ROS镜像下载使用说明

1.下载镜像

阿里云盘 已经配置过ROS的镜像，附带可运行示例项目

由于体积过大，只能发送阿里云盘快传，有效期24小时

如果失效，请联系客服，会尽快处理！

最晚周末解决

系统默认密码：1

共 3 项　　　　　　　　　　　　　　　　🔍 搜索分享　　⇅ 按名称排序　　☰

Ubuntu20.04_ROS　　　Ubuntu18.04_ROS　　　Ubuntu16.04_ROS
_noetic　　　　　　　　_melodic　　　　　　　_kinetic
昨天 23:43　　　　　　　昨天 23:43　　　　　　　昨天 23:43

以下是原始镜像（无配置）的下载链接：

https://releases.ubuntu.com/16.04/ubuntu–16.04.7–desktop–amd64.iso

https://releases.ubuntu.com/18.04/ubuntu–18.04.6–desktop–amd64.iso

https://releases.ubuntu.com/20.04/ubuntu–20.04.6–desktop–amd64.iso

2.vmware 安装镜像

推荐vmware workstation17，其他版本同样适用

优先推荐使用Ubuntu20.04 ROS noetic版本，性能最好，环境适配，易于上手开发！

名称 ^	修改日期	类型	大小
📁 Ubuntu20 64 位 的克隆.vmx.lck	2023/7/12 23:07	文件夹	
📄 Ubuntu20 64 位 的克隆.nvram	2023/7/11 17:26	VMware 虚拟机...	9 KB
📄 Ubuntu20 64 位 的克隆.vmsd	2023/7/11 17:26	VMware 快照元...	0 KB
🔲 Ubuntu20 64 位 的克隆.vmx	2023/7/11 17:32	VMware 虚拟机...	5 KB
📄 Ubuntu20 64 位 的克隆.vmxf	2023/7/11 17:32	VMware 组成员	1 KB
💿 Ubuntu20.04_ROS_Noetic-cl1.vmdk	2023/7/11 17:28	VMware 虚拟磁...	2 KB
💿 Ubuntu20.04_ROS_Noetic-cl1-s001.v...	2023/7/11 17:28	VMware 虚拟磁...	1,282,368...
💿 Ubuntu20.04_ROS_Noetic-cl1-s002.v...	2023/7/11 17:28	VMware 虚拟磁...	3,778,752...
💿 Ubuntu20.04_ROS_Noetic-cl1-s003.v...	2023/7/11 17:28	VMware 虚拟磁...	97,792 KB
💿 Ubuntu20.04_ROS_Noetic-cl1-s004.v...	2023/7/11 17:28	VMware 虚拟磁...	4,864 KB
💿 Ubuntu20.04_ROS_Noetic-cl1-s005.v...	2023/7/11 17:28	VMware 虚拟磁...	1,237,056...

