EECE7398 – Lab 3

1. Dataset

The Stanford Dogs Dataset, consisting of 120 categories and 20,580 images, was used to fine-tune the YOLOv6-n model. The dataset was split into (70% training, 15% validation, 15% testing): Training set: 14,406 images, Validation set: 3,087 images, Testing set: 3,087 images

2. Outputs

Command used:

```
!python /content/YOLOv6/tools/eval.py  --weights yolov6n.pt --data /content/data.yaml --device 0
```

```
Fusing model...
Switch model to deploy modality.
Model Summary: Params: 4.65M, Gflops: 11.39
img record infomation path is:/content/YOLOv6/dataset/custom_dataset/images/.val_cache.json
Val: Checking formats of labels with 8 process(es):
3087 label(s) found, 0 label(s) missing, 0 label(s) empty, 0 invalid label files: 100% 3087/3087 [00:00<00:00, 9373.52it/s]
Convert to COCO format
100% 3087/3087 [00:00<00:00, 169705.05it/s]
Convert to COCO format finished. Resutls saved in /content/YOLOv6/dataset/custom_dataset/annotations/instances_val.json
Val: Final numbers of valid images: 3087/ labels: 3087.
0.6s for dataset initialization.
Inferencing model in val datasets.: 100%|██████████| 97/97 [00:52<00:00,  1.85it/s]

Evaluating speed.
Average pre-process time: 0.10 ms
Average inference time: 0.71 ms
Average NMS time: 1.63 ms

Evaluating mAP by pycocotools.
Saving runs/val/exp1/predictions.json...
loading annotations into memory...
Done (t=0.02s)
creating index...
index created!
Loading and preparing results...
DONE (t=4.17s)
creating index...
index created!
Running per image evaluation...
Evaluate annotation type *bbox*
DONE (t=27.13s).
Accumulating evaluation results...
DONE (t=12.18s).
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.001
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=100 ] = 0.001
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=100 ] = 0.001
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = -1.000
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.001
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.001
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=  1 ] = 0.066
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets= 10 ] = 0.100
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.103
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = -1.000
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.188
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.103
```

Figure 1: Testing on the target dataset without pretraining

Command used:

```
!python /content/YOLOv6/tools/train.py \
    --batch-size 32 \
    --conf-file /content/YOLOv6/configs/yolov6n_finetune.py \
    --epochs 100 \
    --img-size 1280 \
    --data-path /content/data.yaml \
    --device 0 \
    --name yolov6n_finetune
```

