

安全操作检测

郁博文

2023-12-29





01

模型选择

模型选择

- 由于先前使用的resnet模型的效果不好，同时这次是一个六分类的任务，所以选择了yolov5，所选用的分别为yolov5s,yolov5l,yolov5m和yolov5n。



02

训练过程

训练过程

训练使用了一张4090，batchsize为64，num_workers设置为8，每个模型训练25个epoch

```
Epoch  GPU_mem  box_loss  obj_loss  cls_loss  Instances  Size
19/24   16.6G  0.03581  0.02914  0.005351  295        640: 100%|██████████| 29/29 [02:36<00:00, 5.38s/it]
      Class  Images  Instances  P      R    mAP50  mAP50-95: 100%|██████████| 3/3 [00:01<00:00, 1.84it/s]
      all    261    1497    0.893  0.708  0.802    0.507
Corrupt JPEG data: 33 extraneous bytes before marker 0xd9

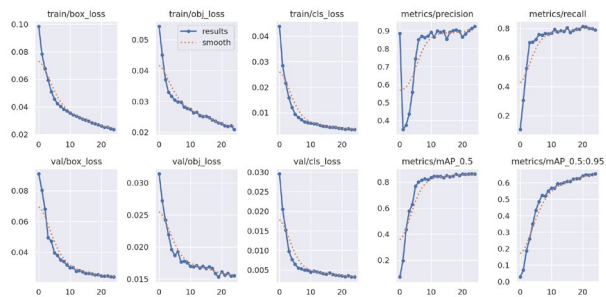
Epoch  GPU_mem  box_loss  obj_loss  cls_loss  Instances  Size
20/24   16.6G  0.03492  0.02912  0.005171  360        640: 100%|██████████| 29/29 [02:45<00:00, 5.72s/it]
      Class  Images  Instances  P      R    mAP50  mAP50-95: 100%|██████████| 3/3 [00:01<00:00, 2.25it/s]
      all    261    1497    0.876  0.75  0.817    0.524
Corrupt JPEG data: 33 extraneous bytes before marker 0xd9

Epoch  GPU_mem  box_loss  obj_loss  cls_loss  Instances  Size
21/24   16.6G  0.03405  0.02851  0.005059  377        640: 100%|██████████| 29/29 [02:43<00:00, 5.63s/it]
      Class  Images  Instances  P      R    mAP50  mAP50-95: 100%|██████████| 3/3 [00:01<00:00, 1.90it/s]
      all    261    1497    0.896  0.745  0.815    0.531
Corrupt JPEG data: 33 extraneous bytes before marker 0xd9

Epoch  GPU_mem  box_loss  obj_loss  cls_loss  Instances  Size
22/24   16.6G  0.03409  0.02832  0.005064  402        640: 100%|██████████| 29/29 [02:29<00:00, 5.15s/it]
      Class  Images  Instances  P      R    mAP50  mAP50-95: 100%|██████████| 3/3 [00:01<00:00, 2.23it/s]
      all    261    1497    0.882  0.747  0.816    0.539
Corrupt JPEG data: 33 extraneous bytes before marker 0xd9

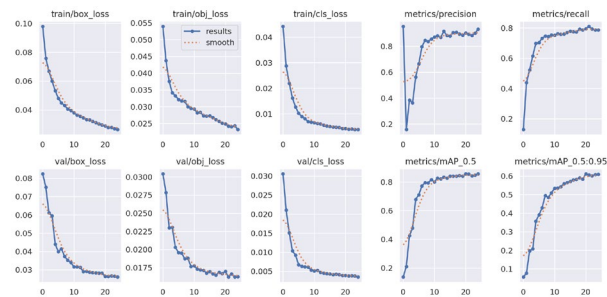
Epoch  GPU_mem  box_loss  obj_loss  cls_loss  Instances  Size
23/24   16.6G  0.03329  0.02893  0.004977  370        640: 100%|██████████| 29/29 [02:48<00:00, 5.83s/it]
      Class  Images  Instances  P      R    mAP50  mAP50-95: 100%|██████████| 3/3 [00:01<00:00, 1.97it/s]
      all    261    1497    0.91  0.753  0.815    0.536
Corrupt JPEG data: 33 extraneous bytes before marker 0xd9

Epoch  GPU_mem  box_loss  obj_loss  cls_loss  Instances  Size
24/24   16.6G  0.03272  0.02773  0.004895  346        640: 100%|██████████| 29/29 [02:12<00:00, 4.55s/it]
      Class  Images  Instances  P      R    mAP50  mAP50-95: 100%|██████████| 3/3 [00:01<00:00, 1.66it/s]
      all    261    1497    0.868  0.754  0.818    0.544
Corrupt JPEG data: 33 extraneous bytes before marker 0xd9
```