下载后，点击 .vmx文件即可自动在vmware中打开镜像

附赠（可能过期，需要自行测试）

vmware 密钥，一行一个：

MC60H-DWHD5-H80U9-6V85M-8280D

JU090-6039P-08409-8J0QH-2YR7F

ZF3R0-FHED2-M80TY-8QYGC-NPKYF

FC7D0-D1YDL-M8DXZ-CYPZE-P2AY6

ZC3TK-63GE6-481JY-WWW5T-Z7ATA

1Z0G9-67285-FZG78-ZL3Q2-234JG

4A4RR-813DK-M81A9-4U35H-06KND

NZ4RR-FTK5H-H81C1-Q30QH-1V2LA

JU090-6039P-08409-8J0QH-2YR7F

4Y09U-AJK97-089Z0-A3054-83KLA

4C21U-2KK9Q-M8130-4V2QH-CF810
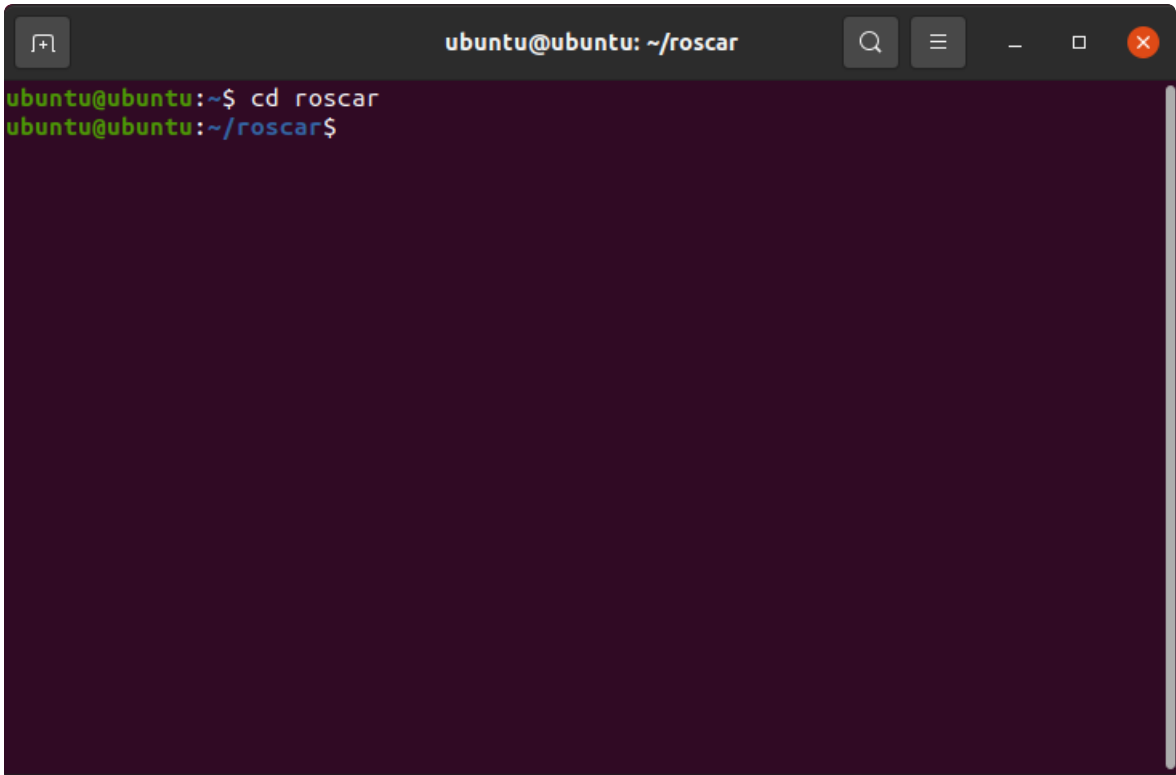
MC60H-DWHD5-H80U9-6V85M-8280D

3. 启动示例项目

3.1 打开终端，进入roscar目录

```
1    cd roscar
```
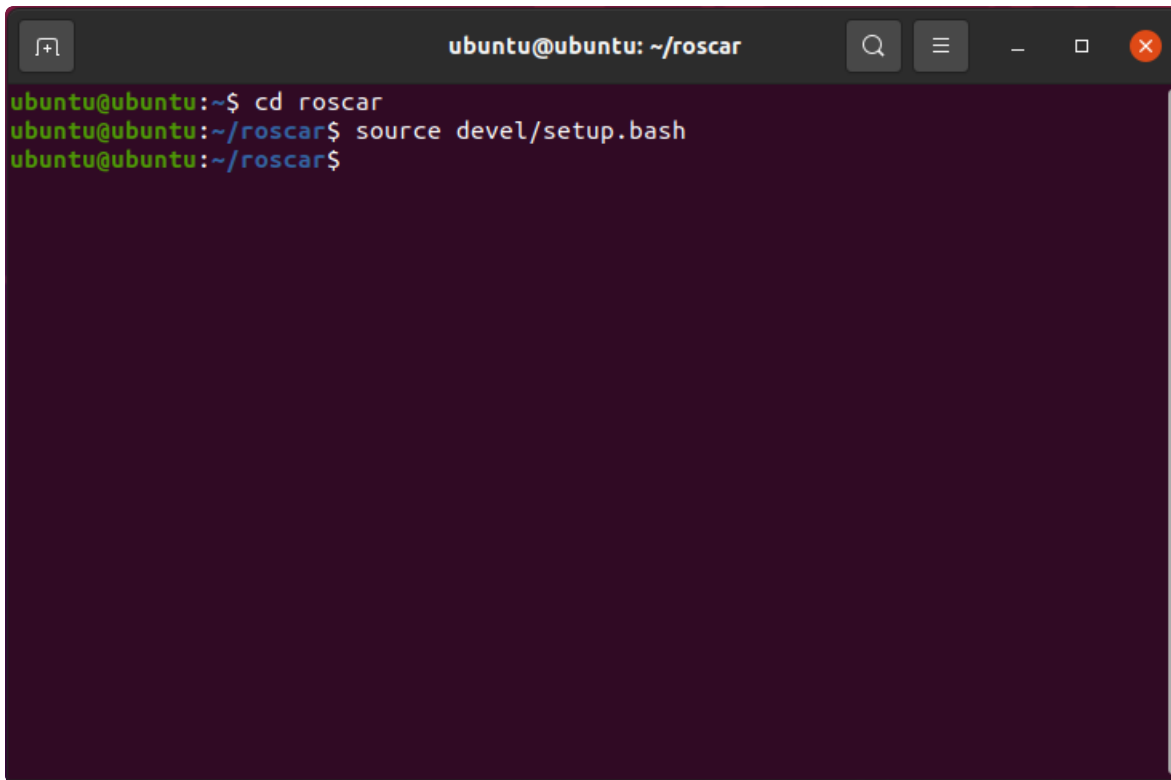

3.2 使能项目环境

```
1    source devel/setup.bash
```
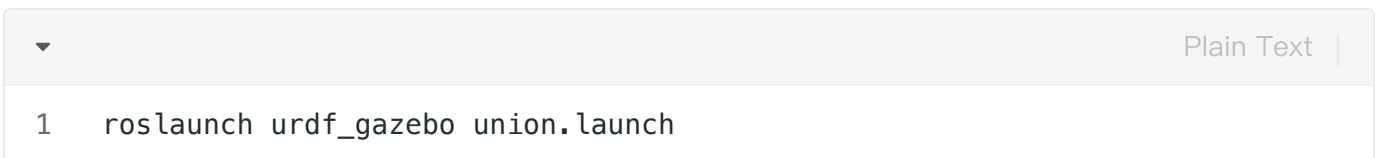
```
ubuntu@ubuntu:~$ cd roscar
ubuntu@ubuntu:~/roscar$ source devel/setup.bash
ubuntu@ubuntu:~/roscar$
```

