姓名+研究方向+学历+学校+可辅导学科方向

1：安装 ROS
http://wiki.ros.org/cn/noetic/Installation/Ubuntu

不要设置环境到~/.bashrc，即不要进行如下操作：
```
echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc
source ~/.bashrc
```

取而代之，我们在使用 ROS 的每个 **bash** 终端中 source 这个脚本。
```
source /opt/ros/noetic/setup.bash
```

2：安装 turtlebot3，slam 等包
```
sudo apt install ros-noetic-gazebo-ros-pkgs ros-noetic-gazebo-ros-control ros-noetic-turtlebot3-* ros-noetic-gmapping ros-noetic-joy ros-noetic-teleop-twist-joy ros-noetic-teleop-twist-keyboard ros-noetic-laser-proc ros-noetic-rgbd-launch ros-noetic-depthimage-to-laserscan ros-noetic-rosserial-arduino ros-noetic-rosserial-python ros-noetic-rosserial-server ros-noetic-rosserial-client ros-noetic-rosserial-msgs ros-noetic-amcl ros-noetic-map-server ros-noetic-move-base ros-noetic-urdf ros-noetic-xacro  ros-noetic-compressed-image-transport ros-noetic-rqt-image-view ros-noetic-gmapping ros-noetic-navigation  ros-noetic-interactive-markers rviz
```

3．下载项目

下载项目至~/DRL-robot-navigation 文件夹内。

4．编译

打开一个 terminal，退出 conda

删除旧编译文件
```
rm -r build_isolated
rm -r devel_isolated
```

编译：
```
source /opt/ros/noetic/setup.bash
conda deactivate
cd ~/DRL-robot-navigation/catkin_ws
catkin_make_isolated
```

5．新建 conda 虚拟环境，安装工具包

打开一个新 terminal，
```
conda create -n py3.6.9 python=3.6.9
conda activate py3.6.9
pip install torch==1.2.0 -f https://download.pytorch.org/whl/torch_stable.html
```

(252 A40 服务器，用不了 pytorch 1.4.0, 1.2.0，要装高版本 pytorch)

```
pip install pyyaml
pip install rospkg
pip install squaternion
pip install attr
pip install attrs
pip install netifaces defusedxml
```

如果 cuda 版本太靠前，执行以下步骤。要不然，程序卡在.to(device)

```
conda install pytorch=1.2.0 torchvision cudatoolkit=10.2 -c pytorch
```

6. 打开一个新的 terminal，配置环境。

```
conda activate py3.6.9
source /opt/ros/noetic/setup.bash
export ROS_HOSTNAME=localhost
export ROS_MASTER_URI=http://localhost:11311
export ROS_PORT_SIM=11311
export
GAZEBO_RESOURCE_PATH=~/DRL-robot-navigation/catkin_ws/src/multi_robot_scenario/
launch
cd ~/DRL-robot-navigation/catkin_ws
source devel_isolated/setup.bash
cd ~/DRL-robot-navigation/TD3
```

7. 执行 python 文件（训练代码）

方法 1：在步骤 6 中的 terminal 中，

```
python velodyne_td3_map.py
```

方法 2：在步骤 6 中的 terminal 中，通过找到 pycharm.sh 文件打开 pycharm。

```
cd /snap/pycharm-community/261/bin
./pycharm.sh
```

