

宿主机操作

(在安装前，须将docker_habitat完全移至~路径下)

1. docker

若本地尚未安装docker，先进入docker_habitat目录:

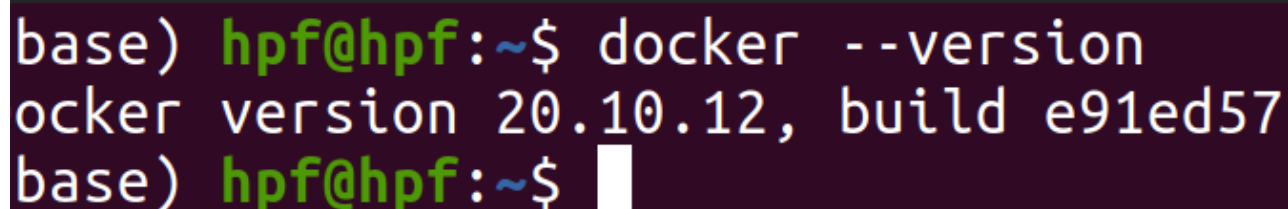
```
cd ~/docker_habitat
```

执行:

```
./docker_install.sh
```

验证:

```
docker --version
```



```
base) hp@hp:~$ docker --version
Docker version 20.10.12, build e91ed57
base) hp@hp:~$
```

若脚本无法执行，则检查脚本是否有运行权限

2. nvidia driver

创建镜像和容器前需要检查宿主机的显卡驱动是否正常

打开终端，输入nvidia-smi

```

Try: sudo apt install <deb name>

(base) user@syl:~$ nvidia-smi
Thu Jan 20 10:34:06 2022

+-----+
| NVIDIA-SMI 470.86                Driver Version: 470.86                CUDA Version: 11.4                |
+-----+-----+
| GPU   Name           Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
|=====+=====+
| 0   NVIDIA GeForce ...   Off      | 00000000:01:00.0 On  |      2%      Default |
| 30%   29C   P8      27W / 350W    | 788MiB / 24234MiB |             MIG M.   |
+-----+-----+

+-----+
| Processes:                        |
| GPU   GI    CI          PID    Type   Process name                      GPU Memory |
|      ID    ID              |                 | Usage     |
+-----+-----+
| 0     N/A   N/A         1103    G     /usr/lib/xorg/Xorg                 523MiB |
| 0     N/A   N/A         1817    G     /usr/bin/gnome-shell               85MiB |
| 0     N/A   N/A         3162    G     ...nlogin/bin/sunloginclient      10MiB |
| 0     N/A   N/A        147003    G     ...token=4084161354625565244     13MiB |
| 0     N/A   N/A        173926    G     ...AAAAAAAA= --shared-files       44MiB |
| 0     N/A   N/A        175019    G     ...AAAAAAAA= --shared-files      106MiB |
+-----+

```

3. nvidia-docker2

安装参考连接：[nvidia-docker2](#)

摘取的主要步骤，可做参考

```
sudo systemctl --now enable docker
```

```

distribution=$(. /etc/os-release;echo $ID$VERSION_ID) \
  && curl -s -L https://nvidia.github.io/nvidia-docker/gpgkey | sudo apt-
key add - \
  && curl -s -L https://nvidia.github.io/nvidia-
docker/$distribution/nvidia-docker.list | sudo tee
/etc/apt/sources.list.d/nvidia-docker.list

```

```

sudo apt-get update
sudo apt-get install -y nvidia-docker2
sudo systemctl restart docker

```

```

# test
sudo docker run --rm --gpus all nvidia/cuda:11.0-base nvidia-smi

```

```

11.0-base: Pulling from nvidia/cuda
54ee1f796a1e: Pull complete
f7bfea53ad12: Pull complete
46d371e02073: Pull complete
b66c17bbf772: Pull complete
8642f1a6dfb3: Pull complete
e5ce55b8b4b9: Pull complete
155bc0332b0a: Pull complete
Digest: sha256:774ca3d612de15213102c2dbbba55df44dc5cf9870ca2be6c6e9c627fa63d67a
Status: Downloaded newer image for nvidia/cuda:11.0-base
Thu Jan 20 02:40:21 2022

```

NVIDIA-SMI 470.86				Driver Version: 470.86			CUDA Version: 11.4		
GPU	Name	Persistence-M	Bus-Id	Disp.A	Volatile	Uncorr. ECC			
Fan	Temp	Perf	Pwr:Usage/Cap	Memory-Usage	GPU-Util	Compute M.			
						MIG M.			
0	NVIDIA GeForce ...	Off	00000000:01:00.0	On		N/A			
30%	28C	P8	27W / 350W	897MiB / 24234MiB	0%	Default			
						N/A			