3.3启动3D仿真环境gazebo

```
1    roslaunch urdf_gazebo union.launch
```

```
ubuntu@ubuntu:~$ cd roscar
ubuntu@ubuntu:~/roscar$ source devel/setup.bash
ubuntu@ubuntu:~/roscar$ roslaunch urdf_gazebo union.launch
... logging to /home/ubuntu/.ros/log/12656e4e-1fd0-11ee-ba88-e52a992e8176/roslau
nch-ubuntu-2224.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://192.168.220.130:35113/

SUMMARY
========

PARAMETERS
 * /gazebo/enable_ros_network: True
 * /robot_description: <?xml version="1....
 * /rosdistro: noetic
 * /rosversion: 1.16.0
 * /use_sim_time: True

NODES
  /
    gazebo (gazebo_ros/gzserver)
    gazebo_gui (gazebo_ros/gzclient)
    model (gazebo_ros/spawn_model)

auto-starting new master
process[master]: started with pid [2236]
ROS_MASTER_URI=http://localhost:11311

setting /run_id to 12656e4e-1fd0-11ee-ba88-e52a992e8176
process[rosout-1]: started with pid [2246]
started core service [/rosout]
process[gazebo-2]: started with pid [2249]
process[gazebo_gui-3]: started with pid [2253]
process[model-4]: started with pid [2259]
[ INFO] [1689068904.444582153]: Finished loading Gazebo ROS API Plugin.
[ INFO] [1689068904.447605589]: waitForService: Service [/gazebo/set_physics_pro
perties] has not been advertised, waiting...
[ INFO] [1689068904.651802500]: Finished loading Gazebo ROS API Plugin.
[ INFO] [1689068904.654562073]: waitForService: Service [/gazebo_gui/set_physics
perties] ha] has not been advertised, waiting...
[ INFO] [1689068906.222978183]: waitForService: Service [/gazebo/set_physics_pro
[ INFO] [1s now available.
_propertie689068906.243175, 0.000000]: Spawn service failed. Exiting.
[ INFO] [1689068906.256984198, 195.270000000]: Physics dynamic reconfigure ready
perties] is
[ERROR] [1orocess has died [pid 2259, exit code 1, cmd /opt/ros/noetic/lib/gazeb
[ INFO] [1n_model -urdf -model mycar -param robot_description __name:=model __lo
.          buntu/.ros/log/12656e4e-1fd0-11ee-ba88-e52a992e8176/model-4.log].
[model-4] /home/ubuntu/.ros/log/12656e4e-1fd0-11ee-ba88-e52a992e8176/model-4*.lo
o_ros/spawi
g:=/home/u589068907.992857992, 195.328000000]: Camera Plugin: Using the 'robotNa
log file: aram: '/'
g          589068908.011903720, 195.328000000]: Camera Plugin (ns = /)  <tf_prefi
[ INFO] [1o ""
mespace' p589068908.515570571, 195.328000000]: Laser Plugin: Using the 'robotNam
[ INFO] [1ram: '/'
x_>, set t689068908.515702678, 195.328000000]: Starting Laser Plugin (ns = /)
[ INFO] [1689068908.539313508, 195.328000000]: Laser Plugin (ns = /)  <tf_prefix
espace' pai ""
[ INFO] [1689068908.662673896, 195.328000000]: PlanarMovePlugin (ns = /) missing
```
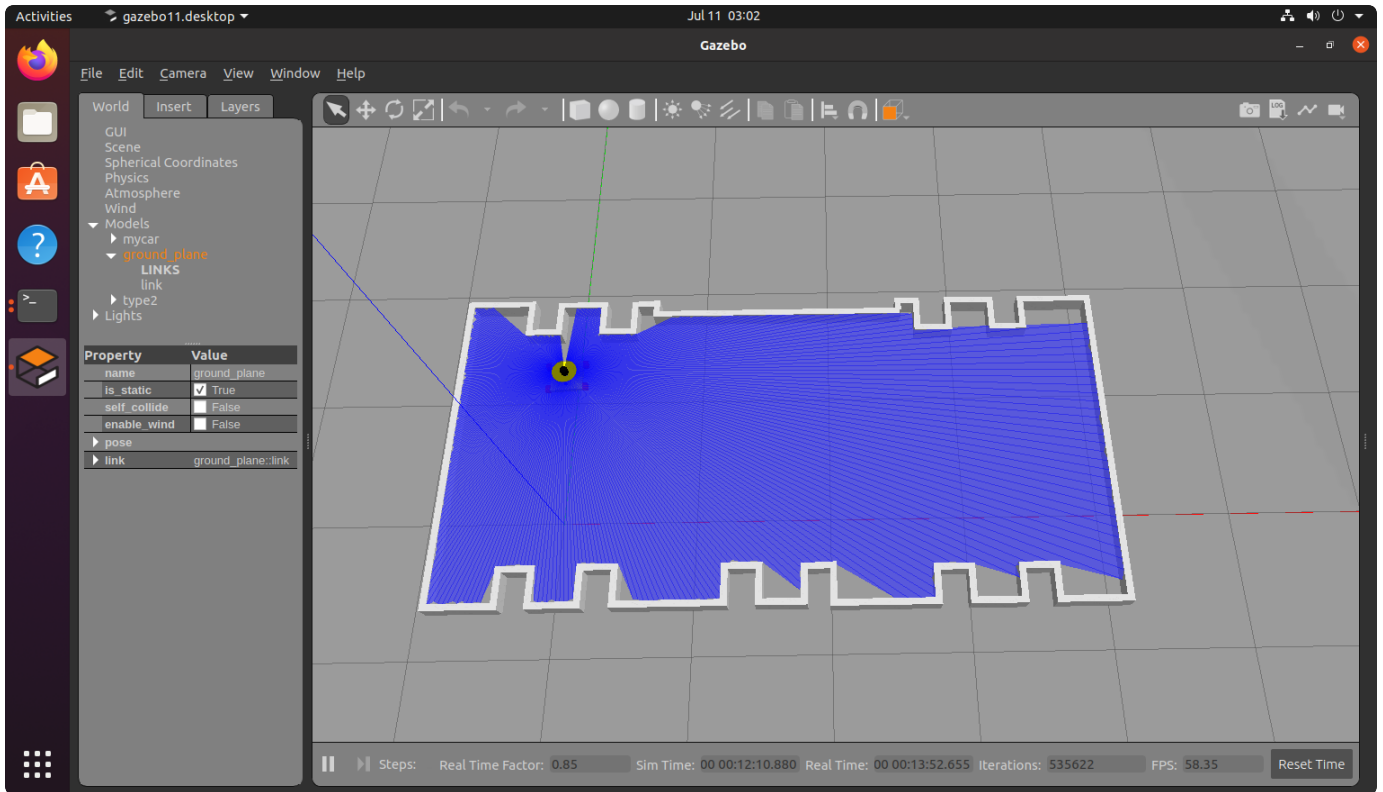
3.4启动2D Rviz界面

