learning rate
    lr_scheduler.step()

    # evaluate on the test dataset
    evaluate(model_option2, data_loader_test, device=device)

print ("\n")
print("That's it! Model 2")

```

Downloading: "https://download.pytorch.org/models/mobilenet_v2-7ebf99e0.pth" to /root/.cache/torch/hub/checkpoints/mobilenet_v2-7ebf99e0.pth
0%| | 0.00/13.6M [00:00<?, ?B/s]


```

MODEL OPTION 2
Model 2 Epoch: 0
Epoch: [0] [ 0/60] eta: 0:00:36 lr: 0.000090 loss: 1.5483 (1.5483) loss_classifier: 0.7352 (0.7352) loss_box_reg: 0.0793 (0.0793) loss_objectness: 0.7081 (0.7081) l
oss_rpn_box_reg: 0.0257 (0.0257) time: 0.6098 data: 0.0252 max mem: 4110
Epoch: [0] [10/60] eta: 0:00:20 lr: 0.000936 loss: 1.4805 (1.4755) loss_classifier: 0.6844 (0.6521) loss_box_reg: 0.0793 (0.0757) loss_objectness: 0.6987 (0.6954) l
oss_rpn_box_reg: 0.0506 (0.0523) time: 0.4007 data: 0.0353 max mem: 5714
Epoch: [0] [20/60] eta: 0:00:15 lr: 0.001783 loss: 1.1994 (1.2825) loss_classifier: 0.4023 (0.4896) loss_box_reg: 0.0807 (0.0973) loss_objectness: 0.6620 (0.6526) l
oss_rpn_box_reg: 0.0349 (0.0430) time: 0.3801 data: 0.0346 max mem: 6171
Epoch: [0] [30/60] eta: 0:00:11 lr: 0.002629 loss: 1.0186 (1.1833) loss_classifier: 0.2883 (0.4310) loss_box_reg: 0.1316 (0.1218) loss_objectness: 0.5236 (0.5883) l
oss_rpn_box_reg: 0.0349 (0.0421) time: 0.3802 data: 0.0377 max mem: 6171
Epoch: [0] [40/60] eta: 0:00:07 lr: 0.003476 loss: 0.8882 (1.1042) loss_classifier: 0.2730 (0.3972) loss_box_reg: 0.1691 (0.1437) loss_objectness: 0.3652 (0.5223) l
oss_rpn_box_reg: 0.0381 (0.0410) time: 0.3797 data: 0.0381 max mem: 6171
Epoch: [0] [50/60] eta: 0:00:03 lr: 0.004323 loss: 0.7166 (1.0127) loss_classifier: 0.2349 (0.3635) loss_box_reg: 0.1691 (0.1471) loss_objectness: 0.2655 (0.4636) l
oss_rpn_box_reg: 0.0324 (0.0384) time: 0.3751 data: 0.0342 max mem: 6171
Epoch: [0] [59/60] eta: 0:00:00 lr: 0.005000 loss: 0.5928 (0.9590) loss_classifier: 0.2266 (0.3439) loss_box_reg: 0.1759 (0.1565) loss_objectness: 0.1994 (0.4216) l
oss_rpn_box_reg: 0.0231 (0.0370) time: 0.3756 data: 0.0379 max mem: 6171
Epoch: [0] Total time: 0:00:22 (0.3823 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:04 model_time: 0.0546 (0.0546) evaluator_time: 0.0107 (0.0107) time: 0.0823 data: 0.0163 max mem: 6171
Test: [49/50] eta: 0:00:00 model_time: 0.0328 (0.0359) evaluator_time: 0.0025 (0.0035) time: 0.0537 data: 0.0166 max mem: 6171
Test: Total time: 0:00:02 (0.0566 s / it)
Averaged stats: model_time: 0.0328 (0.0359) evaluator_time: 0.0025 (0.0035)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.033
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.105
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.004
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.097
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.036
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.208
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.337
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.033
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.370
Model 2 Epoch: 1
Epoch: [1] [ 0/60] eta: 0:00:22 lr: 0.005000 loss: 0.5127 (0.5127) loss_classifier: 0.1759 (0.1759) loss_box_reg: 0.1739 (0.1739) loss_objectness: 0.1374 (0.1374) l
oss_rpn_box_reg: 0.0256 (0.0256) time: 0.3745 data: 0.0383 max mem: 6171
Epoch: [1] [10/60] eta: 0:00:18 lr: 0.005000 loss: 0.5127 (0.5067) loss_classifier: 0.1759 (0.1746) loss_box_reg: 0.1603 (0.1513) loss_objectness: 0.1390 (0.1538) l
oss_rpn_box_reg: 0.0284 (0.0270) time: 0.3690 data: 0.0334 max mem: 6171
Epoch: [1] [20/60] eta: 0:00:14 lr: 0.005000 loss: 0.4856 (0.5248) loss_classifier: 0.1535 (0.1770) loss_box_reg: 0.1603 (0.1709) loss_objectness: 0.1360 (0.1477) l
oss_rpn_box_reg: 0.0284 (0.0292) time: 0.3737 data: 0.0333 max mem: 6171
Epoch: [1] [30/60] eta: 0:00:11 lr: 0.005000 loss: 0.4856 (0.5197) loss_classifier: 0.1565 (0.1767) loss_box_reg: 0.1639 (0.1730) loss_objectness: 0.1248 (0.1423) l
oss_rpn_box_reg: 0.0244 (0.0277) time: 0.3826 data: 0.0362 max mem: 6171
Epoch: [1] [40/60] eta: 0:00:07 lr: 0.005000 loss: 0.4909 (0.5159) loss_classifier: 0.1580 (0.1708) loss_box_reg: 0.1813 (0.1795) loss_objectness: 0.1248 (0.1374) l
oss_rpn_box_reg: 0.0235 (0.0282) time: 0.3854 data: 0.0378 max mem: 6171