Processes:							
GPU	GI	CI	PID	Type	Process name	GPU Memory	
ID	ID					Usage	

4. docker login

登录docker账号

```
sudo docker login
```

```
Username: hpf9017
Password: sim2real2022
```

```

hpf@hpf-ThinkStation-P520:~$ sudo docker login
Authenticating with existing credentials...
Stored credentials invalid or expired
Login with your Docker ID to push and pull images from Docker Hub. If you don't
have a Docker ID, head over to https://hub.docker.com to create one.
Username (hpf9017): hpf9017
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store
Login Succeeded

```

5. docker image

下载镜像

```
sudo docker pull hp9017/habitat:demo
```

```
hp9@hp9-ThinkStation-P520:~$ sudo docker pull hp9017/habitat:demo
demo: Pulling from hp9017/habitat
35807b77a593: Already exists
c63faf7ebb91: Already exists
d0af4aff2aac: Already exists
4860ac2ea9aa: Already exists
964f8d4cad4: Already exists
f68bad238d01: Already exists
75dd747f11f9: Already exists
66bca8babce2: Already exists
97cfad4752a5: Already exists
97ed0d5f10a8: Already exists
d35c98dc1ca2: Already exists
d47c4d48afef: Already exists
68f4730d0214: Already exists
9bd3efcf1156: Already exists
00f94e76c029: Already exists
b1dba69fd36e: Downloading 2.747MB/38.14MB
4c70c14b5cd1: Download complete
0107972584f7: Downloading 3.103MB/43.8MB
8683720968e1: Waiting
c06aef280a1f: Waiting
616f37365399: Pulling fs layer
de36cc778647: Waiting
# docker操作
```

因为镜像文件较大，需等待较长时间

```
hp9@hp9-ThinkStation-P520: ~
d35c98dc1ca2: Already exists
d47c4d48afef: Already exists
68f4730d0214: Already exists
9bd3efcf1156: Already exists
00f94e76c029: Already exists
b1dba69fd36e: Pull complete
4c70c14b5cd1: Pull complete
0107972584f7: Pull complete
8683720968e1: Pull complete
c06aef280a1f: Pull complete
616f37365399: Pull complete
de36cc778647: Pull complete
01f619de832f: Pull complete
9ba81d681b9b: Pull complete
8c595585e333: Pull complete
e57c20b8df23: Pull complete
23d817e6958e: Pull complete
30069e96d189: Pull complete
de6913e7f30f: Pull complete
ec089bce9fde: Pull complete
Digest: sha256:91373f520d5e1a678a343a0f50fa496e2d7881bc3c38727513b90dcc44d9038b
Status: Downloaded newer image for hp9017/habitat:demo
docker.io/hp9017/habitat:demo
hp9@hp9-ThinkStation-P520:~$
```

6. docker container

```
cd ~/docker_habitat
```

```
./create_container.sh
```

docker操作

1. 运行docker

重启后需要执行一次

```
sudo docker start sim2real_env
```

```
cd ~/docker_habitat
```

```
./exec.sh
```

密码：123

进入docker环境

2. habitat sim

```
cd ~
```

```
habitat-viewer ./sim_test/scene_datasets/habitat-test-scenes/van-gogh-room.glb
```

There should be a window created and scene showed in the window, use W, A, S, D to control agent move.



2. ros-x-habitat

第一次进docker，设置环境变量

```
echo "export PYTHONPATH=$PYTHONPATH:/home/sim2real/test/src" >> ~/.bashrc
```

```
echo "source /home/sim2real/test/devel/setup.bash" >> ~/.bashrc
```

```
roscore
```