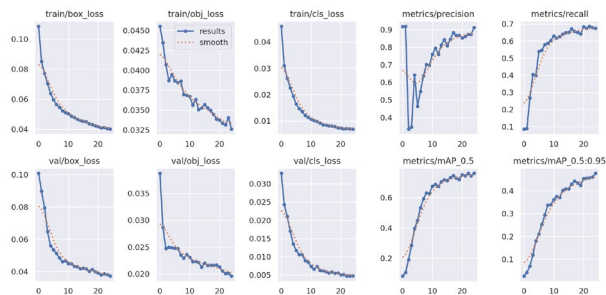
YOLOv5l

mAP50:0.86251 mAP50-95:0.65457



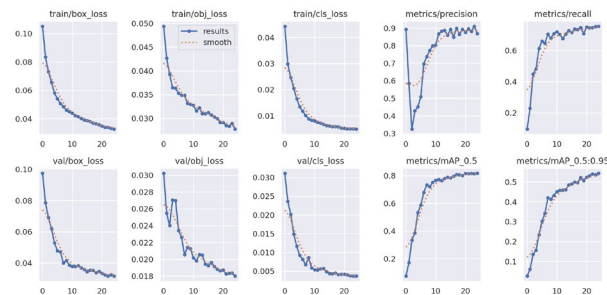
YOLOv5m

mAP50:0.8571 mAP50-95:0.60945



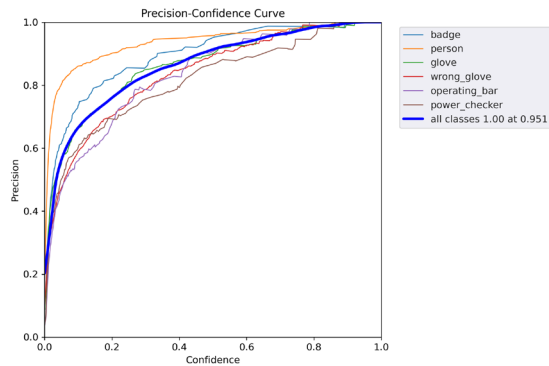
YOLOv5n

mAP50:0.75956 mAP50-95:0.47685



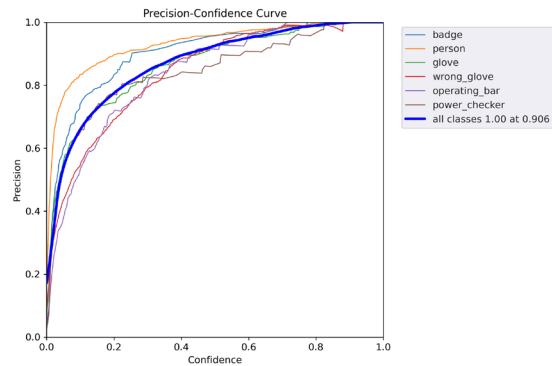
YOLOv5s

mAP50:0.81817 mAP50-95:0.54375



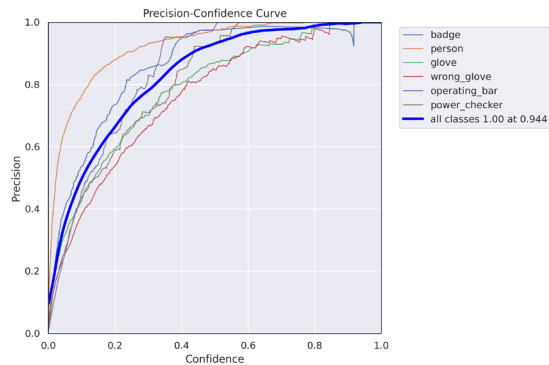
YOLOv5l

mAP50:0.86251 mAP50-95:0.65457



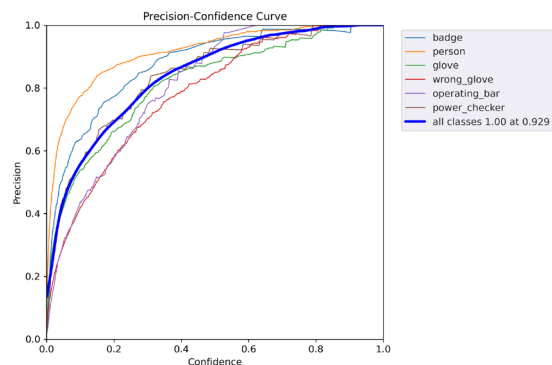
YOLOv5m