Epoch: [1] [50/60] eta: 0:00:03 lr: 0.005000 loss: 0.4838 (0.5030) loss_classifier: 0.1422 (0.1662) loss_box_reg: 0.1787 (0.1787) loss_objectness: 0.1128 (0.1309) l
oss_rpn_box_reg: 0.0235 (0.0273) time: 0.3765 data: 0.0347 max mem: 6171
Epoch: [1] [59/60] eta: 0:00:00 lr: 0.005000 loss: 0.4595 (0.5034) loss_classifier: 0.1332 (0.1642) loss_box_reg: 0.1787 (0.1828) loss_objectness: 0.1061 (0.1283) l
oss_rpn_box_reg: 0.0236 (0.0281) time: 0.3814 data: 0.0405 max mem: 6171
Epoch: [1] Total time: 0:00:22 (0.3798 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:04 model_time: 0.0600 (0.0600) evaluator_time: 0.0039 (0.0039) time: 0.0827 data: 0.0181 max mem: 6171
Test: [49/50] eta: 0:00:00 model_time: 0.0363 (0.0379) evaluator_time: 0.0020 (0.0027) time: 0.0566 data: 0.0168 max mem: 6171
Test: Total time: 0:00:02 (0.0585 s / it)
Averaged stats: model_time: 0.0363 (0.0379) evaluator_time: 0.0020 (0.0027)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.158
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.510
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.055
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.176
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.116
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.339
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.370
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.409
Model 2 Epoch: 2
Epoch: [2] [ 0/60] eta: 0:00:24 lr: 0.005000 loss: 0.5657 (0.5657) loss_classifier: 0.1616 (0.1616) loss_box_reg: 0.2584 (0.2584) loss_objectness: 0.1075 (0.1075) l
oss_rpn_box_reg: 0.0383 (0.0383) time: 0.4106 data: 0.0463 max mem: 6171
Epoch: [2] [10/60] eta: 0:00:19 lr: 0.005000 loss: 0.3937 (0.4336) loss_classifier: 0.1302 (0.1313) loss_box_reg: 0.1717 (0.1799) loss_objectness: 0.0883 (0.0938) l
oss_rpn_box_reg: 0.0226 (0.0286) time: 0.3803 data: 0.0364 max mem: 6171
Epoch: [2] [20/60] eta: 0:00:15 lr: 0.005000 loss: 0.3937 (0.4440) loss_classifier: 0.1302 (0.1346) loss_box_reg: 0.1717 (0.1912) loss_objectness: 0.0815 (0.0914) l
oss_rpn_box_reg: 0.0189 (0.0266) time: 0.3802 data: 0.0395 max mem: 6171
Epoch: [2] [30/60] eta: 0:00:11 lr: 0.005000 loss: 0.4298 (0.4288) loss_classifier: 0.1327 (0.1300) loss_box_reg: 0.2017 (0.1866) loss_objectness: 0.0814 (0.0868) l
oss_rpn_box_reg: 0.0234 (0.0255) time: 0.3804 data: 0.0395 max mem: 6264
Epoch: [2] [40/60] eta: 0:00:07 lr: 0.005000 loss: 0.4020 (0.4208) loss_classifier: 0.1207 (0.1266) loss_box_reg: 0.1513 (0.1819) loss_objectness: 0.0774 (0.0865) l
oss_rpn_box_reg: 0.0253 (0.0258) time: 0.3727 data: 0.0346 max mem: 6264
Epoch: [2] [50/60] eta: 0:00:03 lr: 0.005000 loss: 0.3682 (0.4048) loss_classifier: 0.1056 (0.1216) loss_box_reg: 0.1464 (0.1741) loss_objectness: 0.0764 (0.0835) l
oss_rpn_box_reg: 0.0227 (0.0255) time: 0.3695 data: 0.0342 max mem: 6264
Epoch: [2] [59/60] eta: 0:00:00 lr: 0.005000 loss: 0.3682 (0.4099) loss_classifier: 0.1056 (0.1238) loss_box_reg: 0.1556 (0.1793) loss_objectness: 0.0668 (0.0812) l
oss_rpn_box_reg: 0.0215 (0.0255) time: 0.3782 data: 0.0391 max mem: 6264
Epoch: [2] Total time: 0:00:22 (0.3782 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:04 model_time: 0.0564 (0.0564) evaluator_time: 0.0048 (0.0048) time: 0.0909 data: 0.0288 max mem: 6264
Test: [49/50] eta: 0:00:00 model_time: 0.0338 (0.0363) evaluator_time: 0.0037 (0.0043) time: 0.0618 data: 0.0224 max mem: 6264
Test: Total time: 0:00:03 (0.0639 s / it)
Averaged stats: model_time: 0.0338 (0.0363) evaluator_time: 0.0037 (0.0043)
Accumulating evaluation results...
DONE (t=0.03s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.206
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.552
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.063
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.228
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.141
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.381
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.412
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area= medium | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.455
Model 2 Epoch: 3
Epoch: [3] [ 0/60] eta: 0:00:22 lr: 0.000500 loss: 0.4481 (0.4481) loss_classifier: 0.1347 (0.1347) loss_box_reg: 0.2129 (0.2129) loss_objectness: 0.0810 (0.0810) l
oss_rpn_box_reg: 0.0195 (0.0195) time: 0.3754 data: 0.0440 max mem: 6264