在 pycharm 中运行 velodyne_td3_map.py 文件。

8.停止训练和项目代码

```
killall -9 rosout roslaunch rosmaster gzserver nodelet robot_state_publisher
gzclient rviz roscore python python3
```

```
conda deactivate
source /opt/ros/noetic/setup.bash
cd /media/agent/eb0d0016-e15f-4a25-8c28-0ad31789f3cb/ROS/DRL-robot-navigation/
catkin_ws
catkin_make_isolated
```

```
conda activate py3.6.9
source /opt/ros/noetic/setup.bash
export ROS_HOSTNAME=localhost
export ROS_MASTER_URI=http://localhost:11311
export ROS_PORT_SIM=11311
export GAZEBO_RESOURCE_PATH=/media/agent/eb0d0016-e15f-4a25-8c28-0ad31789f3cb/
ROS/DRL-robot-navigation/catkin_ws/src/multi_robot_scenario/launch
##source ~/.bashrc
```

```
cd /media/agent/eb0d0016-e15f-4a25-8c28-0ad31789f3cb/ROS/DRL-robot-navigation/
catkin_ws
source devel_isolated/setup.bash
cd /media/agent/eb0d0016-e15f-4a25-8c28-0ad31789f3cb/ROS/DRL-robot-navigation/
TD3
```

```
cd /snap/pycharm-community/261/bin

./pycharm.sh
```

```
python ppo_exploration_41.py
```

```
cd /media/agent/eb0d0016-e15f-4a25-8c28-0ad31789f3cb/app/pycharm-2019.2.4/bin

./pycharm.sh
```

```
python velodyne_td3_map.py

roslaunch multi_robot_scenario test_move_base6.launch
```

```
ssh zhuhao@10.110.1.252
```

```
killall -9 rosout roslaunch rosmaster gzserver nodelet robot_state_publisher
gzclient rviz roscore move_base slam_gmapping
```

```
conda activate py3.6.9

source /opt/ros/noetic/setup.bash
export ROS_HOSTNAME=localhost
export ROS_MASTER_URI=http://localhost:11311
export ROS_PORT_SIM=11311
export GAZEBO_RESOURCE_PATH=/mnt/sdc/zhuhao/ros/DRL-robot-navigation/catkin_ws/
src/multi_robot_scenario/launch
cd /mnt/sdc/zhuhao/ros/DRL-robot-navigation/catkin_ws
source devel_isolated/setup.bash
cd /mnt/sdc/zhuhao/ros/DRL-robot-navigation/TD3

python ppo_exploration_61.py

python velodyne_td3_map.py
```

```
vim /mnt/sdc/zhuhao/ros/DRL-robot-navigation/TD3/test_env_map.py
vim /mnt/sdc/zhuhao/ros/DRL-robot-navigation/TD3/velodyne_td3_map.py

export PATH=/usr/local/cuda-11.0/bin
export LD_LIBRARY_PATH=/usr/local/cuda-11.0/lib64

roslaunch multi_robot_scenario test_move_base4.launch


test_exploration.py

Error: Non-unique names detected in <link name='link'>









How to set up sources with an anaconda environment?

Hi, thanks for sharing the Noetic branch. I am testing this branch with an
anaconda environment.
First, I opened a terminal using non-conda env. Then complie workspace:
----------
$ cd ~/DRL-robot-navigation/catkin_ws
### Compile
$ catkin_make_isolated
----------(It succeeds!)

Next, I have created an conda env, activated it, and installed some modules as
follows.
conda activate py3.6.9
--------------------
pip install torch==1.2.0 -f https://download.pytorch.org/whl/torch_stable.html
pip install pyyaml
pip install rospkg
pip install squaternion
pip install attr
pip install attrs
pip install netifaces defusedxml
------------------------

Finally, I opened a new terminal and set up sources:
---------------------- (This two lines are added to activate conda env and
source ROS)
$ conda activate py3.6.9
$ source /opt/ros/noetic/setup.bash
-------------------------
$ export ROS_HOSTNAME=localhost
$ export ROS_MASTER_URI=http://localhost:11311
$ export ROS_PORT_SIM=11311
$ export
GAZEBO_RESOURCE_PATH=~/DRL-robot-navigation/catkin_ws/src/multi_robot_scenario/
launch
-----------------------------------
```

$ ########## source ~/.bashrc (This line is deleted because it exits conda env py3.6.9 and turns to conda env base)
$ cd ~/DRL-robot-navigation/catkin_ws
$ source devel_isolated/setup.bash
$ cd ~/DRL-robot-navigation/TD3
$ python3 velodyne_td3.py

The result is as follows, the following error occurs :

Roscore launched!
Unable to register with master node [http://localhost:11311]: master may not be running yet. Will keep trying.
... logging to /home/agent/.ros/log/770251f6-541a-11ec-aeed-e7829104ff20/roslaunch-agent-B365M-POWER-172401.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://localhost:46189/
ros_comm version 1.15.13

SUMMARY
========

PARAMETERS
 * /rosdistro: noetic
 * /rosversion: 1.15.13

NODES

auto-starting new master
process[master]: started with pid [172411]
ROS_MASTER_URI=http://localhost:11311/

setting /run_id to 770251f6-541a-11ec-aeed-e7829104ff20
process[rosout-1]: started with pid [172421]
started core service [/rosout]
Gazebo launched!
... logging to /home/agent/.ros/log/770251f6-541a-11ec-aeed-e7829104ff20/roslaunch-agent-B365M-POWER-172431.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://localhost:43295/

SUMMARY
========

PARAMETERS
 * /joint_state_publisher/publish_frequency: 30.0
 * /robot_description: <?xml version="1....
 * /robot_state_publisher/publish_frequency: 30.0
 * /rosdistro: noetic
 * /rosversion: 1.15.13
 * /use_sim_time: True

NODES
  /
    gazebo (gazebo_ros/gzserver)
    joint_state_publisher (joint_state_publisher/joint_state_publisher)
    robot_state_publisher (robot_state_publisher/robot_state_publisher)
    rviz (rviz/rviz)
    urdf_spawner (gazebo_ros/spawn_model)

