

基于深度学习的物体检测 - 作业 2

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1. Faster R-CNN 的检测结果如 Fig.1-Fig.5 所示

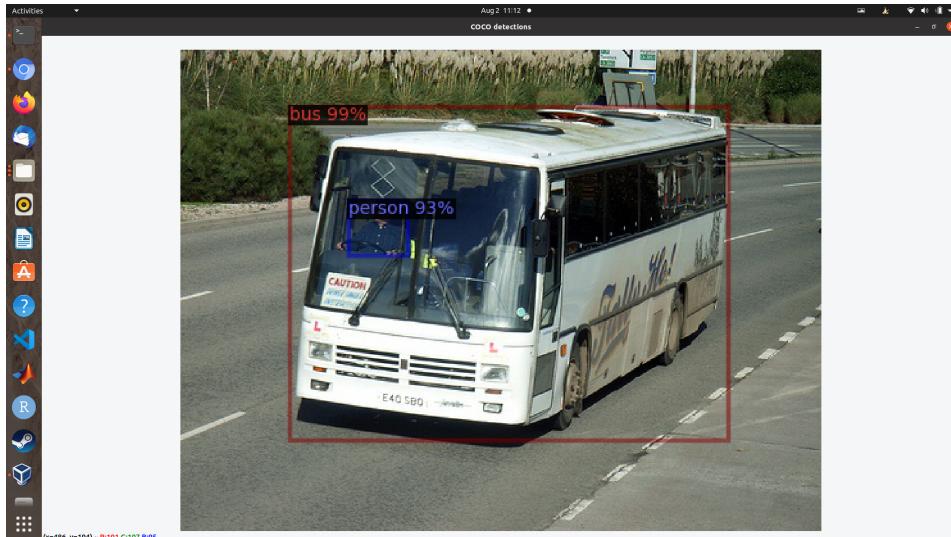


Figure 1: Faster R-CNN 检测结果 1

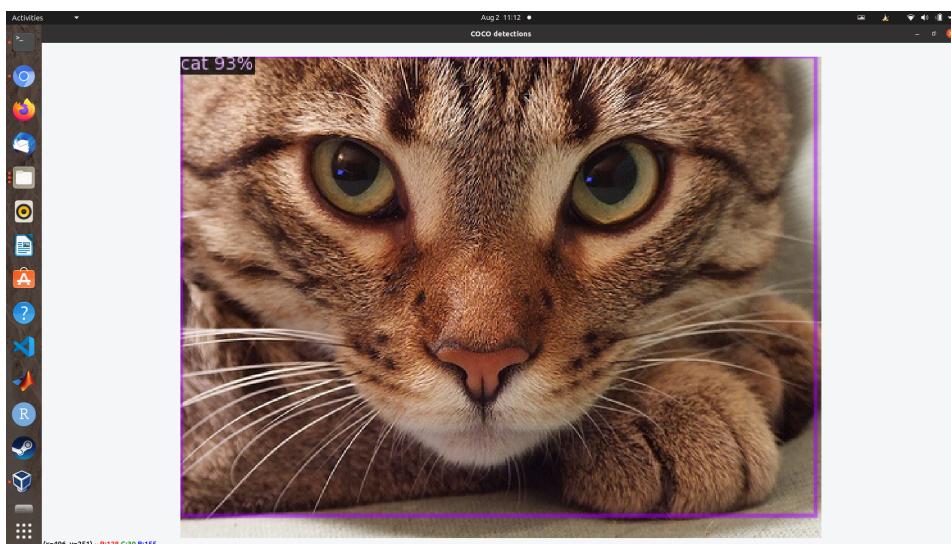


Figure 2: Faster R-CNN 检测结果 2

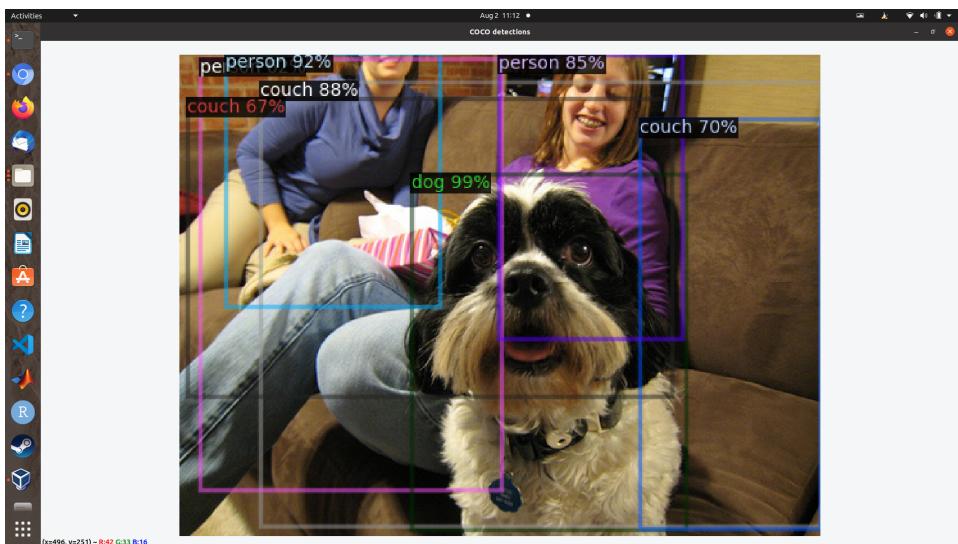