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Epoch: [3] [10/60] eta: 0:00:19 lr: 0.000500 loss: 0.3439 (0.3628) loss_classifier: 0.1153 (0.1113) loss_box_reg: 0.1754 (0.1707) loss_objectness: 0.0569 (0.0573) 1
oss_rpn_box_reg: 0.0234 (0.0235) time: 0.3869 data: 0.0380 max mem: 6264
Epoch: [3] [20/60] eta: 0:00:15 lr: 0.000500 loss: 0.3216 (0.3389) loss_classifier: 0.0992 (0.1041) loss_box_reg: 0.1535 (0.1563) loss_objectness: 0.0542 (0.0577) 1
oss_rpn_box_reg: 0.0201 (0.0208) time: 0.3821 data: 0.0383 max mem: 6264
Epoch: [3] [30/60] eta: 0:00:11 lr: 0.000500 loss: 0.3216 (0.3517) loss_classifier: 0.1030 (0.1079) loss_box_reg: 0.1612 (0.1644) loss_objectness: 0.0571 (0.0585) 1
oss_rpn_box_reg: 0.0184 (0.0209) time: 0.3786 data: 0.0372 max mem: 6264
Epoch: [3] [40/60] eta: 0:00:07 lr: 0.000500 loss: 0.3549 (0.3523) loss_classifier: 0.1067 (0.1080) loss_box_reg: 0.1705 (0.1640) loss_objectness: 0.0620 (0.0580) 1
oss_rpn_box_reg: 0.0228 (0.0224) time: 0.3842 data: 0.0362 max mem: 6264
Epoch: [3] [50/60] eta: 0:00:03 lr: 0.000500 loss: 0.3358 (0.3526) loss_classifier: 0.1067 (0.1090) loss_box_reg: 0.1589 (0.1649) loss_objectness: 0.0577 (0.0572) 1
oss_rpn_box_reg: 0.0208 (0.0215) time: 0.3863 data: 0.0402 max mem: 6264
Epoch: [3] [59/60] eta: 0:00:00 lr: 0.000500 loss: 0.3065 (0.3492) loss_classifier: 0.1011 (0.1070) loss_box_reg: 0.1562 (0.1631) loss_objectness: 0.0480 (0.0581) 1
oss_rpn_box_reg: 0.0183 (0.0211) time: 0.3807 data: 0.0394 max mem: 6264
Epoch: [3] Total time: 0:00:22 (0.3819 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:03 model_time: 0.0543 (0.0543) evaluator_time: 0.0025 (0.0025) time: 0.0744 data: 0.0169 max mem: 6264
Test: [49/50] eta: 0:00:00 model_time: 0.0326 (0.0352) evaluator_time: 0.0017 (0.0019) time: 0.0515 data: 0.0161 max mem: 6264
Test: Total time: 0:00:02 (0.0540 s / it)
Averaged stats: model_time: 0.0326 (0.0352) evaluator_time: 0.0017 (0.0019)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.222
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.599
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.084
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.246
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.157
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.386
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.414
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.457
Model 2 Epoch: 4
Epoch: [4] [ 0/60] eta: 0:00:23 lr: 0.000500 loss: 0.3060 (0.3060) loss_classifier: 0.0976 (0.0976) loss_box_reg: 0.1501 (0.1501) loss_objectness: 0.0435 (0.0435) 1
oss_rpn_box_reg: 0.0148 (0.0148) time: 0.3883 data: 0.0459 max mem: 6264
Epoch: [4] [10/60] eta: 0:00:19 lr: 0.000500 loss: 0.3060 (0.3268) loss_classifier: 0.0976 (0.1039) loss_box_reg: 0.1409 (0.1477) loss_objectness: 0.0590 (0.0565) 1
oss_rpn_box_reg: 0.0148 (0.0188) time: 0.3977 data: 0.0474 max mem: 6264
Epoch: [4] [20/60] eta: 0:00:15 lr: 0.000500 loss: 0.3483 (0.3647) loss_classifier: 0.1080 (0.1158) loss_box_reg: 0.1570 (0.1722) loss_objectness: 0.0538 (0.0567) 1
oss_rpn_box_reg: 0.0173 (0.0201) time: 0.3888 data: 0.0413 max mem: 6264
Epoch: [4] [30/60] eta: 0:00:11 lr: 0.000500 loss: 0.3649 (0.3614) loss_classifier: 0.1056 (0.1116) loss_box_reg: 0.1827 (0.1712) loss_objectness: 0.0523 (0.0576) 1
oss_rpn_box_reg: 0.0194 (0.0211) time: 0.3780 data: 0.0349 max mem: 6264
Epoch: [4] [40/60] eta: 0:00:07 lr: 0.000500 loss: 0.3387 (0.3632) loss_classifier: 0.0948 (0.1108) loss_box_reg: 0.1673 (0.1717) loss_objectness: 0.0498 (0.0586) 1
oss_rpn_box_reg: 0.0232 (0.0222) time: 0.3841 data: 0.0390 max mem: 6264
Epoch: [4] [50/60] eta: 0:00:03 lr: 0.000500 loss: 0.3387 (0.3586) loss_classifier: 0.1016 (0.1096) loss_box_reg: 0.1673 (0.1700) loss_objectness: 0.0504 (0.0577) 1
oss_rpn_box_reg: 0.0192 (0.0213) time: 0.3847 data: 0.0403 max mem: 6264
Epoch: [4] [59/60] eta: 0:00:00 lr: 0.000500 loss: 0.2903 (0.3500) loss_classifier: 0.0981 (0.1075) loss_box_reg: 0.1418 (0.1655) loss_objectness: 0.0504 (0.0563) 1
oss_rpn_box_reg: 0.0150 (0.0207) time: 0.3776 data: 0.0356 max mem: 6264
Epoch: [4] Total time: 0:00:22 (0.3829 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:03 model_time: 0.0543 (0.0543) evaluator_time: 0.0024 (0.0024) time: 0.0760 data: 0.0186 max mem: 6264