新开一个终端，进入roscar目录并使能环境（重复3.1–3.2）

启动底层控制节点，并打开rviz界面

```
roslaunch nav_ma nav06_union.launch
```

```
/home/ubuntu/roscar/src/nav_ma/launch/nav06_union.launc...

ubuntu@ubuntu:~$ cd roscar/
ubuntu@ubuntu:~/roscar$ source devel/setup.bash
ubuntu@ubuntu:~/roscar$ roslaunch nav_ma nav06_union.launch
... logging to /home/ubuntu/.ros/log/12656e4e-1fd0-11ee-ba88-e52a992e8176/roslau
nch-ubuntu-3033.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://192.168.220.130:34867/

SUMMARY
========

CLEAR PARAMETERS
 * /move_base/

PARAMETERS
 * /amcl/base_frame_id: base_footprint
 * /amcl/global_frame_id: map
 * /amcl/gui_publish_rate: 10.0
 * /amcl/kld_err: 0.05
 * /amcl/kld_z: 0.99
 * /amcl/laser_lambda_short: 0.1
```

```
/home/ubuntu/roscar/src/nav_ma/launch/nav06_union.launc...

[ INFO] [1689069105.115038434, 358.797000000]: Created local_planner teb_local_p
lanner/TebLocalPlannerROS
[ INFO] [1689069105.372173545, 358.893000000]: Footprint model 'polygon' loaded
for trajectory optimization.
[ INFO] [1689069105.374419098, 358.893000000]: Parallel planning in distinctive
topologies disabled.
[ INFO] [1689069105.374482768, 358.893000000]: No costmap conversion plugin spec
ified. All occupied costmap cells are treaten as point obstacles.
[ INFO] [1689069106.092845802, 359.249000000]: Recovery behavior will clear laye
r 'obstacle_layer'
[ INFO] [1689069106.095532817, 359.251000000]: Recovery behavior will clear laye
r 'obstacle_layer'
[ INFO] [1689069106.100901096, 359.257000000]: Recovery behavior will clear laye
r 'obstacle_layer'
[ERROR] [1689069106.102029457, 359.257000000]: Failed to load a plugin. Using de
fault recovery behaviors. Error: According to the loaded plugin descriptions the
 class move_slow_and_clear/MoveSlowAndClear with base class type nav_core::Recov
eryBehavior does not exist. Declared types are  clear_costmap_recovery/ClearCost
mapRecovery rotate_recovery/RotateRecovery
[ INFO] [1689069106.110082346, 359.261000000]: Recovery behavior will clear laye
r 'obstacle_layer'
[ INFO] [1689069106.117809978, 359.265000000]: Recovery behavior will clear laye
r 'obstacle_layer'
[ INFO] [1689069106.207504767, 359.322000000]: odom received!
```