Figure 3: Faster R-CNN 检测结果 3

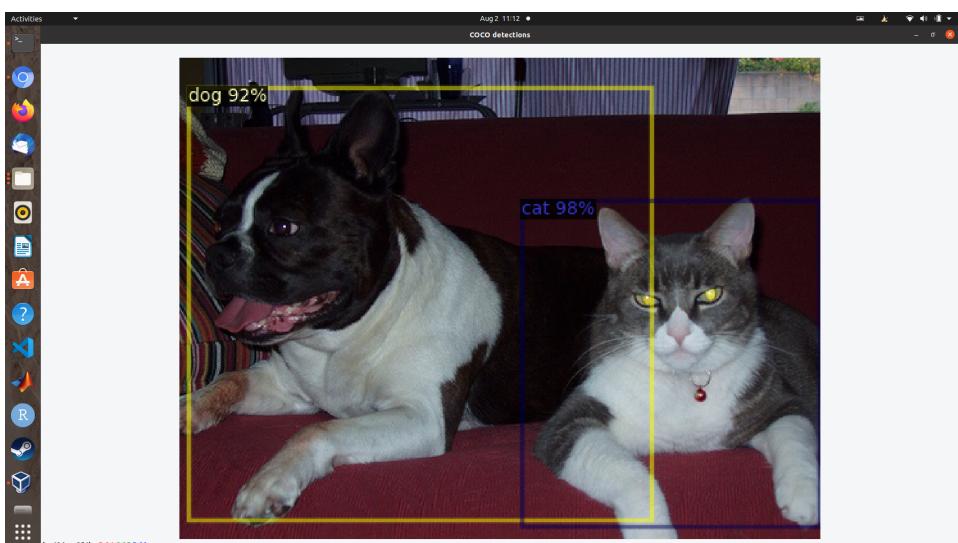


Figure 4: Faster R-CNN 检测结果 4

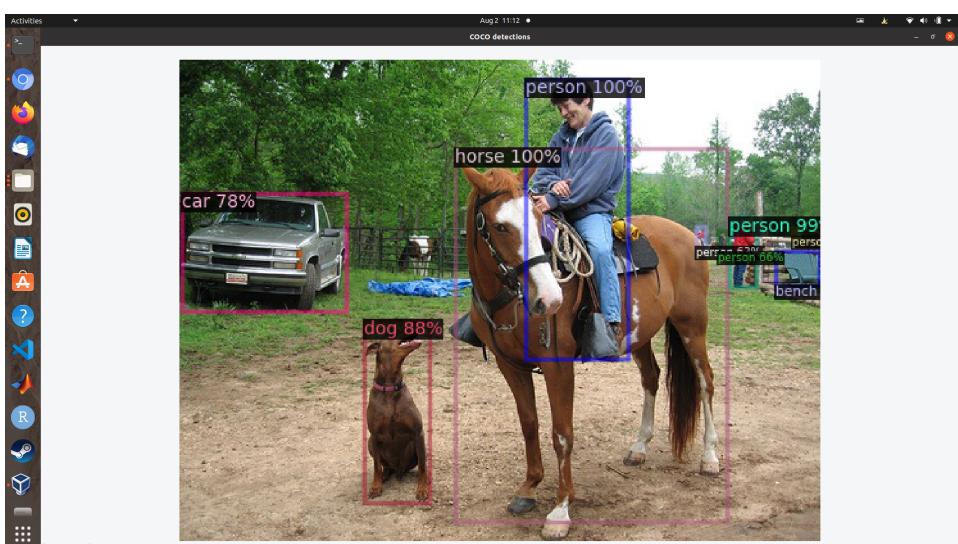


Figure 5: Faster R-CNN 检测结果 5

RetinaNet 的检测结果如 Fig.6-Fig.10 所示

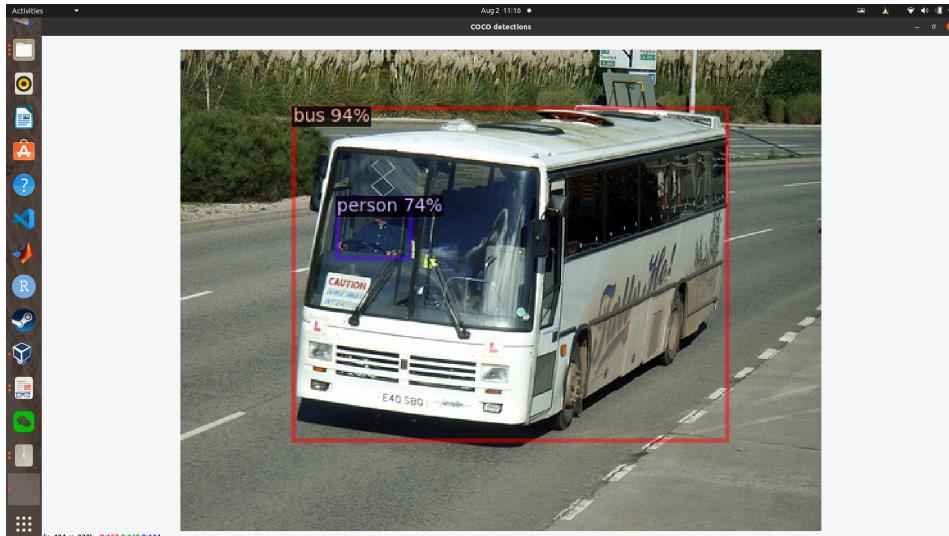


Figure 6: RetinaNet 检测结果 1