Test: [49/50] eta: 0:00:00 model_time: 0.0343 (0.0363) evaluator_time: 0.0033 (0.0050) time: 0.0662 data: 0.0219 max mem: 6264
Test: Total time: 0:00:03 (0.0621 s / it)
Averaged stats: model_time: 0.0343 (0.0363) evaluator_time: 0.0033 (0.0050)
Accumulating evaluation results...
DONE (t=0.03s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.279
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.645
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.157
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.002
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.308
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.182
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.429
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.454
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.067
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.497
Model 2 Epoch: 5
Epoch: [5] [ 0/60] eta: 0:00:23 lr: 0.000500 loss: 0.6110 (0.6110) loss_classifier: 0.1749 (0.1749) loss_box_reg: 0.2841 (0.2841) loss_objectness: 0.1050 (0.1050) 1
oss_rpn_box_reg: 0.0470 (0.0470) time: 0.3990 data: 0.0475 max mem: 6264
Epoch: [5] [10/60] eta: 0:00:18 lr: 0.000500 loss: 0.3202 (0.3145) loss_classifier: 0.1059 (0.0987) loss_box_reg: 0.1407 (0.1428) loss_objectness: 0.0445 (0.0554) 1
oss_rpn_box_reg: 0.0142 (0.0177) time: 0.3774 data: 0.0368 max mem: 6264
Epoch: [5] [20/60] eta: 0:00:15 lr: 0.000500 loss: 0.3202 (0.3502) loss_classifier: 0.1026 (0.1043) loss_box_reg: 0.1407 (0.1639) loss_objectness: 0.0498 (0.0616) 1
oss_rpn_box_reg: 0.0161 (0.0204) time: 0.3790 data: 0.0359 max mem: 6264
Epoch: [5] [30/60] eta: 0:00:11 lr: 0.000500 loss: 0.3115 (0.3456) loss_classifier: 0.1009 (0.1048) loss_box_reg: 0.1383 (0.1634) loss_objectness: 0.0521 (0.0579) 1
oss_rpn_box_reg: 0.0183 (0.0196) time: 0.3765 data: 0.0356 max mem: 6264
Epoch: [5] [40/60] eta: 0:00:07 lr: 0.000500 loss: 0.3016 (0.3376) loss_classifier: 0.0947 (0.1021) loss_box_reg: 0.1300 (0.1581) loss_objectness: 0.0525 (0.0580) 1
oss_rpn_box_reg: 0.0164 (0.0194) time: 0.3746 data: 0.0389 max mem: 6264
Epoch: [5] [50/60] eta: 0:00:03 lr: 0.000500 loss: 0.3181 (0.3369) loss_classifier: 0.0858 (0.1008) loss_box_reg: 0.1355 (0.1588) loss_objectness: 0.0574 (0.0569) 1
oss_rpn_box_reg: 0.0168 (0.0203) time: 0.3805 data: 0.0384 max mem: 6264
Epoch: [5] [59/60] eta: 0:00:00 lr: 0.000500 loss: 0.3293 (0.3430) loss_classifier: 0.0954 (0.1028) loss_box_reg: 0.1463 (0.1619) loss_objectness: 0.0472 (0.0579) 1
oss_rpn_box_reg: 0.0162 (0.0204) time: 0.3846 data: 0.0346 max mem: 6698
Epoch: [5] Total time: 0:00:22 (0.3801 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:04 model_time: 0.0558 (0.0558) evaluator_time: 0.0051 (0.0051) time: 0.0865 data: 0.0248 max mem: 6698
Test: [49/50] eta: 0:00:00 model_time: 0.0344 (0.0365) evaluator_time: 0.0020 (0.0034) time: 0.0565 data: 0.0183 max mem: 6698
Test: Total time: 0:00:03 (0.0614 s / it)
Averaged stats: model_time: 0.0344 (0.0365) evaluator_time: 0.0020 (0.0034)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.244
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.621
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.106
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.004
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.269
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.159
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.394
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.418
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.067
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.457
Model 2 Epoch: 6
Epoch: [6] [ 0/60] eta: 0:00:20 lr: 0.000050 loss: 0.3441 (0.3441) loss_classifier: 0.1117 (0.1117) loss_box_reg: 0.1667 (0.1667) loss_objectness: 0.0453 (0.0453) 1
oss_rpn_box_reg: 0.0204 (0.0204) time: 0.3436 data: 0.0268 max mem: 6698
Epoch: [6] [10/60] eta: 0:00:18 lr: 0.000050 loss: 0.3446 (0.3596) loss_classifier: 0.1105 (0.1085) loss_box_reg: 0.1865 (0.1809) loss_objectness: 0.0481 (0.0506) 1
oss_rpn_box_reg: 0.0204 (0.0197) time: 0.3729 data: 0.0367 max mem: 6698
Epoch: [6] [20/60] eta: 0:00:15 lr: 0.000050 loss: 0.2979 (0.3221) loss_classifier: 0.0930 (0.0967) loss_box_reg: 0.1443 (0.1573) loss_objectness: 0.0454 (0.0483) 1
oss_rpn_box_reg: 0.0179 (0.0197) time: 0.3775 data: 0.0367 max mem: 6698

```