注：终端中的所有红色错误并不影响例程运行！
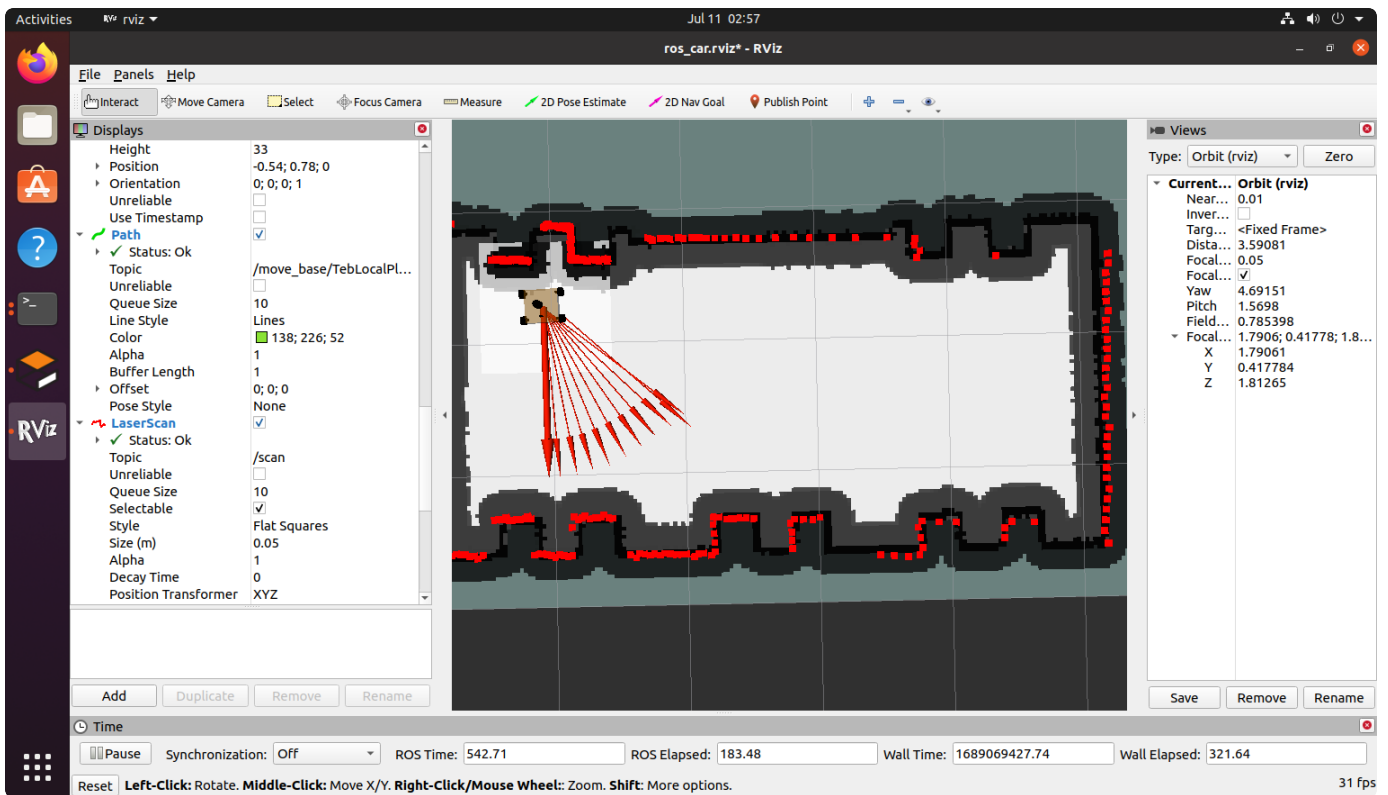
4.附赠rosdep配置脚本

rosdep 是ros中批量管理项目功能包的软件，简单来说，你下载了别人的项目，但你没有安装项目需要的几十个功能包，那么rosdep 可以对项目进行扫描，自动批量下载所需依赖功能包。