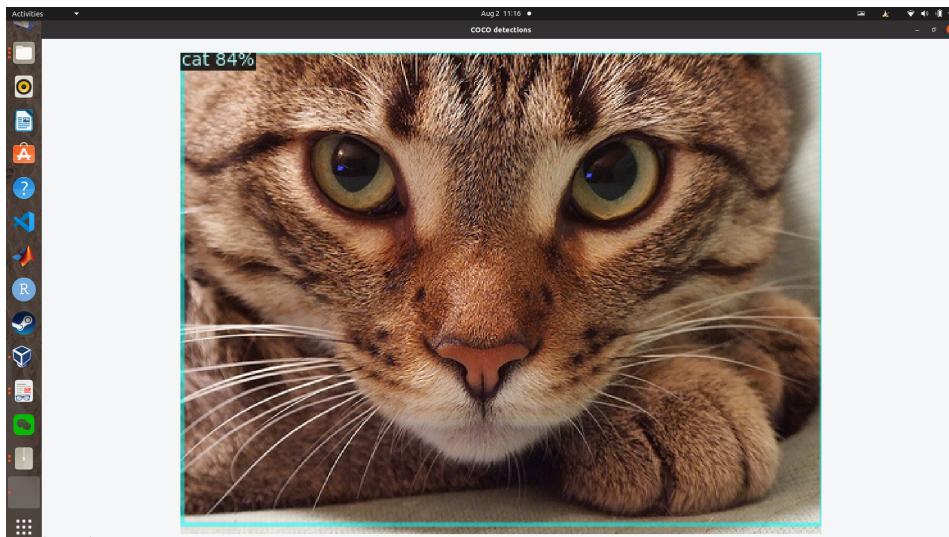


Figure 7: RetinaNet 检测结果 2

从检测结果上来看, Faster R-CNN 和 RetinaNet 都能够检测到图片中的主要目标。在运行速度上, Faster R-CNN 要比 RetinaNet 略微快一点; 在检测得到的置信度上 Faster R-CNN 的检测目标的置信度要比 RetinaNet 要高一些; 在检测结果数量上, Faster R-CNN 容易得到一些假阳性的检测框, 比如将同一个人的不同躯干识别成不同的人体, 而 RetinaNet 则要好一些。