mAP50:0.8571 mAP50-95:0.60945



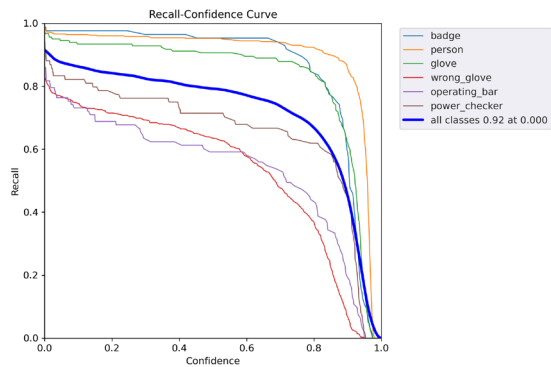
YOLOv5n

mAP50:0.75956 mAP50-95:0.47685



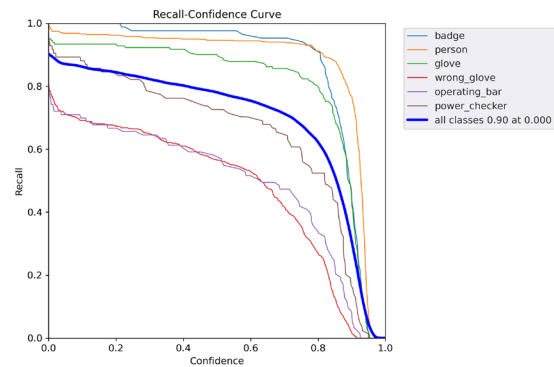
YOLOv5s

mAP50:0.81817 mAP50-95:0.54375



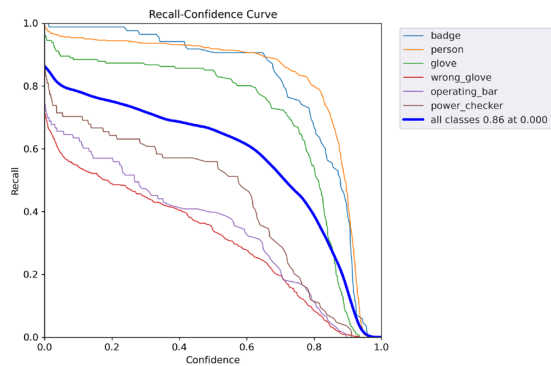
YOLOv5l

mAP50:0.86251 mAP50-95:0.65457



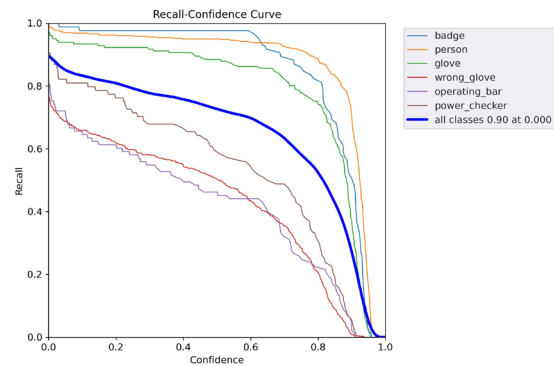
YOLOv5m

mAP50:0.8571 mAP50-95:0.60945



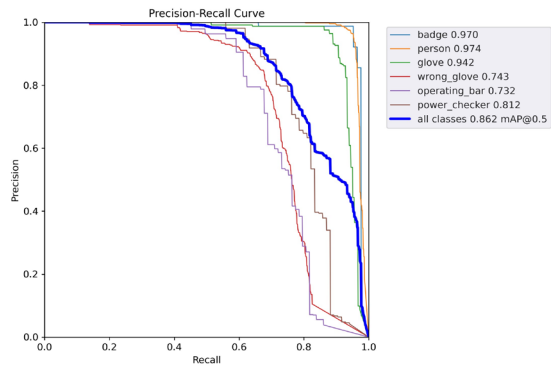
YOLOv5n

mAP50:0.75956 mAP50-95:0.47685



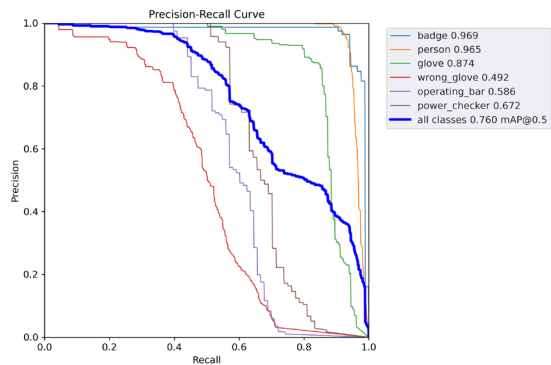
