1. BEV容器下载和建立

这里的容器提供了一个基础运行环境，基本支持所用到的模型，但考虑到不同模型依赖的软件包版本不一致，可能会影响到模型性能，建议安装容器后再根据具体的模型配置不同的虚拟环境。

1.1. bev_docker下载

显卡驱动版本>450.80.2

下载链接：https://pan.baidu.com/s/1z5-zxwma3SkFzDgzZXH-BQ?pwd=g7iw

1.2. 建立镜像

```
# 解压，进入bev_docker文件夹, 在文件夹内执行
docker build -f Dockerfile -t bev-playground:v1.0 .
```

1.3. 数据集下载

Prepare nuScenes dataset:

You can download nuScenes 3D detection data HERE and unzip all zip files.

The folder structure should be organized as follows before our processing.

```
data
├── nuscenes
│   ├── maps
│   ├── samples
│   ├── sweeps
│   ├── v1.0-test
│   ├── v1.0-trainval
```

建议将数据集下载到主机中的某个目录，如/data，生成容器时通过【-v 本地目录:容器内目录】完成数据挂载，实现数据集在主机和容器中同步；

1.4. 生成并进入容器

```
# 生成容器，'-v /data:/data'表示'-v 本地数据集存放目录:容器内目录'，请根据需要修改本地目录
docker run -itd --gpus all --shm-size=2g --network=host -v /data:/data --name my-bev-docker bev-playground:v1.0 bash
# 进入容器
docker exec -it my-bev-docker bash
```

1.5. 下载detectorn2源码（容器中）

```
pip install 'git+https://github.com/facebookresearch/detectron2.git'
```

2. BEVDet

BEVDet源代码链接

```
git clone https://github.com/HuangJunJie2017/BEVDet.git
cd BEVDet
pip install -v -e .
```

Dataset Preparation.

Like the general way to prepare dataset, it is recommended to symlink the dataset root in container `/data` to `$BEVDet/data`.

The folder structure should be organized as follows before our processing.

```
BEVDet
├── mmdet3d
├── tools
├── configs
├── data
│   ├── nuscenes
│   │   ├── maps
│   │   ├── samples
│   │   ├── sweeps
│   │   ├── v1.0-test
| |   ├── v1.0-trainval
```

We typically need to organize the useful data information with a .pkl or .json file in a specific style, e.g., coco-style for organizing images and their annotations.
To prepare these files for nuScenes, run the following command:

```
python tools/create_data_bevdet.py
```

The folder structure after processing should be as below.

```
BEVDet
├── mmdet3d
├── tools
├── configs
├── data
│   ├── nuscenes
│   │   ├── maps
│   │   ├── samples
│   │   ├── sweeps
│   │   ├── v1.0-test
| |   ├── v1.0-trainval
│   │   ├── bevdetv3-nuscenes_gt_database
│   │   ├── bevdetv3-nuscenes_dbinfos_train.pkl
│   │   ├── bevdetv3-nuscenes_infos_train.pkl
│   │   ├── bevdetv3-nuscenes_infos_val.pkl
```

2.1. 模型下载

Config	mAP	NDS	Latency(ms)	FPS	Model	Log
[BEVDet-R50](#)	28.3	35.0	29.1/4.2/33.3	30.7	[baidu](#)	[baidu](#)
[BEVDet-R50-CBGS](#)	31.3	39.8	28.9/4.3/33.2	30.1	[baidu](#)	[baidu](#)
[BEVDet-R50-4D-CBGS](#)	31.4/35.4#	44.7/44.9#	29.1/4.3/33.4	30.0	[baidu](#)	[baidu](#)
[BEVDet-R50-4D-Depth-CBGS](#)	36.1/36.2#	48.3/48.4#	35.7/4.0/39.7	25.2	[baidu](#)	[baidu](#)
[BEVDet-R50-4D-Stereo-CBGS](#)	38.2/38.4#	49.9/50.0#	-	-	[baidu](#)	[baidu](#)
[BEVDet-R50-4DLongterm-CBGS](#)	34.8/35.4#	48.2/48.7#	30.8/4.2/35.0	28.6	[baidu](#)	[baidu](#)
[BEVDet-R50-4DLongterm-Depth-CBGS](#)	39.4/39.9#	51.5/51.9#	38.4/4.0/42.4	23.6	[baidu](#)	[baidu](#)
[BEVDet-R50-4DLongterm-Stereo-CBGS](#)	41.1/41.5#	52.3/52.7#	-	-	[baidu](#)	[baidu](#)
[BEVDet-STBase-4D-Stereo-512x1408-CBGS](#)	47.2#	57.6#	-	-	[baidu](#)	[baidu](#)
[DAL-Tiny](#)	67.4	71.3	-	16.6	[baidu](#)	[baidu](#)
[DAL-Base](#)	70.0	73.4	-	10.7	[baidu](#)	[baidu](#)
[DAL-Large](#)	71.5	74.0	-	6.10	[baidu](#)	[baidu](#)