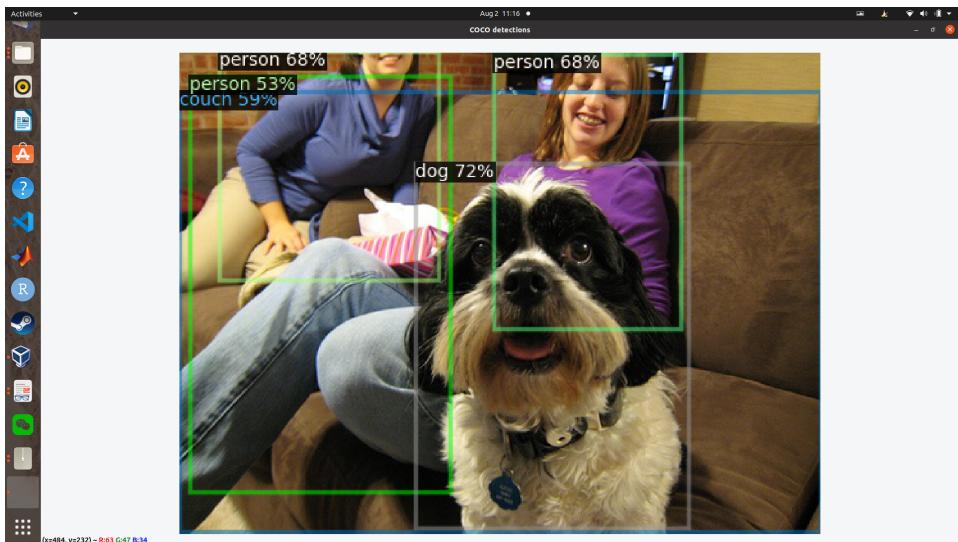


Figure 8: RetinaNet 检测结果 3

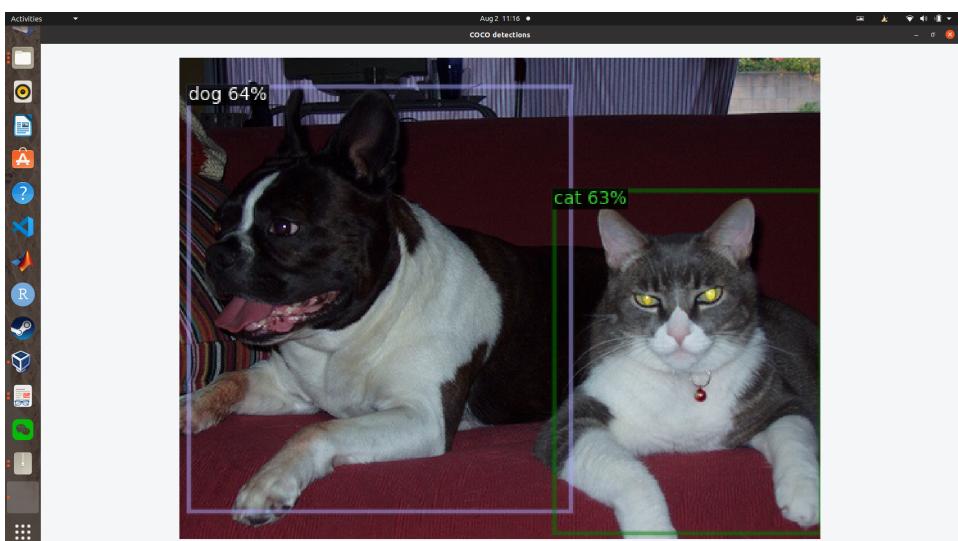


Figure 9: RetinaNet 检测结果 4

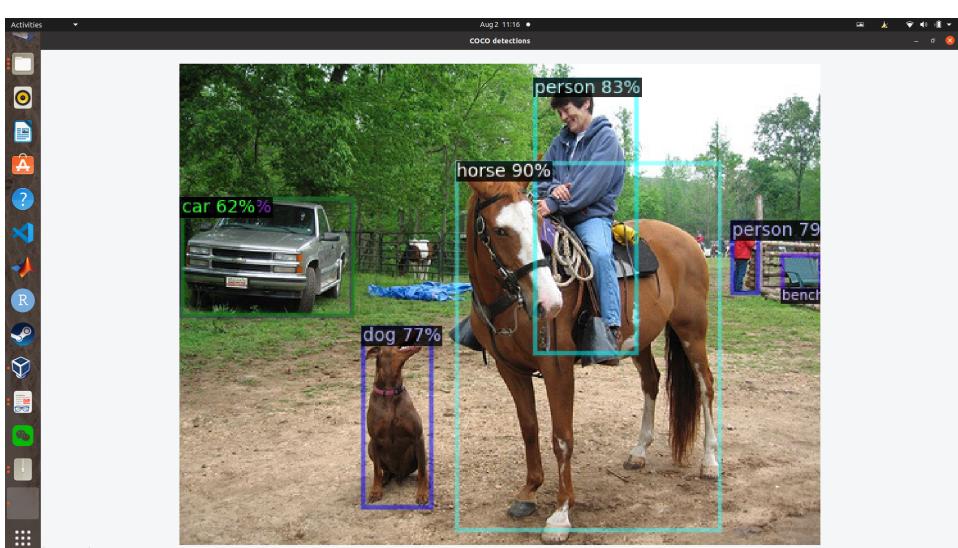


Figure 10: RetinaNet 检测结果 5

2. Faster R-CNN 和 RetinaNet 的评估结果如 Fig.11-Fig.12 所示。Faster R-CNN 的 AP 为 37.9316 而 RetinaNet 为 37.4235，与官方给出的结果相同。

```

Aug 2 15:44 • detectron2 - train_net.py

File Edit View Navigate Code Refactor Run Tools VCS Window Help
detectron2 tools train_net.py
Project Project Run: train_net
Run: train_net
Average Recall (AR) @[ IoU=0.50:8.95 | area= large | maxDets=100 ] = 0.651
[08/02 15:44:18 d2.evaluation.coco_evaluation]: Evaluation results for bbox:
| AP | AP50 | AP75 | APs | APm | APL |
|-----|-----|-----|-----|-----|-----|
| 37.932 | 58.355 | 41.948 | 22.448 | 41.145 | 49.899 |
[08/02 15:44:18 d2.evaluation.coco_evaluation]: Per-category bbox AP:
| category | AP | | | | |
|---|---|---|---|---|---|
| person | 52.783 | bicycle | 28.198 | car | 42.287 |
| motorcycle | 48.152 | airplane | 68.659 | bus | 61.211 |
| train | 56.946 | truck | 38.071 | boat | 24.932 |
| traffic light | 26.851 | fire hydrant | 65.991 | stop sign | 65.881 |
| parking meter | 43.798 | bench | 21.924 | bird | 34.199 |
| cat | 68.732 | dog | 55.181 | horse | 52.288 |
| sheep | 48.725 | cow | 51.986 | elephant | 57.473 |
| bear | 64.686 | zebra | 63.418 | giraffe | 63.338 |