YOLOv5s

mAP50:0.81817 mAP50-95:0.54375



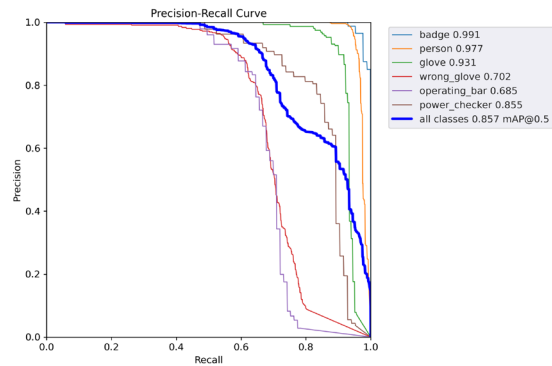
YOLOv5l

mAP50:0.86251 mAP50-95:0.65457



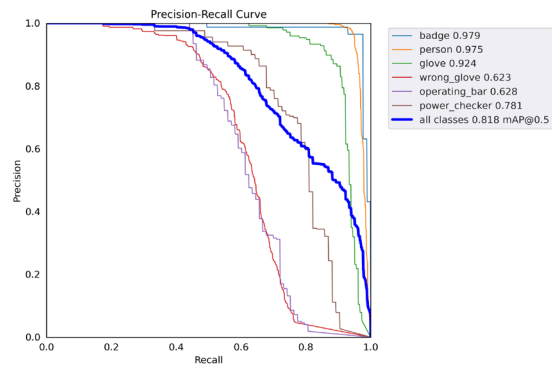
YOLOv5n

mAP50:0.75956 mAP50-95:0.47685



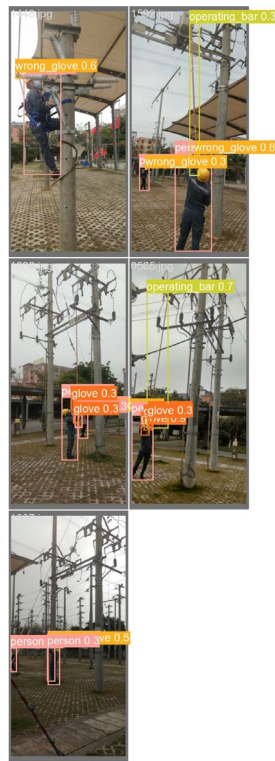
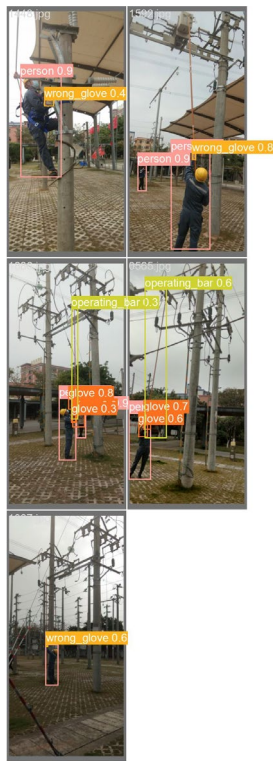
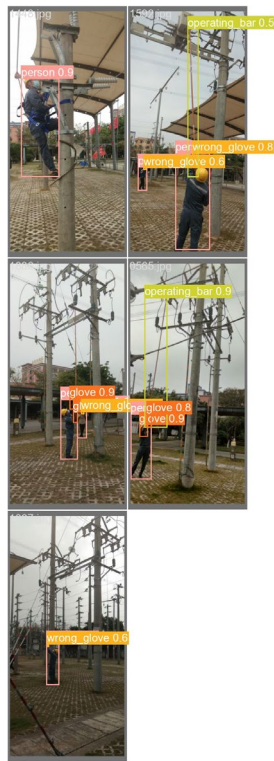
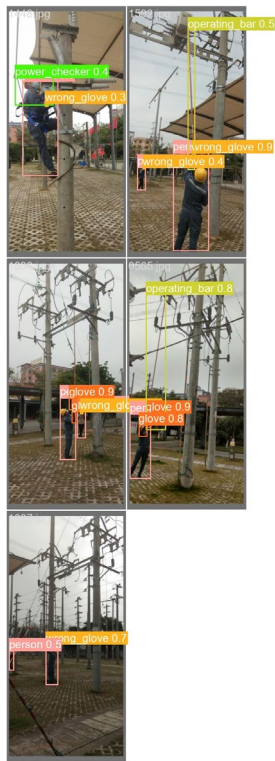
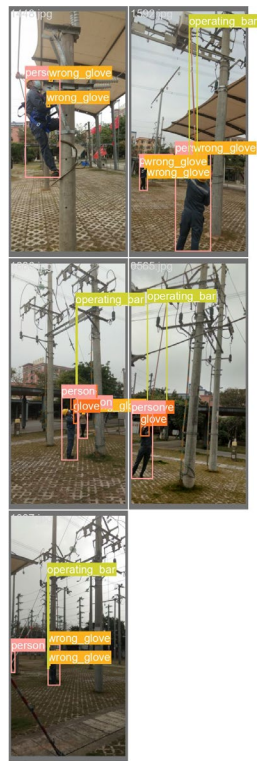
YOLOv5m

mAP50:0.8571 mAP50-95:0.60945