但是，由于外网限制，rosdep的配置一直都是ros中的难点，因此通过如下程序可以自动化进行替代配置，解决网络问题。

网盘镜像中皆已经配置过rosdep，可以正常使用。

以下是自动化rosdep配置脚本

```python
'''
Author: Meroke 3154911544@qq.com
Date: 2023-07-11 16:06:27
LastEditors: Meroke 3154911544@qq.com
LastEditTime: 2023-07-13 00:01:48
FilePath: \python\Tool\rosdep.py
Description:

Copyright (c) 2023 by ${git_name_email}, All Rights Reserved.
'''
import os
import subprocess
import platform

def get_ubuntu_version():
    try:
        output = subprocess.check_output(['lsb_release', '-rs']).decode().strip()
        return output
    except subprocess.CalledProcessError:
        print("Failed to get Ubuntu version.")
        return None

def get_directory_path():
    system_version = platform.system()
    release_version = get_ubuntu_version()
    print("system_version: {}".format(system_version))

    if system_version == 'Linux':
        if release_version == '16.04' or release_version == '18.04':
            directory_path = '/usr/local/lib/python3.6/dist-packages'
        elif release_version == '20.04':
            directory_path = '/usr/lib/python3/dist-packages'
        else:
            directory_path = None
            print("Unsupported Ubuntu version")
    else:
        directory_path = None
        print("Not running on Ubuntu")

    return directory_path


def check_and_execute_commands():
    file_path = '/etc/ros/rosdep/sources.list.d/20-default.list'
```
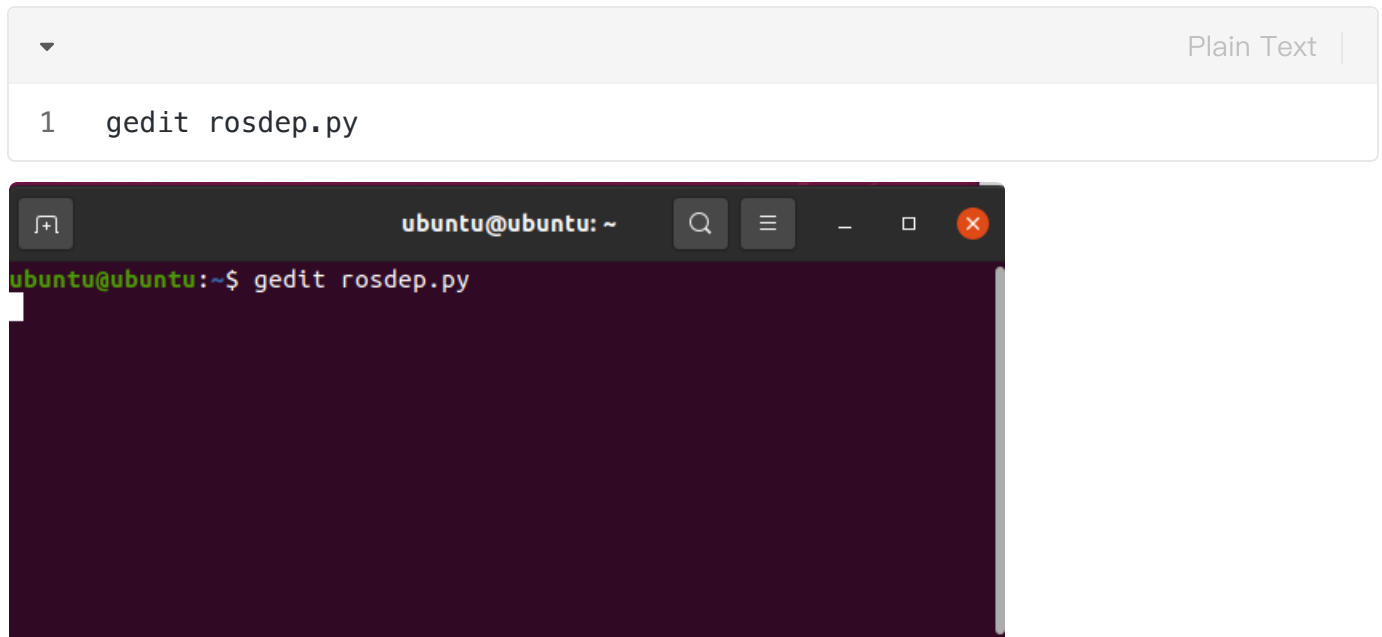
```python
    if os.path.exists(file_path):
        os.remove(file_path)
        print(f"Deleted file: {file_path}")

    init_command = 'sudo rosdep init'
    init_process = subprocess.Popen(init_command, shell=True)
    init_process.wait()

    fix_command = "sudo rosdep fix-permissions"
    fix_process = subprocess.Popen(fix_command, shell=True)
    fix_process.wait()
    if init_process.returncode == 0:
        update_command = 'rosdep update'
        update_process = subprocess.Popen(update_command, shell=True)
        update_process.wait()


    if update_process.returncode == 0:
            print("rosdep update completed successfully")
    else:
        print("rosdep update failed")


def replace_url(file_path, old_url, new_url):
    with open(file_path, 'r') as file:
        content = file.read()

    updated_content = content.replace(old_url, new_url)

    with open(file_path, 'w') as file:
        file.write(updated_content)



def search_and_replace_urls(directory_path):
    target_files = [
        'rosdistro/__init__.py',
        'rosdep2/gbpdistro_support.py',
        'rosdep2/sources_list.py',
        'rosdep2/rep3.py'
    ]
    old_url = 'raw.githubusercontent.com/ros/rosdistro'
    new_url = 'gitee.com/zhao-xuzuo/rosdistro/raw'

    try:
        for root, dirs, files in os.walk(directory_path):
            for file in files:
                file_path = os.path.join(root, file)
```
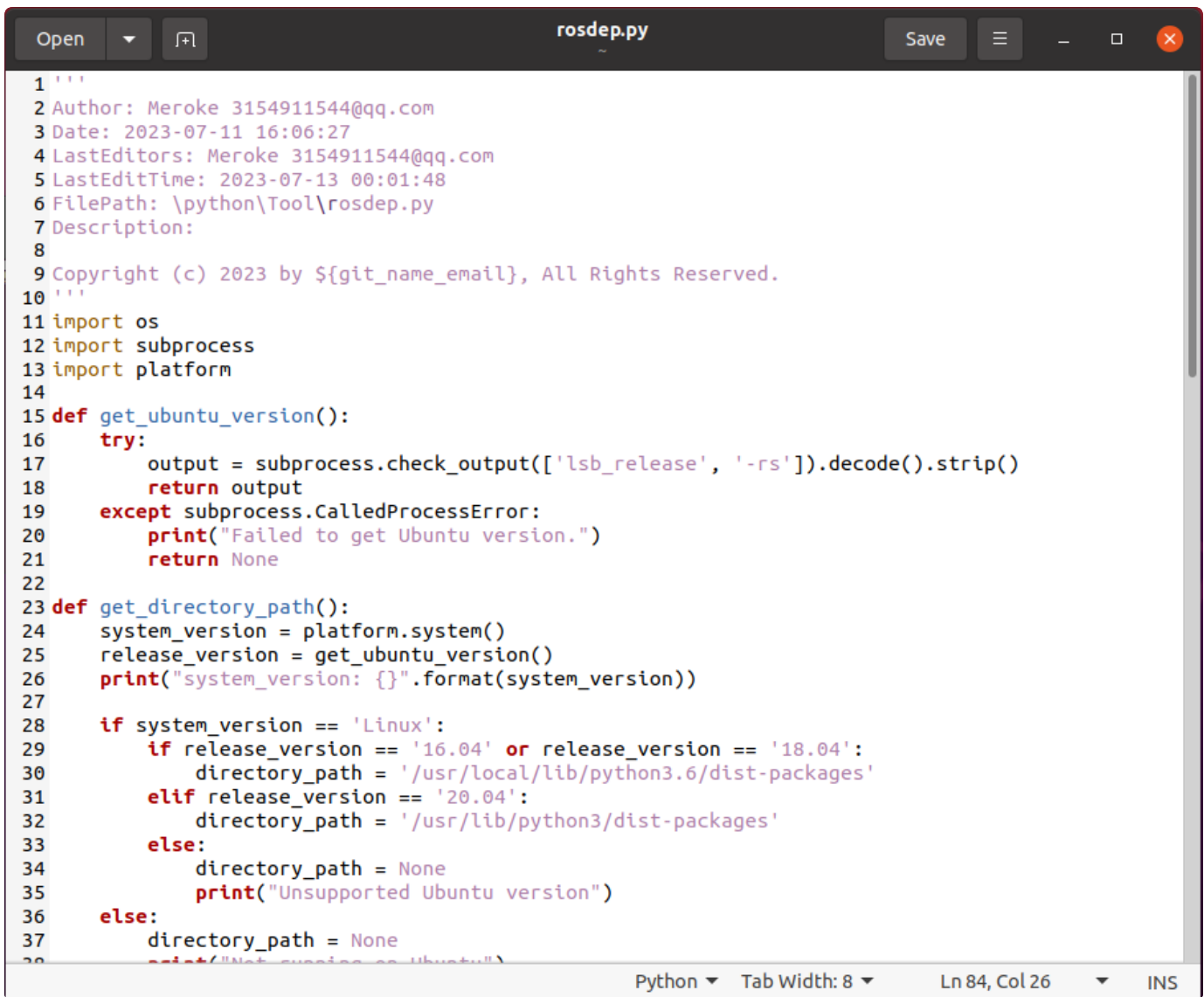
```
93          if file_path.endswith(tuple(target_files)):
94              replace_url(file_path, old_url, new_url)
95              print(f"Replaced URL in {file_path}")
96      except PermissionError:
97          print("Permission denied. 请使用使用sudo python3 rosde.py")
98      except FileNotFoundError:
99          print(f"File not found: {file_path}")
100
101
102  # 指定目录路径
103  directory_path = get_directory_path()
104  print("directory_path:{}".format(directory_path))
105  search_and_replace_urls(directory_path)
106  check_and_execute_commands()
107  print("task finished!")
```