| backpack | 13.899 | umbrella | 35.929 | handbag | 18.927 |
| tie | 35.826 | suitcase | 33.056 | teddy bear | 18.845 |
| skis | 28.297 | snowboard | 36.131 | sports ball | 66.424 |
| kite | 59.973 | baseball bat | 24.958 | baseball glove | 32.742 |
| skateboard | 46.179 | surfboard | 35.751 | tennis racket | 42.633 |
| bottle | 37.429 | wine glass | 32.072 | cup | 39.324 |
| fork | 29.148 | knife | 14.488 | spoon | 12.533 |
| bowl | 48.655 | banana | 21.687 | apple | 18.165 |
| sandwich | 29.688 | orange | 29.951 | broccoli | 22.443 |
| carrot | 19.431 | hot dog | 25.653 | pizza | 49.195 |
| donut | 42.992 | cake | 33.896 | chair | 23.771 |
| couch | 37.083 | potted plant | 19.553 | bed | 35.533 |
| dining table | 24.832 | toilet | 54.346 | tv | 52.369 |
| laptop | 56.347 | mouse | 68.835 | remote | 26.186 |
| keyboard | 47.919 | cell phone | 32.398 | microwave | 53.696 |
| oven | 58.948 | toaster | 37.164 | sink | 33.883 |
| refrigerator | 58.847 | book | 14.258 | clock | 48.849 |
| vase | 35.558 | scissors | 22.549 | teddy bear | 41.571 |
| hair dryer | 8.088 | toothbrush | 19.421 | |
[08/02 15:44:11 d2.engine.defaults]: Evaluation results for coco_2017_val in csv format:
[08/02 15:44:11 d2.evaluation.testing]: copypaste: Task: bbox
[08/02 15:44:11 d2.evaluation.testing]: copypaste: AP, AP50, AP75, APs, APm, APL
[08/02 15:44:11 d2.evaluation.testing]: copypaste: 37.9316, 58.355, 41.948, 22.448, 41.145, 49.899