YOLOv5s

mAP50:0.81817 mAP50-95:0.54375





03

结果示例



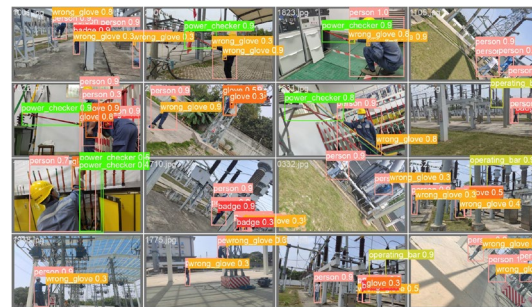
YOLOv5l



LABEL



YOLOv5n



YOLOv5m



YOLOv5s

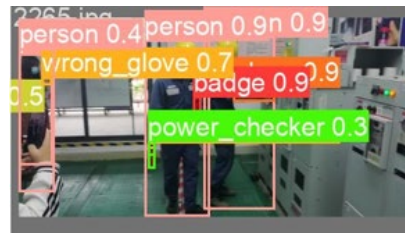
- 正如训练过程中所展示的一样，四个模型对于wrong_glove这个类别的判断能力相较其他类别都略低，在观察结果后，发现有许多误报现象，例如下图
- 经过观察，除了yolov5n以外，其他三个模型都没有正确检测到左下角没有佩戴绝缘手套的情况



YOLOv5l



LABEL



YOLOv5m



YOLOv5n



YOLOv5s

THE END
THANKS

结果和代码链接：

<https://drive.google.com/file/d/1shiTQ3muNdaBpURjfdZ3MRwdHGNP43uO/view?usp=sharing>