新建terminal

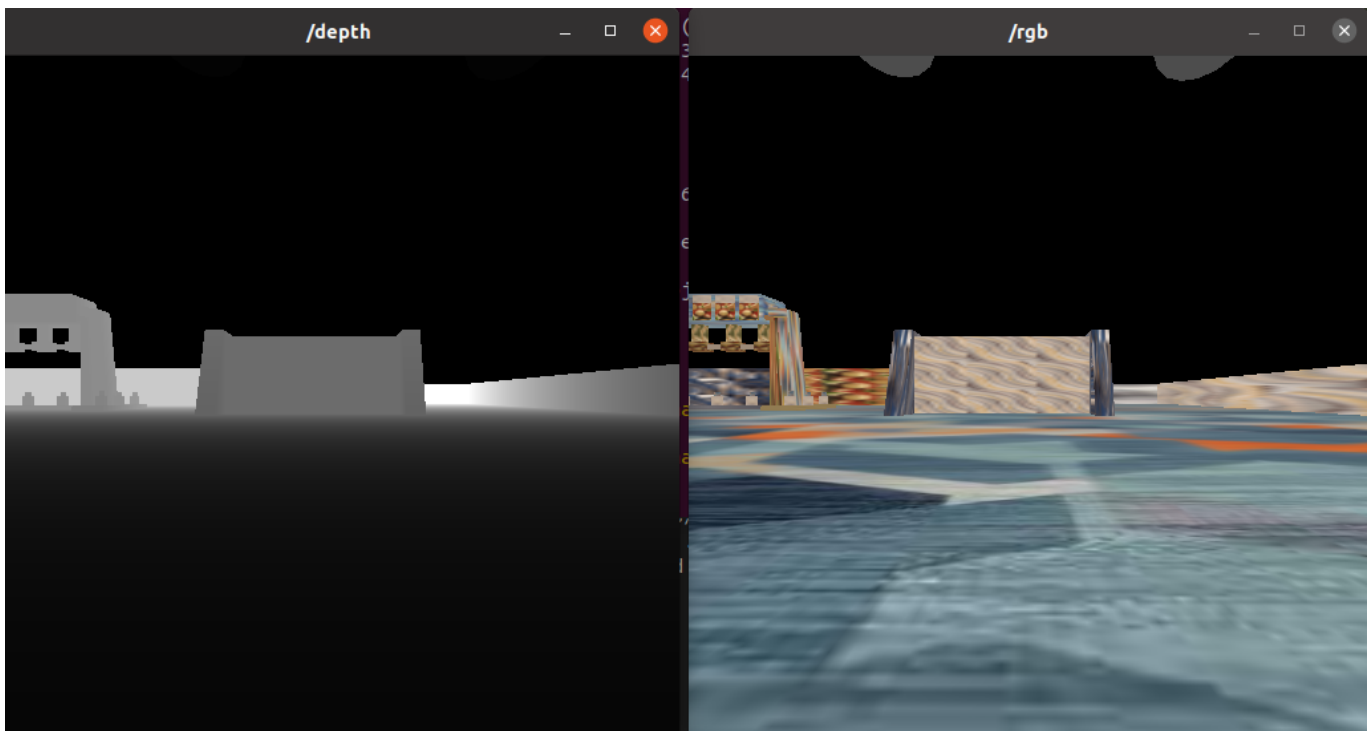
```
cd ~/docker_habitat
```



```
./exec.sh
```

```
cd ~/test/src
```

```
python3 src/scripts/roam_with_joy.py --hab-env-config-path  
./configs/roam_configs/pointnav_rgb_d_roam_mp3d_test_scenes.yaml --episode-  
id -1 --scene-id ./data/scene_datasets/mp3d/2t7WUuJeko7/2t7WUuJeko7.glb --  
video-frame-period 30
```



3. 键盘控制运动

新建terminal

```
cd ~/docker_habitat
```

```
./exec.sh
```

```
roslaunch teleop_twist_keyboard teleop_twist_keyboard.py
```

```
(habitat) sim2real@hpf-ThinkStation-P520:/$ rosrn teleop_twist_keyboard teleop_twist_keyboard.py

Reading from the keyboard and Publishing to Twist!
-----
Moving around:
   u   i   o
   j   k   l
   m   ,   .

For Holonomic mode (strafing), hold down the shift key:
-----
   U   I   O
   J   K   L
   M   <   >

t : up (+z)
b : down (-z)

anything else : stop

q/z : increase/decrease max speeds by 10%
w/x : increase/decrease only linear speed by 10%
e/c : increase/decrease only angular speed by 10%

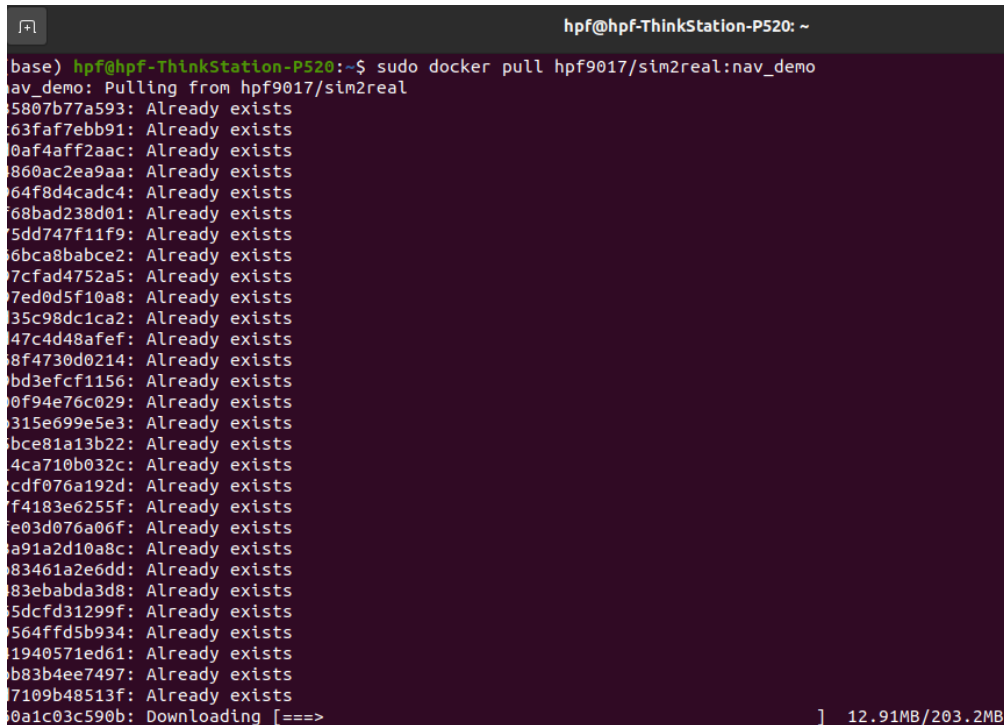
CTRL-C to quit

currently:      speed 0.5      turn 1.0
```