```

Figure 11: Faster R-CNN 评估结果

```

Aug 2 17:06 • detectron2 - train_net.py

File Edit View Navigate Code Refactor Run Tools VCS Window Help
detectron2 tools train_net.py
Project Project Run: train_net
Run: train_net
[08/02 16:59:84 d2.evaluation.coco_evaluation]: Per-category bbox AP:
| category | AP | | | | |
|---|---|---|---|---|---|
| person | 51.538 | bicycle | 29.348 | car | 48.313 |
| motorcycle | 41.432 | airplane | 61.368 | bus | 65.862 |
| train | 58.843 | truck | 33.053 | boat | 23.652 |
| traffic light | 25.513 | fire hydrant | 62.695 | stop sign | 61.315 |
| parking meter | 45.089 | bench | 28.763 | bicycle | 34.813 |
| cat | 14.376 | dog | 15.207 | person | 15.969 |
| sheep | 66.467 | cow | 58.816 | elephant | 57.762 |
| bear | 69.474 | zebra | 64.188 | giraffe | 62.883 |
| backpack | 13.987 | umbrella | 34.589 | handbag | 12.972 |
| tie | 27.228 | suitcase | 32.969 | frisbee | 59.465 |
| skis | 16.423 | snowboard | 19.861 | sports ball | 42.697 |
| kite | 37.852 | baseball bat | 21.557 | baseball glove | 32.658 |
| skateboard | 46.861 | surfboard | 38.483 | tennis racket | 42.283 |
| bottle | 34.554 | wine glass | 34.884 | cup | 48.848 |
| fork | 23.848 | knife | 11.376 | spoon | 11.899 |
| bowl | 48.377 | banana | 55.566 | bread | 15.937 |
| sandwich | 29.391 | orange | 38.239 | broccoli | 21.966 |
| carrot | 18.743 | hot dog | 27.579 | pizza | 47.397 |
| donut | 41.507 | cake | 34.848 | chair | 25.186 |
| couch | 48.456 | potted plant | 24.626 | bed | 48.645 |
| dining table | 26.626 | toilet | 56.184 | tv | 54.988 |
| laptop | 55.154 | mouse | 59.295 | remote | 24.483 |
| keyboard | 41.849 | cell phone | 31.568 | microwave | 56.644 |
| oven | 33.843 | toaster | 26.181 | sink | 31.938 |
| refrigerator | 49.868 | book | 12.876 | clock | 49.821 |
| vase | 14.049 | scissors | 14.647 | teddy bear | 44.178 |
| hair dryer | 8.332 | toothbrush | 16.354 | |
[08/02 16:59:85 d2.engine.defaults]: Evaluation results for coco_2017_val in csv format:
[08/02 16:59:85 d2.evaluation.testing]: copypaste: Task: bbox
[08/02 16:59:85 d2.evaluation.testing]: copypaste: AP, AP50, AP75, APs, APm, APL
[08/02 16:59:85 d2.evaluation.testing]: copypaste: 37.4235, 56.7359, 48.2714, 23.1321, 41.5912, 48.2998

Process finished with exit code 0

```

Figure 12: RetinaNet 评估结果