```

Epoch: [6] [30/60] eta: 0:00:11 lr: 0.000050 loss: 0.2815 (0.3187) loss_classifier: 0.0869 (0.0985) loss_box_reg: 0.1379 (0.1533) loss_objectness: 0.0386 (0.0475) 1
oss_rpn_box_reg: 0.0167 (0.0194) time: 0.3818 data: 0.0380 max mem: 6698
Epoch: [6] [40/60] eta: 0:00:07 lr: 0.000050 loss: 0.2880 (0.3140) loss_classifier: 0.0921 (0.0972) loss_box_reg: 0.1379 (0.1516) loss_objectness: 0.0386 (0.0470) 1
oss_rpn_box_reg: 0.0147 (0.0183) time: 0.3778 data: 0.0371 max mem: 6698
Epoch: [6] [50/60] eta: 0:00:03 lr: 0.000050 loss: 0.2981 (0.3280) loss_classifier: 0.0908 (0.1001) loss_box_reg: 0.1379 (0.1578) loss_objectness: 0.0450 (0.0508) 1
oss_rpn_box_reg: 0.0191 (0.0193) time: 0.3813 data: 0.0365 max mem: 6698
Epoch: [6] [59/60] eta: 0:00:00 lr: 0.000050 loss: 0.3217 (0.3301) loss_classifier: 0.1031 (0.1014) loss_box_reg: 0.1474 (0.1591) loss_objectness: 0.0502 (0.0502) 1
oss_rpn_box_reg: 0.0192 (0.0194) time: 0.3892 data: 0.0359 max mem: 6698
Epoch: [6] Total time: 0:00:22 (0.3816 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:03 model_time: 0.0550 (0.0550) evaluator_time: 0.0026 (0.0026) time: 0.0791 data: 0.0207 max mem: 6698
Test: [49/50] eta: 0:00:00 model_time: 0.0347 (0.0363) evaluator_time: 0.0018 (0.0021) time: 0.0548 data: 0.0173 max mem: 6698
Test: Total time: 0:00:02 (0.0565 s / it)
Averaged stats: model_time: 0.0347 (0.0363) evaluator_time: 0.0018 (0.0021)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.248
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.654
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.074
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.003
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.273
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.156
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.404
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.432
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.056
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.473
Model 2 Epoch: 7
Epoch: [7] [ 0/60] eta: 0:00:21 lr: 0.000050 loss: 0.2458 (0.2458) loss_classifier: 0.0645 (0.0645) loss_box_reg: 0.1382 (0.1382) loss_objectness: 0.0258 (0.0258) 1
oss_rpn_box_reg: 0.0173 (0.0173) time: 0.3662 data: 0.0361 max mem: 6698
Epoch: [7] [10/60] eta: 0:00:18 lr: 0.000050 loss: 0.2629 (0.3183) loss_classifier: 0.0960 (0.0969) loss_box_reg: 0.1356 (0.1473) loss_objectness: 0.0418 (0.0530) 1
oss_rpn_box_reg: 0.0176 (0.0211) time: 0.3693 data: 0.0323 max mem: 6698
Epoch: [7] [20/60] eta: 0:00:15 lr: 0.000050 loss: 0.3018 (0.3290) loss_classifier: 0.0960 (0.1004) loss_box_reg: 0.1356 (0.1556) loss_objectness: 0.0425 (0.0525) 1
oss_rpn_box_reg: 0.0190 (0.0206) time: 0.3700 data: 0.0356 max mem: 6698
Epoch: [7] [30/60] eta: 0:00:11 lr: 0.000050 loss: 0.3247 (0.3496) loss_classifier: 0.0976 (0.1062) loss_box_reg: 0.1588 (0.1684) loss_objectness: 0.0499 (0.0544) 1
oss_rpn_box_reg: 0.0190 (0.0207) time: 0.3895 data: 0.0439 max mem: 6698
Epoch: [7] [40/60] eta: 0:00:07 lr: 0.000050 loss: 0.3315 (0.3473) loss_classifier: 0.0988 (0.1055) loss_box_reg: 0.1758 (0.1672) loss_objectness: 0.0500 (0.0539) 1
oss_rpn_box_reg: 0.0204 (0.0207) time: 0.3878 data: 0.0421 max mem: 6698
Epoch: [7] [50/60] eta: 0:00:03 lr: 0.000050 loss: 0.3005 (0.3331) loss_classifier: 0.0882 (0.1012) loss_box_reg: 0.1401 (0.1601) loss_objectness: 0.0481 (0.0524) 1
oss_rpn_box_reg: 0.0173 (0.0194) time: 0.3751 data: 0.0333 max mem: 6698
Epoch: [7] [59/60] eta: 0:00:00 lr: 0.000050 loss: 0.2915 (0.3343) loss_classifier: 0.0870 (0.1021) loss_box_reg: 0.1539 (0.1606) loss_objectness: 0.0485 (0.0523) 1
oss_rpn_box_reg: 0.0156 (0.0194) time: 0.3839 data: 0.0375 max mem: 6698
Epoch: [7] Total time: 0:00:22 (0.3824 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:03 model_time: 0.0543 (0.0543) evaluator_time: 0.0025 (0.0025) time: 0.0749 data: 0.0173 max mem: 6698
Test: [49/50] eta: 0:00:00 model_time: 0.0332 (0.0362) evaluator_time: 0.0018 (0.0022) time: 0.0539 data: 0.0171 max mem: 6698
Test: Total time: 0:00:02 (0.0563 s / it)
Averaged stats: model_time: 0.0332 (0.0362) evaluator_time: 0.0018 (0.0022)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.268
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.640
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.166