运行

4.1打开终端，输入

```
1   gedit rosdep.py
```


4.2 将脚本内容复制进去，并保存

```python
'''
Author: Meroke 3154911544@qq.com
Date: 2023-07-11 16:06:27
LastEditors: Meroke 3154911544@qq.com
LastEditTime: 2023-07-13 00:01:48
FilePath: \python\Tool\rosdep.py
Description:

Copyright (c) 2023 by ${git_name_email}, All Rights Reserved.
'''
import os
import subprocess
import platform

def get_ubuntu_version():
    try:
        output = subprocess.check_output(['lsb_release', '-rs']).decode().strip()
        return output
    except subprocess.CalledProcessError:
        print("Failed to get Ubuntu version.")
        return None

def get_directory_path():
    system_version = platform.system()
    release_version = get_ubuntu_version()
    print("system_version: {}".format(system_version))

    if system_version == 'Linux':
        if release_version == '16.04' or release_version == '18.04':
            directory_path = '/usr/local/lib/python3.6/dist-packages'
        elif release_version == '20.04':
            directory_path = '/usr/lib/python3/dist-packages'
        else:
            directory_path = None
            print("Unsupported Ubuntu version")
    else:
        directory_path = None
```
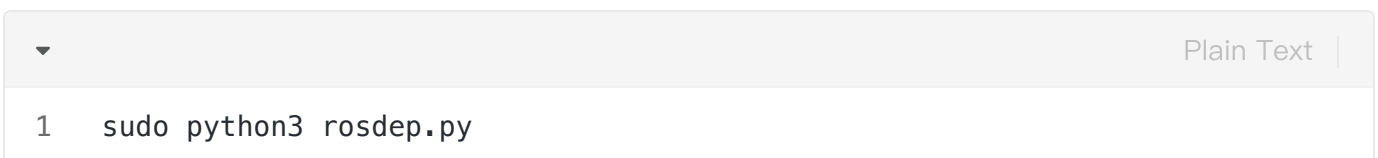
4.3 打开终端，使用sudo权限运行

```
sudo python3 rosdep.py
```

```
ubuntu@ubuntu:~$ gedit rosdep.py
ubuntu@ubuntu:~$ sudo rosdep.py
sudo: rosdep.py: command not found
ubuntu@ubuntu:~$ sudo python3 rosdep.py
system_version: Linux
directory_path:/usr/lib/python3/dist-packages
Replaced URL in /usr/lib/python3/dist-packages/rosdistro/__init__.py
Replaced URL in /usr/lib/python3/dist-packages/rosdep2/sources_list.
py
Replaced URL in /usr/lib/python3/dist-packages/rosdep2/gbpdistro_sup
port.py
Replaced URL in /usr/lib/python3/dist-packages/rosdep2/rep3.py
Deleted file: /etc/ros/rosdep/sources.list.d/20-default.list
Wrote /etc/ros/rosdep/sources.list.d/20-default.list
Recommended: please run

        rosdep update

Recursively changing ownership of ros home directory '/root/.ros' to
 'root:root' (current user)...
Done.
reading in sources list data from /etc/ros/rosdep/sources.list.d
Warning: running 'rosdep update' as root is not recommended.
  You should run 'sudo rosdep fix-permissions' and invoke 'rosdep up
date' again without sudo.
Hit https://gitee.com/zhao-xuzuo/rosdistro/raw/master/rosdep/osx-hom
ebrew.yaml
Hit https://gitee.com/zhao-xuzuo/rosdistro/raw/master/rosdep/base.ya
ml
Hit https://gitee.com/zhao-xuzuo/rosdistro/raw/master/rosdep/python.
yaml
Hit https://gitee.com/zhao-xuzuo/rosdistro/raw/master/rosdep/ruby.ya
ml
Hit https://gitee.com/zhao-xuzuo/rosdistro/raw/master/releases/fuert
e.yaml
Query rosdistro index https://gitee.com/zhao-xuzuo/rosdistro/raw/mas
ter/index-v4.yaml
Skip end-of-life distro "ardent"
Skip end-of-life distro "bouncy"
Skip end-of-life distro "crystal"
Add distro "dashing"
Skip end-of-life distro "eloquent"
Add distro "foxy"
Skip end-of-life distro "groovy"
Skip end-of-life distro "hydro"
Skip end-of-life distro "indigo"
Skip end-of-life distro "jade"
Add distro "kinetic"
Skip end-of-life distro "lunar"
Add distro "melodic"
Add distro "noetic"
Add distro "rolling"
updated cache in /root/.ros/rosdep/sources.cache
rosdep update completed successfully
task finished!
ubuntu@ubuntu:~$
```