ROS_MASTER_URI=http://localhost:11311/

process[gazebo-1]: started with pid [172456]
process[urdf_spawner-2]: started with pid [172461]
process[robot_state_publisher-3]: started with pid [172462]
process[joint_state_publisher-4]: started with pid [172463]
process[rviz-5]: started with pid [172464]
[INFO] [1638523319.979820797]: Finished loading Gazebo ROS API Plugin.
[INFO] [1638523319.980631275]: waitForService: Service [/gazebo/set_physics_properties] has not been advertised, waiting...
[INFO] [1638523320.065212, 0.000000]: Loading model XML from ros parameter robot_description
[INFO] [1638523320.070311, 0.000000]: Waiting for service /gazebo/spawn_urdf_model
[INFO] [1638523320.797520126]: waitForService: Service [/gazebo/set_physics_properties] is now available.
[INFO] [1638523320.854882519]: Physics dynamic reconfigure ready.
[INFO] [1638523320.976913, 0.000000]: Calling service /gazebo/spawn_urdf_model
[INFO] [1638523497.485188702, 0.201000000]: Camera Plugin: Using the 'robotNamespace' param: '/'
[INFO] [1638523497.486945746, 0.201000000]: Camera Plugin (ns = /) <tf_prefix_>, set to ""
[INFO] [1638523497.497253932, 0.201000000]: Camera Plugin: The 'robotNamespace' param was empty
[INFO] [1638523497.498658911, 0.201000000]: Camera Plugin (ns = r1) <tf_prefix_>, set to ""
[INFO] [1638523498.697978, 0.201000]: Spawn status: SpawnModel: Successfully spawned entity
[urdf_spawner-2] process has finished cleanly
log file: /home/agent/.ros/log/770251f6-541a-11ec-aeed-e7829104ff20/urdf_spawner-2*.log
[INFO] [1638523499.690473792, 0.201000000]: Laser Plugin: The 'robotNamespace' param was empty
[INFO] [1638523499.690532451, 0.201000000]: Starting Laser Plugin (ns = r1)
[INFO] [1638523499.691076904, 0.201000000]: Laser Plugin (ns = r1) <tf_prefix_>, set to ""
[INFO] [1638523499.697194393, 0.201000000]: Velodyne laser plugin missing <min_intensity>, defaults to no clipping
[INFO] [1638523499.698738449, 0.201000000]: Velodyne laser plugin ready, 16 lasers
[INFO] [1638523499.710498725, 0.201000000]: Starting plugin DiffDrive(ns = r1/)
[INFO] [1638523499.710623456, 0.201000000]: DiffDrive(ns = r1/): <rosDebugLevel> = Debug