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.004
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.296
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.181
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.433
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.459
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.056
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.503
Model 2 Epoch: 8
Epoch: [8] [ 0/60] eta: 0:00:22 lr: 0.000050 loss: 0.4425 (0.4425) loss_classifier: 0.1317 (0.1317) loss_box_reg: 0.1979 (0.1979) loss_objectness: 0.0853 (0.0853) 1
oss_rpn_box_reg: 0.0276 (0.0276) time: 0.3714 data: 0.0305 max mem: 6698
Epoch: [8] [10/60] eta: 0:00:18 lr: 0.000050 loss: 0.3537 (0.3539) loss_classifier: 0.1093 (0.1074) loss_box_reg: 0.1728 (0.1715) loss_objectness: 0.0553 (0.0527) 1
oss_rpn_box_reg: 0.0218 (0.0222) time: 0.3745 data: 0.0329 max mem: 6698
Epoch: [8] [20/60] eta: 0:00:15 lr: 0.000050 loss: 0.3457 (0.3768) loss_classifier: 0.1065 (0.1140) loss_box_reg: 0.1633 (0.1859) loss_objectness: 0.0543 (0.0545) 1
oss_rpn_box_reg: 0.0191 (0.0225) time: 0.3882 data: 0.0393 max mem: 6698
Epoch: [8] [30/60] eta: 0:00:11 lr: 0.000050 loss: 0.2902 (0.3482) loss_classifier: 0.0924 (0.1072) loss_box_reg: 0.1319 (0.1685) loss_objectness: 0.0415 (0.0518) 1
oss_rpn_box_reg: 0.0168 (0.0207) time: 0.3912 data: 0.0410 max mem: 6698
Epoch: [8] [40/60] eta: 0:00:07 lr: 0.000050 loss: 0.2577 (0.3306) loss_classifier: 0.0835 (0.1037) loss_box_reg: 0.1242 (0.1621) loss_objectness: 0.0408 (0.0526) 1
oss_rpn_box_reg: 0.0162 (0.0202) time: 0.3834 data: 0.0374 max mem: 6698
Epoch: [8] [50/60] eta: 0:00:03 lr: 0.000050 loss: 0.2839 (0.3280) loss_classifier: 0.0816 (0.1001) loss_box_reg: 0.1317 (0.1564) loss_objectness: 0.0482 (0.0519) 1
oss_rpn_box_reg: 0.0156 (0.0195) time: 0.3818 data: 0.0397 max mem: 6698
Epoch: [8] [59/60] eta: 0:00:00 lr: 0.000050 loss: 0.2839 (0.3250) loss_classifier: 0.0880 (0.0991) loss_box_reg: 0.1423 (0.1543) loss_objectness: 0.0434 (0.0526) 1
oss_rpn_box_reg: 0.0146 (0.0190) time: 0.3831 data: 0.0416 max mem: 6698
Epoch: [8] Total time: 0:00:23 (0.3840 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:03 model_time: 0.0550 (0.0550) evaluator_time: 0.0024 (0.0024) time: 0.0759 data: 0.0178 max mem: 6698
Test: [49/50] eta: 0:00:00 model_time: 0.0337 (0.0360) evaluator_time: 0.0017 (0.0021) time: 0.0529 data: 0.0164 max mem: 6698
Test: Total time: 0:00:02 (0.0555 s / it)
Averaged stats: model_time: 0.0337 (0.0360) evaluator_time: 0.0017 (0.0021)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.274
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.674
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.159
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.002
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.303
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.177
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.402
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.433
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.067
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.473
Model 2 Epoch: 9
Epoch: [9] [ 0/60] eta: 0:00:21 lr: 0.000005 loss: 0.2460 (0.2460) loss_classifier: 0.0772 (0.0772) loss_box_reg: 0.0851 (0.0851) loss_objectness: 0.0695 (0.0695) 1
oss_rpn_box_reg: 0.0143 (0.0143) time: 0.3595 data: 0.0282 max mem: 6698
Epoch: [9] [10/60] eta: 0:00:19 lr: 0.000005 loss: 0.3128 (0.3490) loss_classifier: 0.1043 (0.1090) loss_box_reg: 0.1557 (0.1661) loss_objectness: 0.0507 (0.0528) 1
oss_rpn_box_reg: 0.0184 (0.0211) time: 0.3812 data: 0.0373 max mem: 6698
Epoch: [9] [20/60] eta: 0:00:15 lr: 0.000005 loss: 0.3055 (0.3252) loss_classifier: 0.0996 (0.1000) loss_box_reg: 0.1423 (0.1527) loss_objectness: 0.0504 (0.0517) 1
oss_rpn_box_reg: 0.0183 (0.0208) time: 0.3827 data: 0.0378 max mem: 6698
Epoch: [9] [30/60] eta: 0:00:11 lr: 0.000005 loss: 0.3133 (0.3458) loss_classifier: 0.1029 (0.1053) loss_box_reg: 0.1559 (0.1669) loss_objectness: 0.0531 (0.0533) 1
oss_rpn_box_reg: 0.0151 (0.0202) time: 0.3792 data: 0.0380 max mem: 6698
Epoch: [9] [40/60] eta: 0:00:07 lr: 0.000005 loss: 0.3147 (0.3327) loss_classifier: 0.0928 (0.1006) loss_box_reg: 0.1422 (0.1570) loss_objectness: 0.0547 (0.0553) 1
oss_rpn_box_reg: 0.0164 (0.0197) time: 0.3742 data: 0.0354 max mem: 6698