4. 视觉导航

下载比赛任务镜像

```
sudo docker pull hp9017/sim2real:nav_demo
```



```
base) hp9017@hpf-ThinkStation-P520:~$ sudo docker pull hp9017/sim2real:nav_demo
nav_demo: Pulling from hp9017/sim2real
5807b77a593: Already exists
63faf7ebb91: Already exists
0af4aff2aac: Already exists
860ac2ea9aa: Already exists
64f8d4cad4: Already exists
68bad238d01: Already exists
5dd747f11f9: Already exists
6bca8babce2: Already exists
7cfad4752a5: Already exists
7ed0d5f10a8: Already exists
35c98dc1ca2: Already exists
47c4d48afef: Already exists
8f4730d0214: Already exists
bd3efcf1156: Already exists
0f94e76c029: Already exists
315e699e5e3: Already exists
bce81a13b22: Already exists
4ca710b032c: Already exists
cdf076a192d: Already exists
f4183e6255f: Already exists
e03d076a06f: Already exists
a91a2d10a8c: Already exists
83461a2e6dd: Already exists
83ebabda3d8: Already exists
5dcfd31299f: Already exists
564ffd5b934: Already exists
1940571ed61: Already exists
b83b4ee7497: Already exists
7109b48513f: Already exists
0a1c03c590b: Downloading [====>] 12.91MB/203.2MB
```


因为镜像文件较大，需等待较长时间

```
hp@hp-ThinkStation-P520: ~$ sudo docker pull hp9017/sim2real:nav_demo
av_demo: Pulling from hp9017/sim2real
5807b77a593: Already exists
63faf7ebb91: Already exists
0af4aff2aac: Already exists
860ac2ea9aa: Already exists
64f8d4cad4c: Already exists
68bad238d01: Already exists
5dd747f11f9: Already exists
6bca8babce2: Already exists
7cfad4752a5: Already exists
7ed0d5f10a8: Already exists
35c98dc1ca2: Already exists
47c4d48afef: Already exists
8f4730d0214: Already exists
bd3efcf1156: Already exists
0f94e76c029: Already exists
315e699e5e3: Already exists
bce81a13b22: Already exists
4ca710b032c: Already exists
cdf076a192d: Already exists
f4183e6255f: Already exists
e03d076a06f: Already exists
a91a2d10a8c: Already exists
83461a2e6dd: Already exists
83ebabda3d8: Already exists
5dcfd31299f: Already exists
564ffd5b934: Already exists
1940571ed61: Already exists
b83b4ee7497: Already exists
7109b48513f: Already exists
0a1c03c590b: Pull complete
Digest: sha256:35dbbace3a195ce8c0ae56e3ee12e23590568977cac459e0bc63f630aa4ff1a6
Status: Downloaded newer image for hp9017/sim2real:nav_demo
docker.io/hp9017/sim2real:nav_demo
```

