

2024雷达站

环境配置

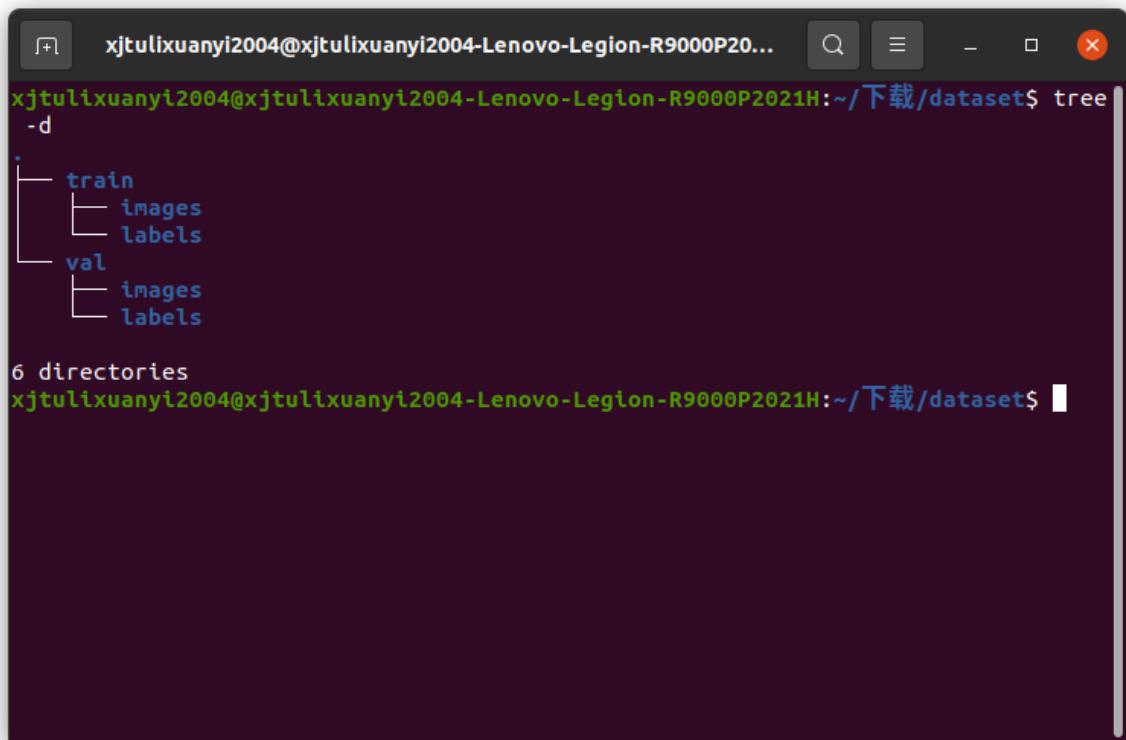
- Nvidia显卡驱动（软件和更新530）
- ROS（鱼香ROS）
- Livox-SDK+livox_ros_driver（Mid-70驱动）
- MiniConda

```
conda create -n yolov8 python=3.9
conda activate yolov8
pip3 install torch torchvision torchaudio (依据PyTorch官网自己查阅, 如网络不好可添加 -i
https://pypi.tuna.tsinghua.edu.cn/simple)
pip install ultralytics
pip install tensorrt==8.6.1
```