2.2. 模型训练

```
# single gpu
python tools/train.py $config
# multiple gpu
./tools/dist_train.sh $config num_gpu
```

2.3. 模型测试

```
# single gpu
python tools/test.py $config $checkpoint --eval mAP
# multiple gpu
./tools/dist_test.sh $config $checkpoint num_gpu --eval mAP
```

3. BEVFormer

Dataset Preparation.

Download CAN bus expansion

Download nuScenes CAN bus expansion data [HERE](#).

```
# download 'can_bus.zip'
unzip can_bus.zip
# move can_bus to data dir '/data'
```

Prepare nuScenes data

Like the general way to prepare dataset, it is recommended to symlink the dataset root to $BEVFormer/data. eg:

```
# must use absolute path
ln -s /data $BEVFormer
```

We genetate custom annotation files which are different from mmdet3d's

```
python tools/create_data.py nuscenes --root-path ./data/nuscenes --out-dir ./data/nuscenes --extra-tag
nuscenes --version v1.0 --canbus ./data
```

Using the above code will generate `nuscenes_infos_temporal_{train,val}.pkl` .

Folder structure

```
bevformer
├── projects/
├── tools/
├── configs/
├── ckpts/
│   ├── r101_dcn_fcos3d_pretrain.pth
├── data/
│   ├── can_bus/
│   ├── nuscenes/
│   │   ├── maps/
│   │   ├── samples/
│   │   ├── sweeps/
│   │   ├── v1.0-test/
│   │   ├── v1.0-trainval/
│   │   ├── nuscenes_infos_temporal_train.pkl
│   │   ├── nuscenes_infos_temporal_val.pkl
```

3.1. 模型下载

Backbone	Method	Lr Schd	NDS	mAP	memroy	Config	Download
R50	BEVFormer-tiny_fp16	24ep	35.9	25.7	-	config	model/log
R50	BEVFormer-tiny	24ep	35.4	25.2	6500M	config	model/log
R101-DCN	BEVFormer-small	24ep	47.9	37.0	10500M	config	model/log
R101-DCN	BEVFormer-base	24ep	51.7	41.6	28500M	config	model/log
R50	BEVformerV2-t1-base	24ep	42.6	35.1	23952M	config	model/log
R50	BEVformerV2-t1-base	48ep	43.9	35.9	23952M	config	model/log
R50	BEVformerV2-t1	24ep	45.3	38.1	37579M	config	model/log
R50	BEVformerV2-t1	48ep	46.5	39.5	37579M	config	model/log
R50	BEVformerV2-t2	24ep	51.8	42.0	38954M	config	model/log
R50	BEVformerV2-t2	48ep	52.6	43.1	38954M	config	model/log
R50	BEVformerV2-t8	24ep	55.3	46.0	40392M	config	model/log

3.2. 模型训练

./tools/dist_train.sh ./projects/configs/bevformer/bevformer_base.py 8

3.3. 模型测试

./tools/dist_test.sh ./projects/configs/bevformer/bevformer_base.py ./path/to/ckpts.pth 8

参考资料

Docker使用文档

常用Docker命令

Docker可视化工具:

Docker extension in VSCode

Dev Containers extension in VSCode