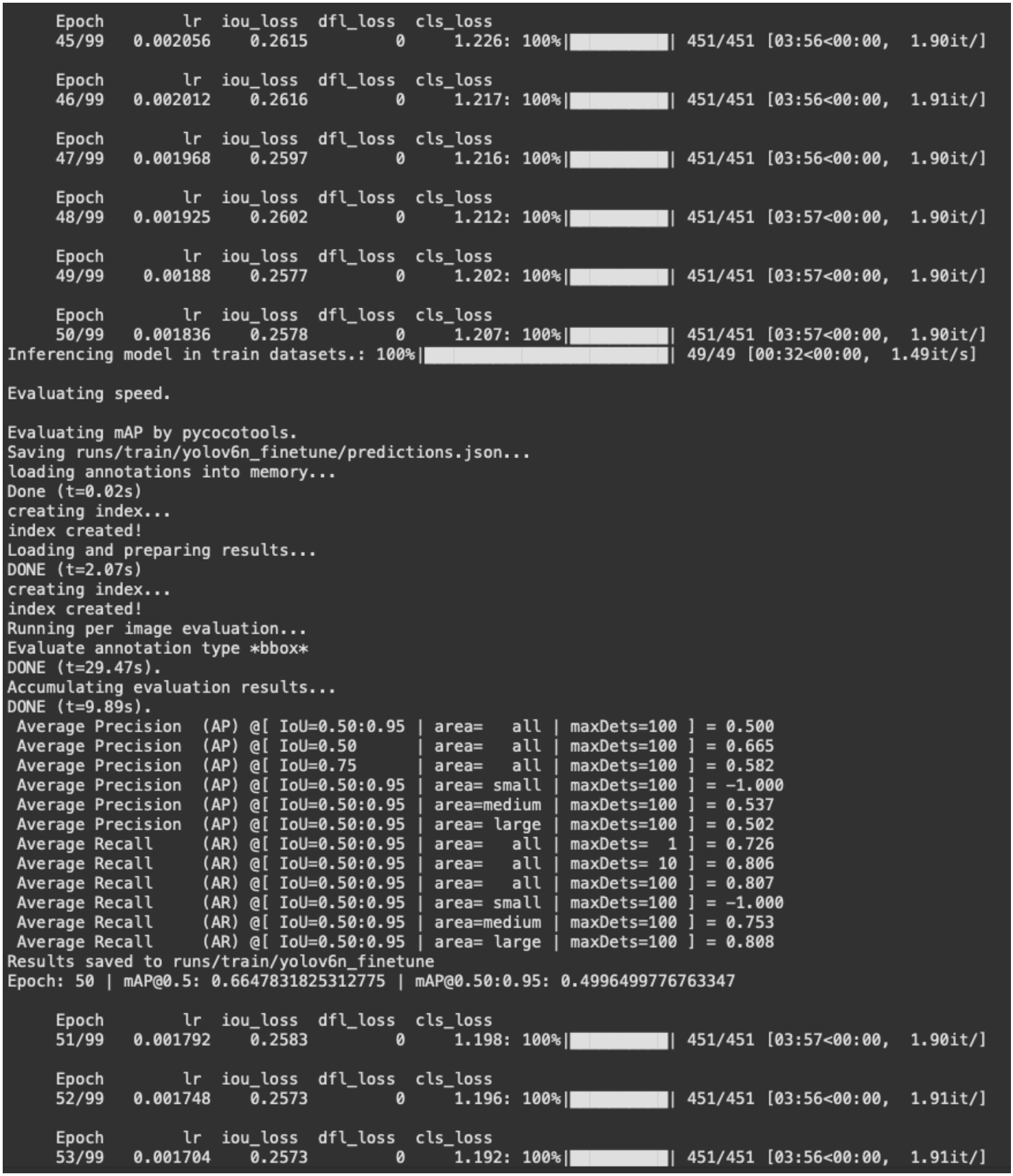

Figure 2: YOLOv6-n finetune training process

Command used:

```
!python /content/YOLOv6/tools/eval.py  --weights /content/best_ckpt.pt --data /content/data.yaml --device 0
```

```
Fusing model...
Switch model to deploy modality.
Model Summary: Params: 4.66M, Gflops: 11.42
img record infomation path is:/content/YOLOv6/dataset/custom_dataset/images/.val_cache.json
Val: Checking formats of labels with 8 process(es):
3087 label(s) found, 0 label(s) missing, 0 label(s) empty, 0 invalid label files: 100% 3087/3087 [00:00<00:00, 9974.87it/s]
Convert to COCO format
100% 3087/3087 [00:00<00:00, 163183.77it/s]
Convert to COCO format finished. Resutls saved in /content/YOLOv6/dataset/custom_dataset/annotations/instances_val.json
Val: Final numbers of valid images: 3087/ labels: 3087.
0.6s for dataset initialization.
Inferencing model in val datasets.: 100%|████████████████████████| 97/97 [00:18<00:00,  5.25it/s]

Evaluating speed.
Average pre-process time: 0.10 ms
Average inference time: 0.76 ms
Average NMS time: 1.22 ms

Evaluating mAP by pycocotools.
Saving runs/val/exp2/predictions.json...
loading annotations into memory...
Done (t=0.02s)
creating index...
index created!
Loading and preparing results...
DONE (t=0.92s)
creating index...
index created!
Running per image evaluation...
Evaluate annotation type *bbox*
DONE (t=15.51s).
Accumulating evaluation results...
DONE (t=5.03s).
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.691
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=100 ] = 0.779
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=100 ] = 0.739
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = -1.000
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.555
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.696
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=  1 ] = 0.847
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets= 10 ] = 0.910
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.910
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = -1.000
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.783
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.913
```

Figure 3: Testing on the target dataset after pretraining