- 海康相机sdk（tar.gz）
- 网口配置（192.168.1.148; 255.255.255.0; 192.168.1.1）

模型准备（整车识别示例）

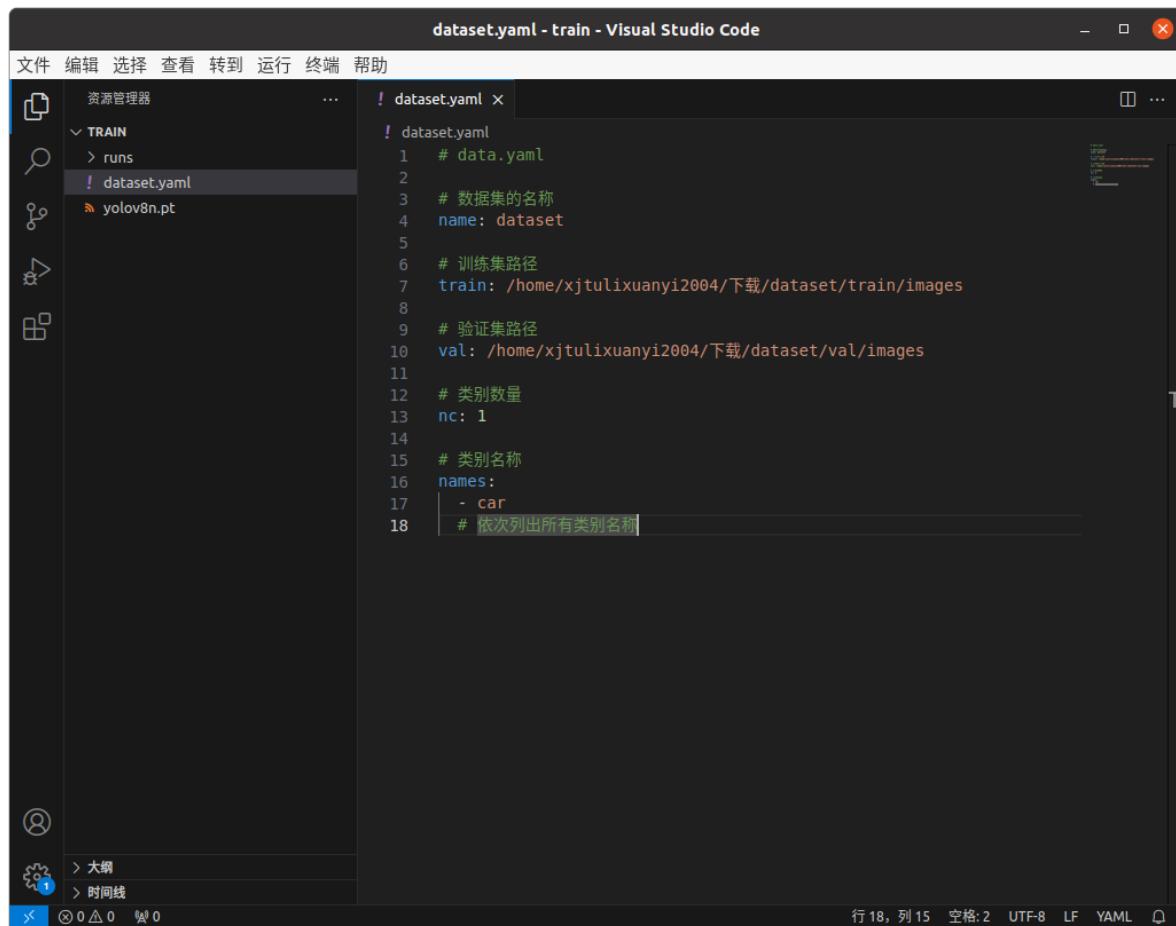
数据集结构



```
xjtulixuanyi2004@xjtulixuanyi2004-Lenovo-Legion-R9000P2021H:~/下载/dataset$ tree
.
├── train
│   ├── images
│   └── labels
└── val
    ├── images
    └── labels

6 directories
xjtulixuanyi2004@xjtulixuanyi2004-Lenovo-Legion-R9000P2021H:~/下载/dataset$
```