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Epoch: [9] [50/60] eta: 0:00:03 lr: 0.000005 loss: 0.3147 (0.3339) loss_classifier: 0.0905 (0.1009) loss_box_reg: 0.1416 (0.1595) loss_objectness: 0.0440 (0.0539) 1
oss_rpn_box_reg: 0.0171 (0.0196) time: 0.3785 data: 0.0387 max mem: 6698
Epoch: [9] [59/60] eta: 0:00:00 lr: 0.000005 loss: 0.3137 (0.3334) loss_classifier: 0.0933 (0.1010) loss_box_reg: 0.1546 (0.1593) loss_objectness: 0.0440 (0.0534) 1
oss_rpn_box_reg: 0.0176 (0.0197) time: 0.3840 data: 0.0408 max mem: 6698
Epoch: [9] Total time: 0:00:22 (0.3805 s / it)
creating index...
index created!
Test: [ 0/50] eta: 0:00:03 model_time: 0.0545 (0.0545) evaluator_time: 0.0024 (0.0024) time: 0.0752 data: 0.0176 max mem: 6698
Test: [49/50] eta: 0:00:00 model_time: 0.0351 (0.0366) evaluator_time: 0.0019 (0.0022) time: 0.0553 data: 0.0174 max mem: 6698
Test: Total time: 0:00:02 (0.0572 s / it)
Averaged stats: model_time: 0.0351 (0.0366) evaluator_time: 0.0019 (0.0022)
Accumulating evaluation results...
DONE (t=0.02s).
IoU metric: bbox
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.273
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.652
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.135
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.003
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.302
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.184
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.431
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.465
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.000
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.089
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.507

```

That's it! Model 2