[INFO] [1638523499.711047215, 0.201000000]: DiffDrive(ns = r1/): <tf_prefix> =
[DEBUG] [1638523499.711102141, 0.201000000]: DiffDrive(ns = r1/): <commandTopic> =
cmd_vel
[DEBUG] [1638523499.711116354, 0.201000000]: DiffDrive(ns = r1/): <odometryTopic> = odom
[DEBUG] [1638523499.711153205, 0.201000000]: DiffDrive(ns = r1/): <odometryFrame> = odom
[DEBUG] [1638523499.711164916, 0.201000000]: DiffDrive(ns = r1/): <robotBaseFrame> =
base_link
[DEBUG] [1638523499.711235821, 0.201000000]: DiffDrive(ns = r1/): <publishWheelTF> = false
[WARN] [1638523499.711250520, 0.201000000]: DiffDrive(ns = r1/): missing <publishOdomTF>
default is true
[DEBUG] [1638523499.711290227, 0.201000000]: DiffDrive(ns = r1/): <publishWheelJointState>
= true
[DEBUG] [1638523499.711344992, 0.201000000]: DiffDrive(ns = r1/): <wheelSeparation> =
0.29999999999999999
[DEBUG] [1638523499.711362835, 0.201000000]: DiffDrive(ns = r1/): <wheelDiameter> =
0.17999999999999999
[DEBUG] [1638523499.711377474, 0.201000000]: DiffDrive(ns = r1/): <wheelAcceleration> = 1.8
[DEBUG] [1638523499.711391185, 0.201000000]: DiffDrive(ns = r1/): <wheelTorque> = 20
[DEBUG] [1638523499.711405342, 0.201000000]: DiffDrive(ns = r1/): <updateRate> = 50
[DEBUG] [1638523499.711453639, 0.201000000]: DiffDrive(ns = r1/): <odometrySource> =
world := 1
[DEBUG] [1638523499.711485094, 0.201000000]: DiffDrive(ns = r1/): <leftJoint> =
left_hub_joint
[DEBUG] [1638523499.711499787, 0.201000000]: DiffDrive(ns = r1/): <rightJoint> =
right_hub_joint
[WARN] [1638523499.711518908, 0.201000000]: GazeboRosDiffDrive Plugin (ns =) missing
<publishTf>, defaults to 1
[INFO] [1638523499.711922234, 0.201000000]: DiffDrive(ns = r1/): Advertise joint_states
[INFO] [1638523499.712257380, 0.201000000]: DiffDrive(ns = r1/): Try to subscribe to cmd_vel
[INFO] [1638523499.713753381, 0.201000000]: DiffDrive(ns = r1/): Subscribe to cmd_vel
[INFO] [1638523499.714150768, 0.201000000]: DiffDrive(ns = r1/): Advertise odom on odom
[INFO] [1638523499.721365047, 0.201000000]: GazeboRosJointStatePublisher is going to
publish joint: chassis_swivel_joint
[INFO] [1638523499.721390973, 0.201000000]: GazeboRosJointStatePublisher is going to
publish joint: swivel_wheel_joint
[INFO] [1638523499.721424750, 0.201000000]: GazeboRosJointStatePublisher is going to
publish joint: left_hub_joint
[INFO] [1638523499.721433820, 0.201000000]: GazeboRosJointStatePublisher is going to
publish joint: right_hub_joint
[INFO] [1638523499.721446512, 0.201000000]: Starting GazeboRosJointStatePublisher Plugin
(ns = r1/)!, parent name: r1
[DEBUG] [1638523499.732124524, 0.211000000]: Trying to publish message of type
[sensor_msgs/LaserScan/90c7ef2dc6895d81024acba2ac42f369] on a publisher with type
[sensor_msgs/LaserScan/90c7ef2dc6895d81024acba2ac42f369]
[DEBUG] [1638523499.793156774, 0.222000000]: Trying to publish message of type
[nav_msgs/Odometry/cd5e73d190d741a2f92e81eda573aca7] on a publisher with type
[nav_msgs/Odometry/cd5e73d190d741a2f92e81eda573aca7]
[DEBUG] [1638523499.793237857, 0.222000000]: Trying to publish message of type
[sensor_msgs/JointState/3066dcd76a6cfaef579bd0f34173e9fd] on a publisher with type
[sensor_msgs/JointState/3066dcd76a6cfaef579bd0f34173e9fd]

[DEBUG] [1638523499.807064731, 0.235000000]: Trying to publish message of type [sensor_msgs/CameraInfo/c9a58c1b0b154e0e6da7578cb991d214] on a publisher with type [sensor_msgs/CameraInfo/c9a58c1b0b154e0e6da7578cb991d214]
Exception in thread /r1/odom:
Traceback (most recent call last):
  File "/home/agent/anaconda3/envs/py3.6.9/lib/python3.6/threading.py", line 916, in _bootstrap_inner
    self.run()
  File "/home/agent/anaconda3/envs/py3.6.9/lib/python3.6/threading.py", line 864, in run
    self._target(*self._args, **self._kwargs)
  File "/opt/ros/noetic/lib/python3/dist-packages/rospy/impl/tcpros_pubsub.py", line 185, in robust_connect_subscriber
    conn.receive_loop(receive_cb)
  File "/opt/ros/noetic/lib/python3/dist-packages/rospy/impl/tcpros_base.py", line 846, in receive_loop
    self.close()
  File "/opt/ros/noetic/lib/python3/dist-packages/rospy/impl/tcpros_base.py", line 858, in close
    self.socket.close()
AttributeError: 'NoneType' object has no attribute 'close'

Exception in thread /r1/front_laser/scan:
Traceback (most recent call last):
  File "/home/agent/anaconda3/envs/py3.6.9/lib/python3.6/threading.py", line 916, in _bootstrap_inner
    self.run()
  File "/home/agent/anaconda3/envs/py3.6.9/lib/python3.6/threading.py", line 864, in run
    self._target(*self._args, **self._kwargs)
  File "/opt/ros/noetic/lib/python3/dist-packages/rospy/impl/tcpros_pubsub.py", line 185, in robust_connect_subscriber
    conn.receive_loop(receive_cb)
  File "/opt/ros/noetic/lib/python3/dist-packages/rospy/impl/tcpros_base.py", line 846, in receive_loop
    self.close()
  File "/opt/ros/noetic/lib/python3/dist-packages/rospy/impl/tcpros_base.py", line 858, in close
    self.socket.close()
AttributeError: 'NoneType' object has no attribute 'close'