yaml文件格式



```
dataset.yaml - train - Visual Studio Code
文件 编辑 选择 查看 转到 运行 终端 帮助
! dataset.yaml x
! dataset.yaml
1 # data.yaml
2
3 # 数据集的名称
4 name: dataset
5
6 # 训练集路径
7 train: /home/xjtulixuanyi2004/下载/dataset/train/images
8
9 # 验证集路径
10 val: /home/xjtulixuanyi2004/下载/dataset/val/images
11
12 # 类别数量
13 nc: 1
14
15 # 类别名称
16 names:
17   - car
18   # 依次列出所有类别名称

资源管理器 ... ! dataset.yaml x
TRAIN
> runs
! dataset.yaml
yolov8n.pt

! dataset.yaml x
! dataset.yaml
1 # data.yaml
2
3 # 数据集的名称
4 name: dataset
5
6 # 训练集路径
7 train: /home/xjtulixuanyi2004/下载/dataset/train/images
8
9 # 验证集路径
10 val: /home/xjtulixuanyi2004/下载/dataset/val/images
11
12 # 类别数量
13 nc: 1
14
15 # 类别名称
16 names:
17   - car
18   # 依次列出所有类别名称

活动监视器 ...
搜索 ...
设置 ...
帮助 ...
退出 ...

行 18, 列 15 空格:2 UTF-8 LF YAML □
```

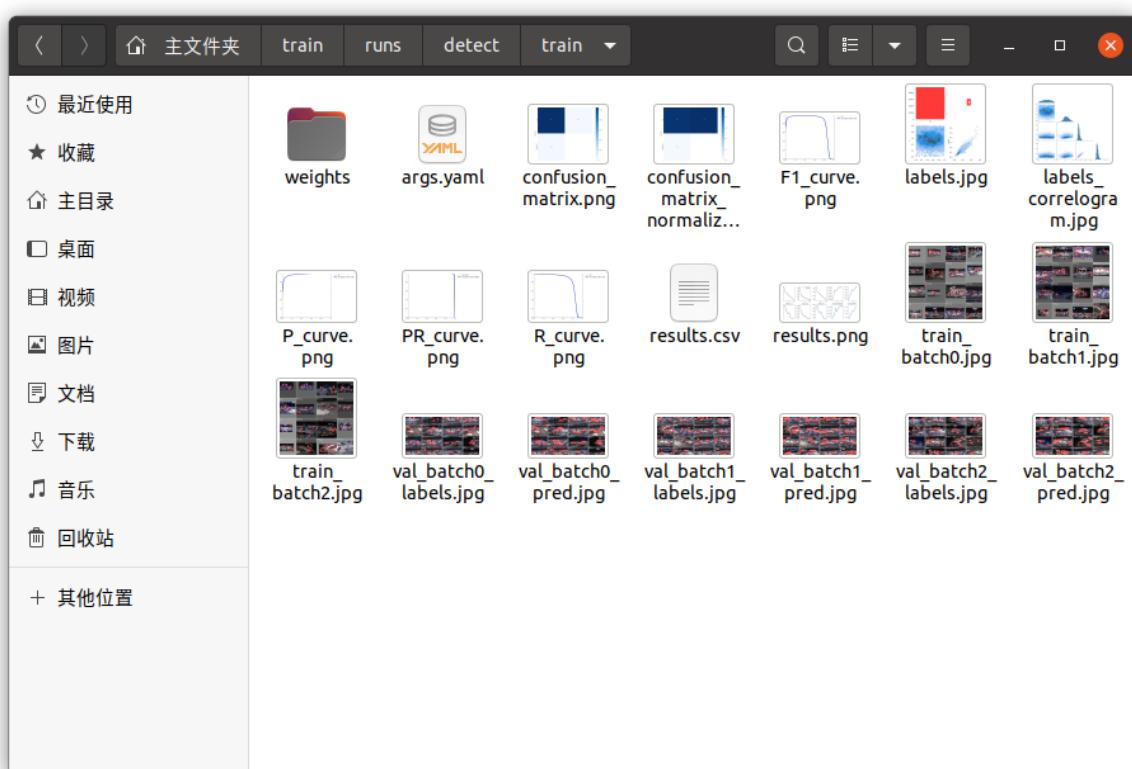
开始训练 (CLI)

```
yolo detect train data=dataset.yaml model=yolov8n.pt epochs=10 imgsz=640
```