比赛任务开发docker环境

新建terminal

```
cd ~/docker_sim2real
```

需要根据宿主机的cpu修改create_container_algo.sh中的cpu和内存参数

举例：

宿主机cpu为：Intel® Xeon(R) W-2125 CPU @ 4.00GHz × 8

机器人cpu为：11th Gen Intel® Core i7-1165G7 @ 2.80GHz × 8

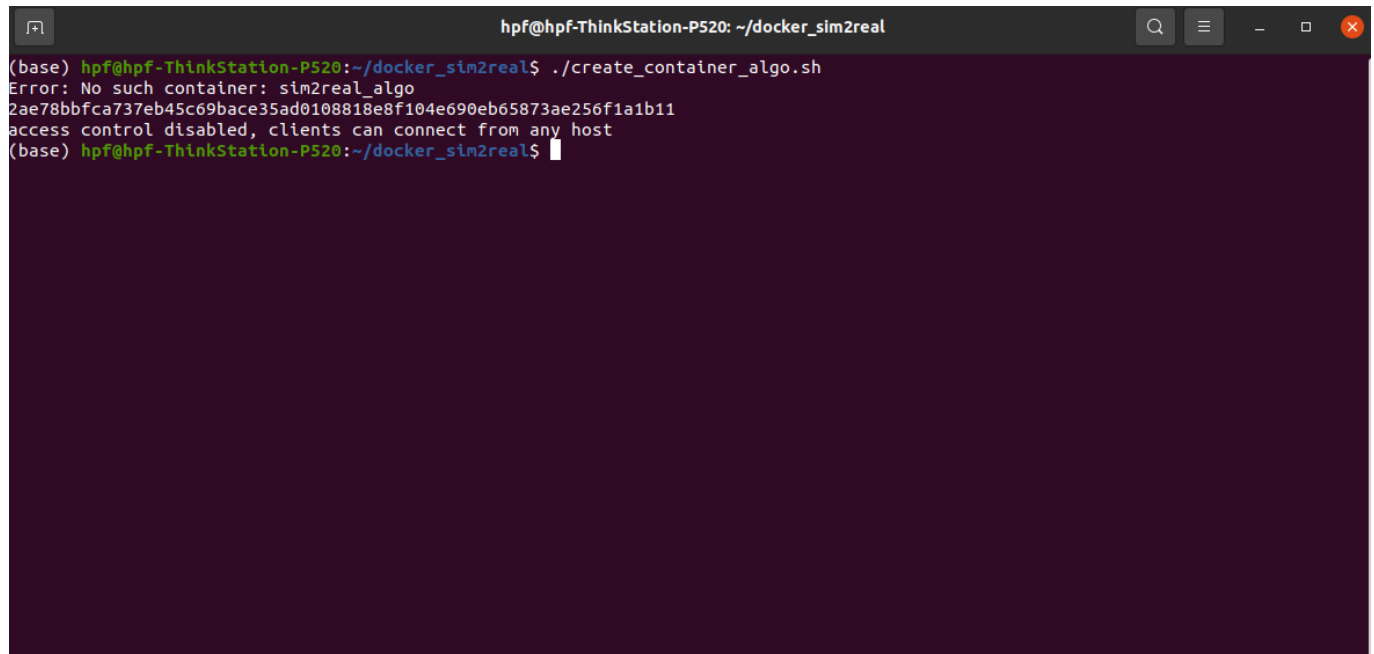
则cpu= $(2.8 \times 8) / 4 = 5.6$

机器人内存为：8GB

则M=8192M

```
./create_container_algo.sh
```

第一次执行会显示“Error: No such container: sim2real_algo”

A terminal window titled 'hpf@hpf-ThinkStation-P520: ~/docker_sim2real'. The prompt is '(base) hpf@hpf-ThinkStation-P520:~/docker_sim2real\$'. The user has entered './create_container_algo.sh'. The output shows an error: 'Error: No such container: sim2real_algo' followed by a long alphanumeric string '2ae78bbfca737eb45c69bace35ad0108818e8f104e690eb65873ae256f1a1b11' and the message 'access control disabled, clients can connect from any host'. The prompt is now '(base) hpf@hpf-ThinkStation-P520:~/docker_sim2real\$' with a cursor.

```
(base) hpf@hpf-ThinkStation-P520:~/docker_sim2real$ ./create_container_algo.sh
Error: No such container: sim2real_algo
2ae78bbfca737eb45c69bace35ad0108818e8f104e690eb65873ae256f1a1b11
access control disabled, clients can connect from any host
(base) hpf@hpf-ThinkStation-P520:~/docker_sim2real$
```

```
./exec_elgo.sh
```

进入比赛任务开发的docker环境

确定在2. ros-x-habitat的步骤中已经启动habitat节点，能显示rgb图像和深度图

```
cd ~
```

```
roslaunch habitat_navigation rtab_navigation.launch
```