如无报错，则代表rosdep配置成功

5.PX4 教程

https://www.yuque.com/xtdrone/manual_cn/basic_config_13#Gr8fz

直接仿真飞行使用可看：

用键盘控制无人机飞行

在一个终端运行

```Bash
cd ~/PX4_Firmware
roslaunch px4 indoor1.launch
```

- 注意，用ctrl+c关闭仿真进程，有可能没有把Gazebo的相关进程关干净，这样再启动仿真时可能会报错。如果出现这种情况，可以用killall -9 gzclient, killall -9 gzserver 这两个命令强行关闭gazebo所有进程。

Gazebo启动后，在另一个终端运行（注意要等Gazebo完全启动完成，或者可能脚本会报错）

```Bash
cd ~/XTDrone/communication/
python multirotor_communication.py iris 0
```

与0号iris建立通信后，在另一个终端运行

```Bash
cd ~/XTDrone/control/keyboard
python multirotor_keyboard_control.py iris 1 vel
```

便可以通过键盘控制1架iris的解锁/上锁(arm/disarm)，修改飞行模式，飞机速度等。使用v起飞利用的是takeoff飞行模式，相关参数（起飞速度、高度）要在rcS中设置。一般可以使用offboard模式起飞，这时起飞速度要大于0.3m/s才能起飞(即：upward velocity 需要大于0.3)。注意，飞机要先解锁才能起飞！飞到一定高度后可以切换为'hover'模式悬停，再运行自己的飞行脚本，或利用键盘控制飞机。
推荐起飞流程，按i把向上速度加到0.3以上，再按b切offboard模式，最后按t解锁。

注意：执行上述指令，请使用python3替代python， 数字不可省略。

6.问题解决

1. 运行自带测试小车导航实例时，出现如下错误，是缺少gazebo_ros库

解决方法:

```
1    sudo apt install ros-noetic-gazebo-ros  # ubuntu20.04版本
2    或
3    sudo apt install ros-melodic-gazebo-ros  # ubuntu18.04版本
```

注意：针对px4进阶版本，请注意，gazebo版本可能导致冲突，建议需要使用PX4的，请不要执行上述指令。

Terminal ▾   Nov 16 00:53

ubuntu@ubuntu: ~/roscar

```
GAZEBO_PLUGIN_PATH :/home/ubuntu/PX4_Firmware/build/px4_sitl_default/buil
GAZEBO_MODEL_PATH :/home/ubuntu/PX4_Firmware//Tools/sitl_gazebo/models
LD_LIBRARY_PATH /home/ubuntu/catkin_ws/devel/lib:/opt/ros/noetic/lib:/hom
/PX4_Firmware/build/px4_sitl_default/build_gazebo
ubuntu@ubuntu:~$ cd roscar
ubuntu@ubuntu:~/roscar$ source devel/setup.bash
ubuntu@ubuntu:~/roscar$ roslaunch urdf_gazebo union.launch
... logging to /home/ubuntu/.ros/log/3b85e47e-845d-11ee-bdf6-1fa5d8a3176d/
ch-ubuntu-3975.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.

Resource not found: gazebo_ros
ROS path [0]=/opt/ros/noetic/share/ros
ROS path [1]=/home/ubuntu/roscar/src
ROS path [2]=/opt/ros/noetic/share
The traceback for the exception was written to the log file
ubuntu@ubuntu:~/roscar$ 
```