训练结束

```
xjtulixuanyi2004@xjtulixuanyi2004-Lenovo-Legion-R9000P2021H:~/train/runs$ tree
.
└── detect
    └── train
        ├── args.yaml
        ├── confusion_matrix_normalized.png
        ├── confusion_matrix.png
        ├── F1_curve.png
        ├── labels_correlogram.jpg
        ├── labels.jpg
        ├── P_curve.png
        ├── PR_curve.png
        ├── R_curve.png
        ├── results.csv
        ├── results.png
        ├── train_batch0.jpg
        ├── train_batch1.jpg
        ├── train_batch2.jpg
        ├── val_batch0_labels.jpg
        ├── val_batch0_pred.jpg
        ├── val_batch1_labels.jpg
        ├── val_batch1_pred.jpg
        ├── val_batch2_labels.jpg
        └── val_batch2_pred.jpg
        └── weights
            ├── best.pt
            └── last.pt

3 directories, 22 files
xjtulixuanyi2004@xjtulixuanyi2004-Lenovo-Legion-R9000P2021H:~/train/runs$
```

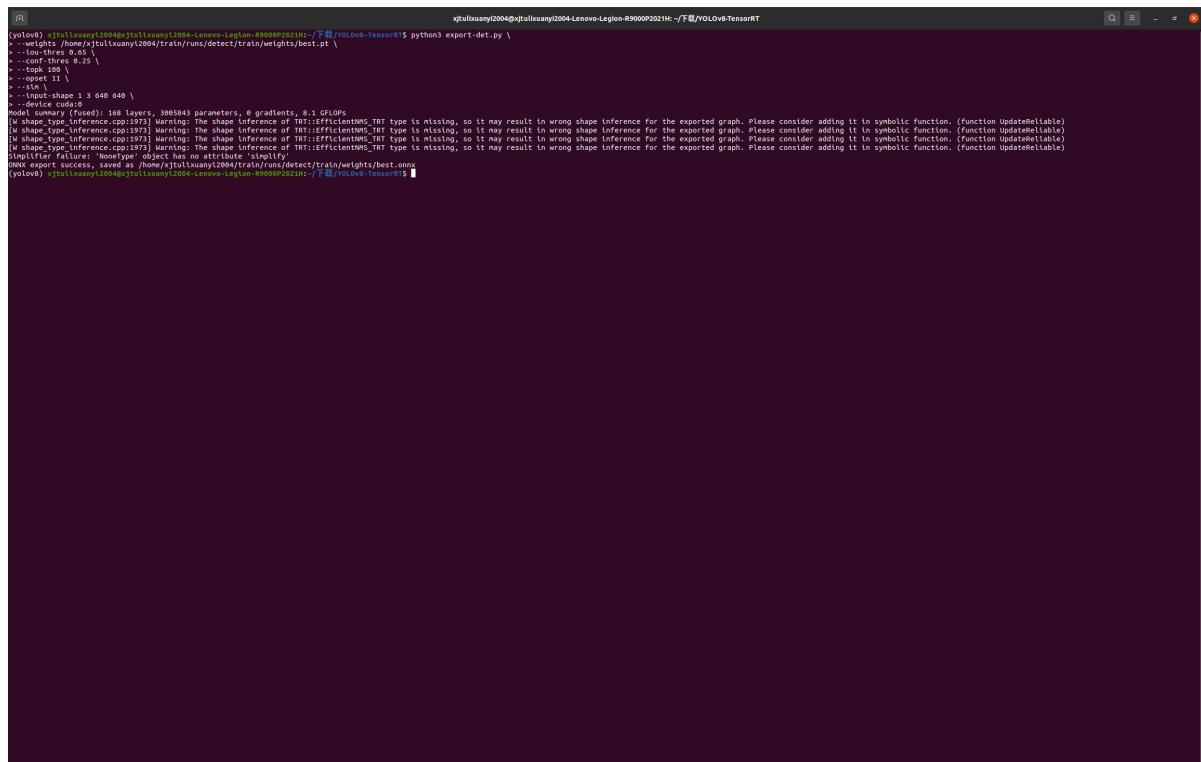


模型转换 (.pt->.onnx->.engine)

```
conda activate yolov8
pip install onnx
git clone https://github.com/triple-Mu/YOLOv8-TensorRT.git
cd YOLOv8-TensorRT
```

.pt->.onnx

```
python3 export-det.py \
--weights yolov8s.pt \
--iou-thres 0.65 \
--conf-thres 0.25 \
--topk 100 \
--opset 11 \
--sim \
--input-shape 1 3 640 640 \
--device cuda:0
```



```
(yolov8) xjulixuanyi2004@xjulixuanyi2004-Lenovo-Legion-R9000P2021H: ~/下层/YOLOv8-TensorRT$ python3 export-det.py \
> --weights /home/xjulixuanyi2004/train/runs/detect/train/weights/best.pt \
> --iou-thres 0.65 \
> --conf-thres 0.25 \
> --topk 100 \
> --opset 11 \
> --sim \
> --input-shape 1 3 640 640 \
> --device cuda:0
Model summary (fused): 100 layers, 300533 parameters, 0 gradients, 8 GPUs
[W shape_type_inference.cpp:1971] Warning: The shape inference of Int:EfficientNMS:TRT type is missing, so it may result in wrong shape inference for the exported graph. Please consider adding it in symbolic function. (Function UpdateRelTable)
[W shape_type_inference.cpp:1971] Warning: The shape inference of Int:EfficientNMS:TRT type is missing, so it may result in wrong shape inference for the exported graph. Please consider adding it in symbolic function. (Function UpdateRelTable)
[W shape_type_inference.cpp:1971] Warning: The shape inference of Int:EfficientNMS:TRT type is missing, so it may result in wrong shape inference for the exported graph. Please consider adding it in symbolic function. (Function UpdateRelTable)
[E simplifier failure: 'NoneType' object has no attribute 'simplify']
Model export success, saved at /home/xjulixuanyi2004/train/runs/detect/train/weights/best.onnx
(yolov8) xjulixuanyi2004@xjulixuanyi2004~/train/runs/detect[train]$
```

.onnx->.engine (时间较长)

```
python3 build.py \
--weights yolov8s.onnx \
--iou-thres 0.65 \
--conf-thres 0.25 \
--topk 100 \
--fp16 \
--device cuda:0
```

```
xj@lxuanyi2004:xj@lxuanyi2004-Lenovo-Legion-R9000P2021H:/下届/YOLOv8-TensorRT
(xj@lxuanyi2004:xj@lxuanyi2004-Lenovo-Legion-R9000P2021H:~)$ conda activate yolov8
(yolov8) xj@lxuanyi2004:xj@lxuanyi2004-Lenovo-Legion-R9000P2021H:~/下届/YOLOv8-TensorRT$ python build.py --weights /home/xj@lxuanyi2004/train/runs/detect/train/weights/best.onnx \
--iou-thres 0.65 \
--conf-thres 0.25 \
--topk 100 \
--fp16 \
--device cuda0
python: can't open file 'build.py': [Errno 2] No such file or directory
(yolov8) xj@lxuanyi2004:xj@lxuanyi2004-Lenovo-Legion-R9000P2021H:~/下届/YOLOv8-TensorRT$ python build.py --weights /home/xj@lxuanyi2004/train/runs/detect/train/weights/best.onnx --iou-thres 0.65 --conf-thres 0.25 --topk 100 --fp16 --device cuda0
[08/08/2024 11:26:04] [TRT] [W] onnx2trt.utils.cpp:460: One or more weights outside the range of INT32 was clamped
[08/08/2024 11:26:04] [TRT] [W] builtin_op_importers.cpp:322: Attribute class_agnostic not found in plugin model. Ensure that the plugin creator has a default value defined or the engine may fail to build.
[08/08/2024 11:26:04] [TRT] [W] checkers.cpp:100: Found 1 warning(s). Please review the warning(s) and fix them.
[08/08/2024 11:26:04] [TRT] [W] output "nms_dets" with shape: (1, 1) dtype: dataType:INT32
[08/08/2024 11:26:04] [TRT] [W] output "scores" with shape: (1, 100) dtype: dataType:FLOAT
[08/08/2024 11:26:04] [TRT] [W] output "labels" with shape: (1, 100) dtype: dataType:INT32
[08/08/2024 11:26:04] [TRT] [W] checkers.cpp:100: Found 1 warning(s). Please review the warning(s) and fix them.
[08/08/2024 11:26:04] [TRT] [W] If this is not the desired behavior, please modify the weights or retrain with regularization to adjust the magnitude of the weights.
[08/08/2024 11:26:04] [TRT] [W] checkers.cpp:100: Found 1 warning(s). Please review the warning(s) and fix them.
[08/08/2024 11:26:04] [TRT] [W] 35 weights are affected by this issue: detected subnormal FP16 values.
[08/08/2024 11:26:04] [TRT] [W] 35 weights are affected by this issue: detected subnormal FP16 values.
[08/08/2024 11:26:04] [TRT] [W] 35 weights are affected by this issue: detected subnormal FP16 values and converted them to the FP16 minimum subnormalized value.
See: /home/xj@lxuanyi2004/train/runs/detect/train/weights/best.engine
(yolov8) xj@lxuanyi2004:xj@lxuanyi2004-Lenovo-Legion-R9000P2021H:~/下届/YOLOv8-TensorRT$
```

赛前准备

硬件准备

- 串口线 (microUSB)
- 网线+相机线 (大于5m)
- 相机屁股 (目前只有MV-CU060-10UC, 日后看经费是否充足再决定是否增加)
- 相机镜头 (去年使用6mm, 今年可能替换为12mm或25mm)
- Mid-70
- 雷达支架
- USB转ttl (用于和电控通信)

相机雷达联合标定

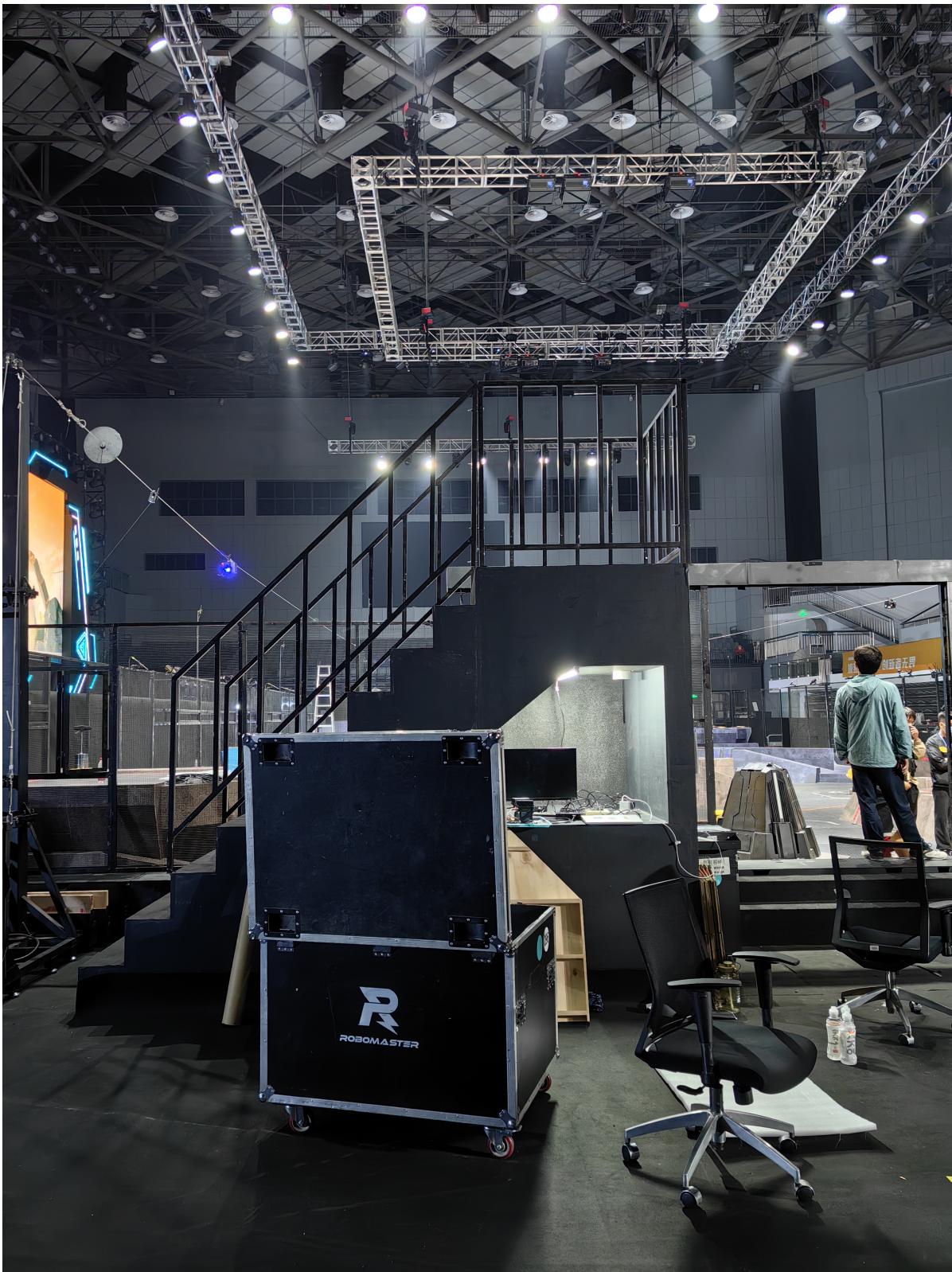
跟着这个链接做即可 https://github.com/Livox-SDK/livox_camera_lidar_calibration

赛场操作

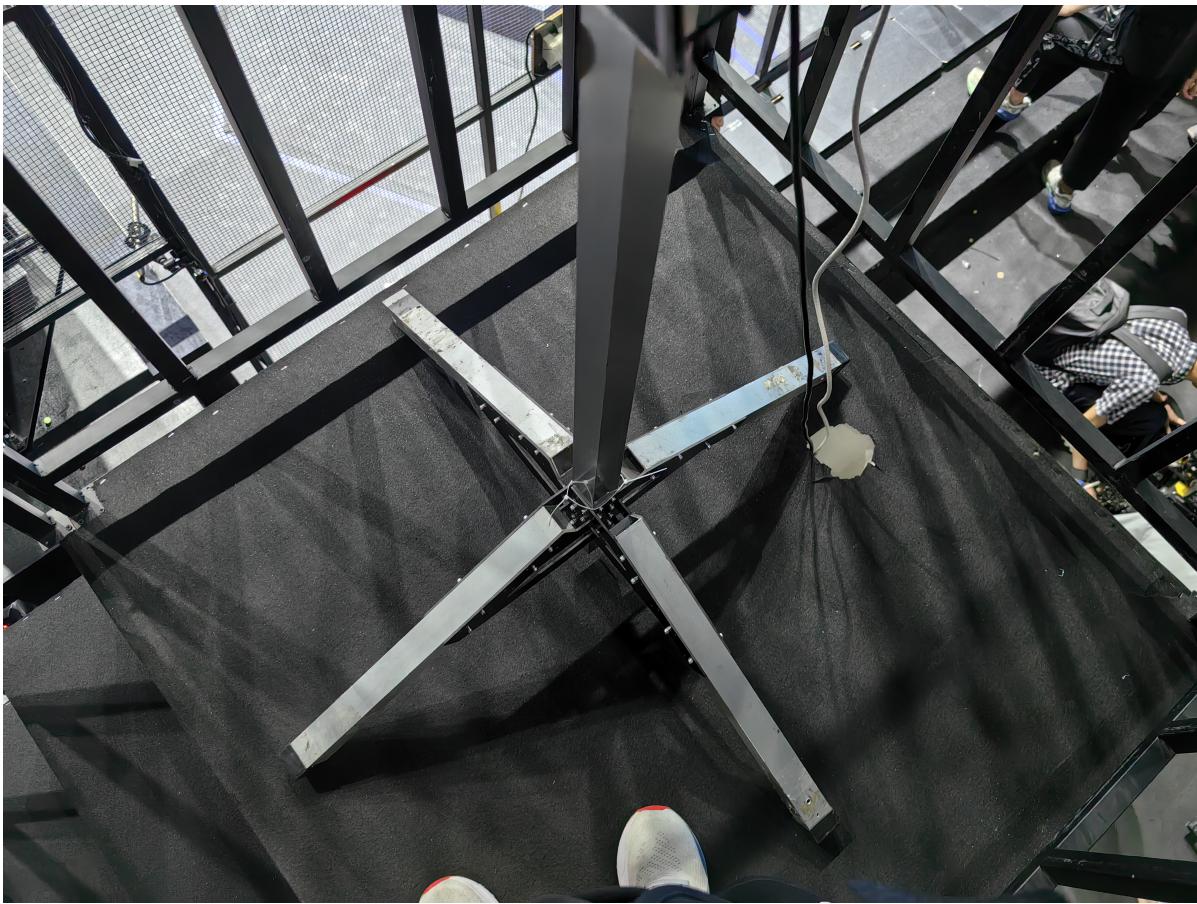
- 上雷达基座放置雷达, 把线放下来
- 连接电源, 打开电脑, 连接所有线
- 连接裁判系统
- `sudo chmod 666 /dev/ttyACM0`
- 根据红蓝方进行标定程序
- 打开录屏
- 离场

部分解释

这是雷达基座，约3m高，因此需要大于5m长的线缆



这是把线缆顺下去的地方，需要格外注意



以下是红蓝方不同的标定方案，与我们在代码里重投影所定的点位置有关

场地内有若干定位标签，供机器人定位使用。图案不会重复，且在任何方向上均不具备对称性。R0 场地定位标签放置在 R2 环形高地小资源岛附近的垂直面上，如“图 4-27 R2 环形高地示意图”所示，其余场地定位标签的位置如下图所示。

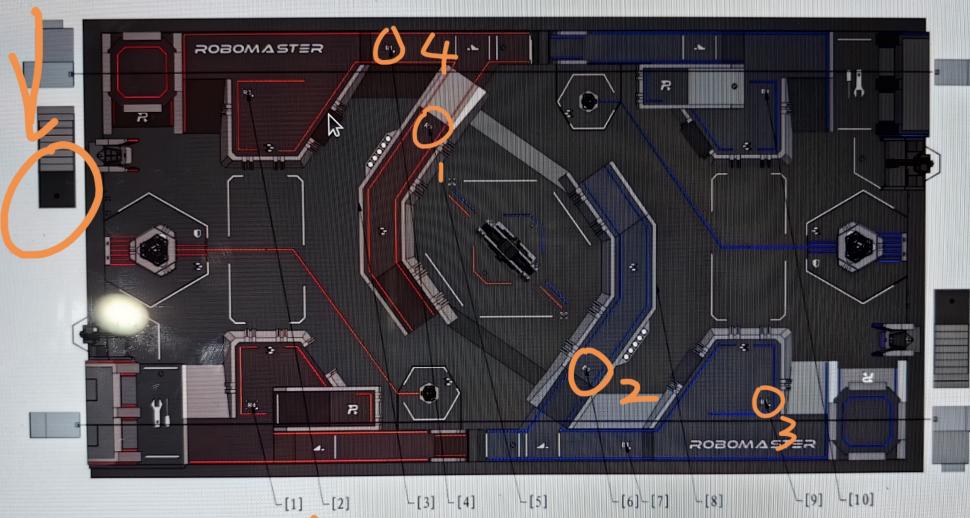


图 4-51 定位标签示意图

表 4-5 定位标签坐标

序号	1	2	3	4	5	6	7	8	9	10
编号	R4	R3	R0	R1	R2	B2	B1	B0	B3	B4

场地内有若干定位标签，供机器人定位使用。图案不会重复，且在任何方向上均不具备对称性。R0 场地定位标签放置在 R2 环形高地小资源岛附近的垂直面上，如“图 4-27 R2 环形高地示意图”所示，其余场地定位标签的位置如下图所示。