```

In [15]: import torch
import torchvision
from PIL import Image
import matplotlib.pyplot as plt

url = "https://upload.wikimedia.org/wikipedia/en/4/42/Beatles_-_Abbey_Road.jpg"
img = Image.open(requests.get(url, stream=True).raw)

transform = transforms.Compose([transforms.Resize(256),
                                transforms.CenterCrop(224),
                                transforms.ToTensor(),
                                ])

img = transform(img).to(device)

# Plot the original image
plt.imshow(transforms.ToPILImage()(img))
print ("Original Image")
plt.show()

transform = torchvision.transforms.Compose([
    torchvision.transforms.Resize(256),
    torchvision.transforms.CenterCrop(224),

    torchvision.transforms.Normalize(
        mean=[0.485, 0.456, 0.406],
        std=[0.229, 0.224, 0.225]
    )
])

img = transform(img).to(device)

print("OPTION 1")

# Make a prediction
with torch.no_grad():
    output = model_option1(img.unsqueeze(0))
    print('Prediction for model_option1: \n', output)

# Filter the output to keep only the top scoring boxes
threshold = 0.5
_boxes = output[0]['boxes']

# Draw the boxes on the image
fig, ax = plt.subplots()
ax.imshow(transforms.ToPILImage()(img))

for box in _boxes:
    x1, y1, x2, y2 = box.tolist()
    w, h = x2 - x1, y2 - y1
    rect = plt.Rectangle((x1, y1), w, h, linewidth=1, edgecolor='r', facecolor='none')
    ax.add_patch(rect)
plt.show()

print("OPTION 2")

# Make a prediction
with torch.no_grad():
    output = model_option2(img.unsqueeze(0))
    print('Prediction for model_option2: \n', output)

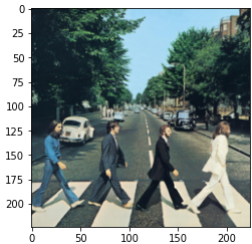
# Filter the output to keep only the top scoring boxes
threshold = 0.5
_boxes = output[0]['boxes']

# Draw the boxes on the image
fig, ax = plt.subplots()
ax.imshow(transforms.ToPILImage()(img))

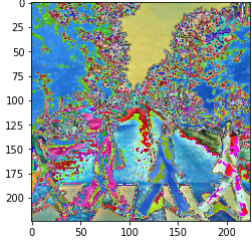
for box in _boxes:
    x1, y1, x2, y2 = box.tolist()
    w, h = x2 - x1, y2 - y1
    rect = plt.Rectangle((x1, y1), w, h, linewidth=1, edgecolor='r', facecolor='none')
    ax.add_patch(rect)
plt.show()

Original Image

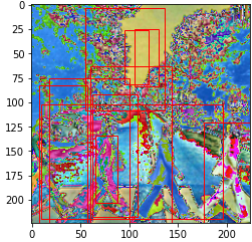
```



OPTION 1
Prediction for model_option1:
[{'boxes': tensor([], device='cuda:0', size=(0, 4)), 'labels': tensor([], device='cuda:0', dtype=torch.int64), 'scores': tensor([], device='cuda:0'), 'masks': tensor([], device='cuda:0', size=(0, 1, 224, 224))}]



OPTION 2
Prediction for model_option2:
[{'boxes': tensor([[61.7875, 91.8146, 108.8170, 217.9420],
[7.7791, 82.5294, 56.8638, 224.0000],
[176.3702, 120.4357, 223.9798, 224.0000],
[64.7320, 133.9791, 87.6553, 202.6269],
[60.2962, 63.2871, 143.0251, 224.0000],
[17.7155, 75.2567, 99.8058, 223.7091],
[95.4509, 26.1168, 119.9425, 81.9522],
[105.6704, 25.2083, 129.5414, 83.2234],
[9.1040, 102.0064, 196.3956, 219.8465],
[54.6946, 3.4210, 136.3288, 107.8350]], device='cuda:0'), 'labels': tensor([1, 1, 1, 1, 1, 1, 1, 1, 1, 1], device='cuda:0'), 'scores': tensor([0.3437, 0.2554, 0.1789, 0.1712, 0.1502, 0.1249, 0.1001, 0.0676, 0.0614, 0.0581], device='cuda:0')}]



In [15]: