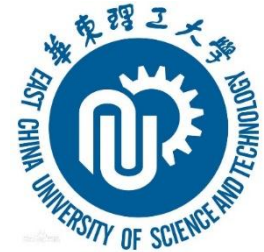


【ROS机械臂入门教程】

第2讲 ROS简介

小五

日期 2023/1/12



目录

「₁」 ROS介绍

「₂」 ROS机器人包

ROS1版本

ROS Noetic Ninjemys (Recommended)	May 23rd, 2020			May, 2025 (Focal EOL)
ROS Melodic Morenia	May 23rd, 2018			May, 2023 (Bionic EOL)

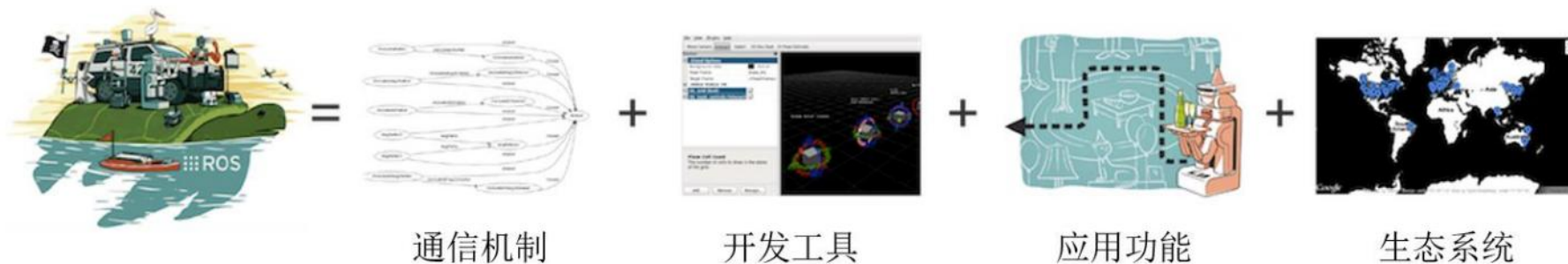
Ubuntu20

Ubuntu18
本次项目使用

ROS2版本

Humble Hawksbill	May 23rd, 2022		
Galactic Geochelone	May 23rd, 2021		November 2022
Foxy Fitzroy	June 5th, 2020		May 2023

■ ROS是什么

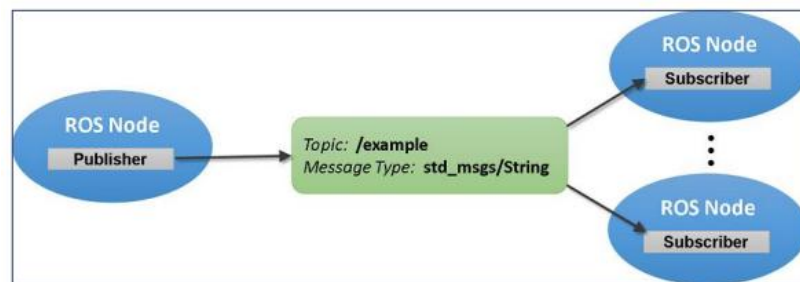


■ 站在机械臂的视角来看

- 通信机制：节点、话题通信、服务通信
- 开发工具：launch、Rviz、rqt、Gazebo、tf
- 应用功能：Moveit!
- 生态系统：Moveit API、Moveit官方教程、机器人ROS包、相机夹爪ROS包

■ 通信机制

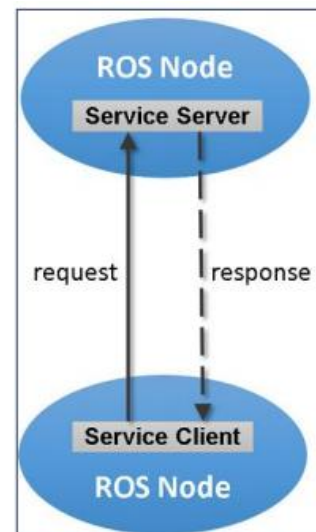
➤ **节点**：执行运算任务的进程，一个系统一般由多个节点组成



话题模型（发布/订阅）

➤ **话题通信**：A节点以某种频率一直向B节点发送消息(信息的一种格式)，B节点一直接收信息

➤ **服务通信**：A节点向B节点发送请求(信息)，B节点应答A的请求，并回应A节点



服务模型
(请求/应答)

■ 发开工具

- launch: 一次性启动多个节点

```
demo.launch -x
[launch]
<!-- By default, we do not start a database (it can be large) -->
<arg name="db" default="false" />

<!-- By default, we are not in debug mode -->
<arg name="debug" default="false" />

<arg name="limited" default="false"/>

<!-- Load the URDF, SRDF and other .yaml configuration files on the param server -->
<include file="$(find ur5_moveit_config)/launch/planning_context.launch">
  <arg name="load_robot_description" value="true"/>
  <arg name="limited" value="$(arg limited)"/>
</include>

<!-- If needed, broadcast static tf for robot root -->

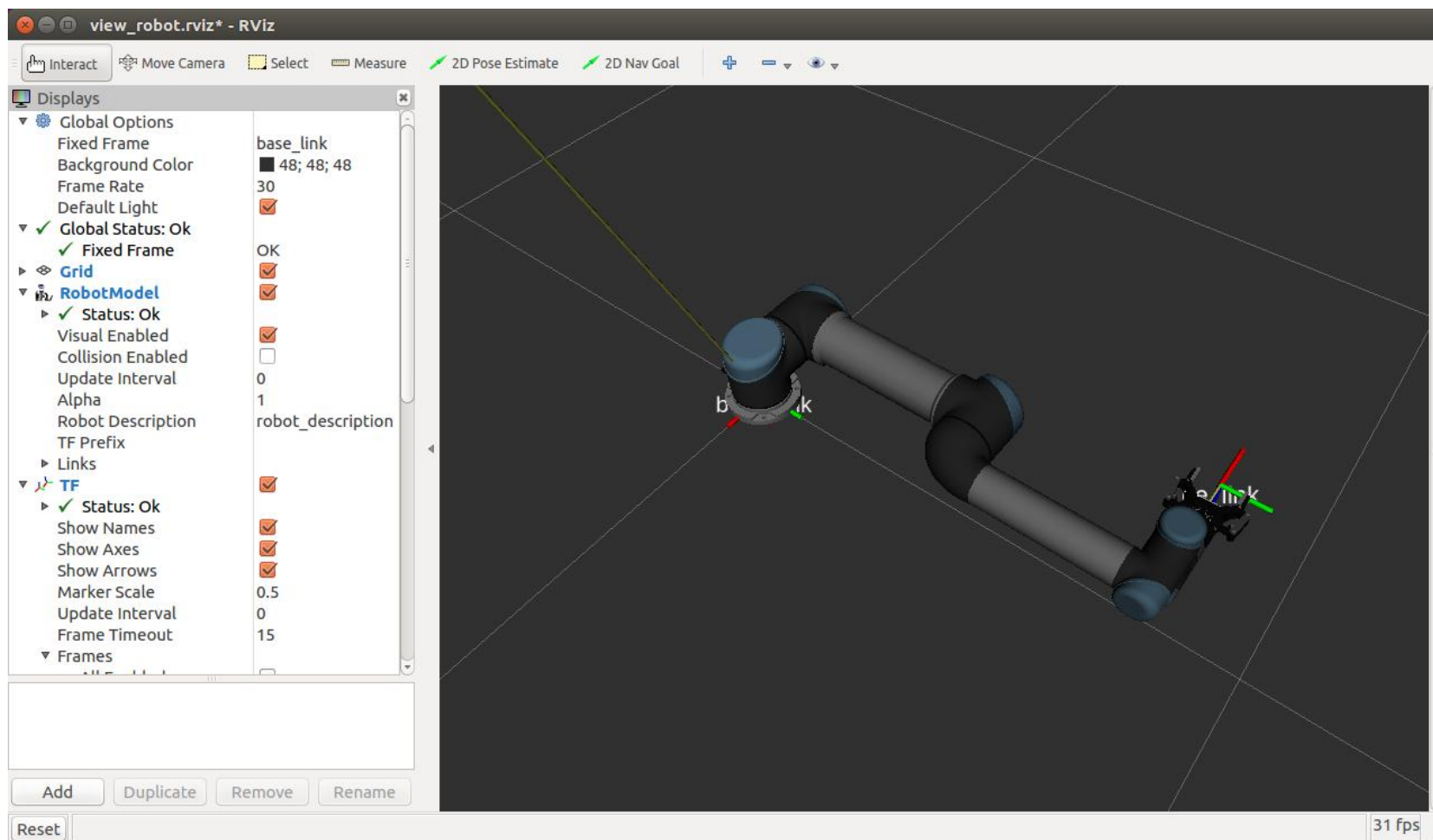
<!-- We do not have a robot connected, so publish fake joint states -->
<node name="joint_state_publisher" pkg="joint_state_publisher" type="joint_state_publisher">
  <param name="/use_gui" value="false"/>
  <rosparam param="/source_list">[/move_group/fake_controller_joint_states]</rosparam>
</node>

<!-- Given the published joint states, publish tf for the robot links -->
<node name="robot_state_publisher" pkg="robot_state_publisher" type="robot_state_publisher" respawn="true" output="screen" />

<!-- Run the main MoveIt executable without trajectory execution (we do not have controllers configured by default) -->
<include file="$(find ur5_moveit_config)/launch/move_group.launch">
  <arg name="allow_trajectory_execution" value="true"/>
  <arg name="fake_execution" value="true"/>
  <arg name="info" value="true"/>
  <arg name="debug" value="$(arg debug)"/>
</include>
```

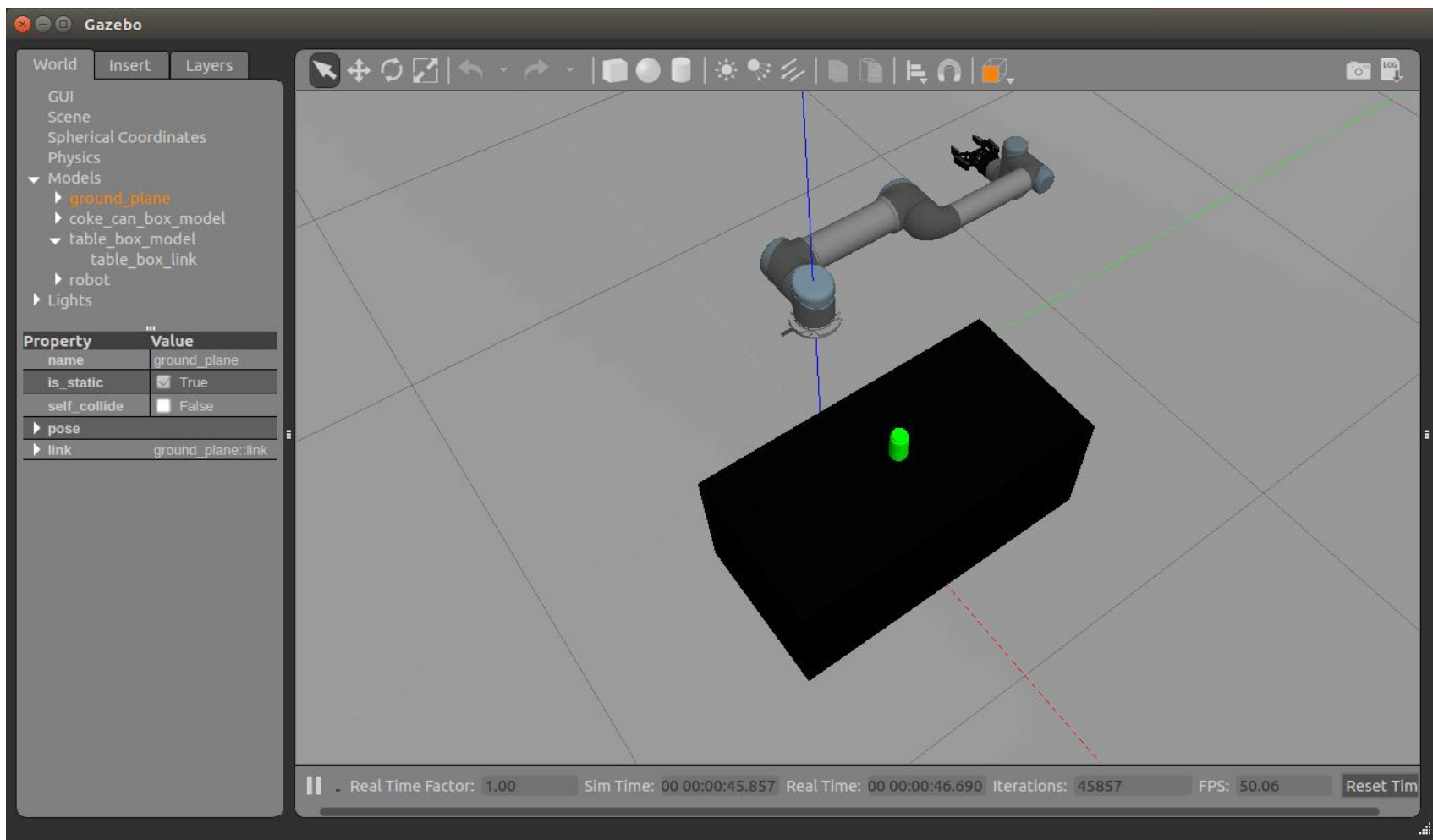
■ 发开工具

➤ Rviz: 可视化工具



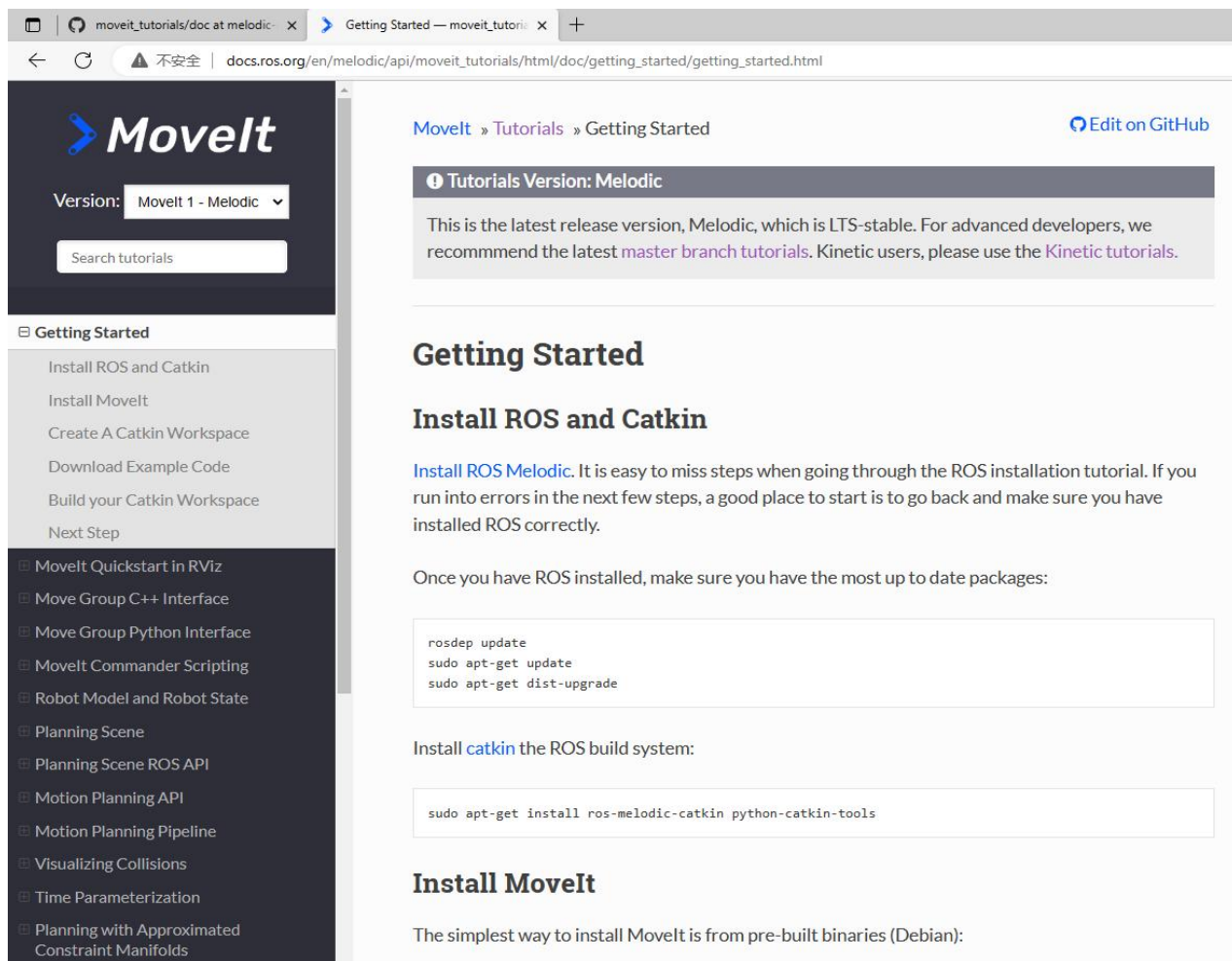
■ 发开工具

➤ Gazebo: 机器人仿真环境



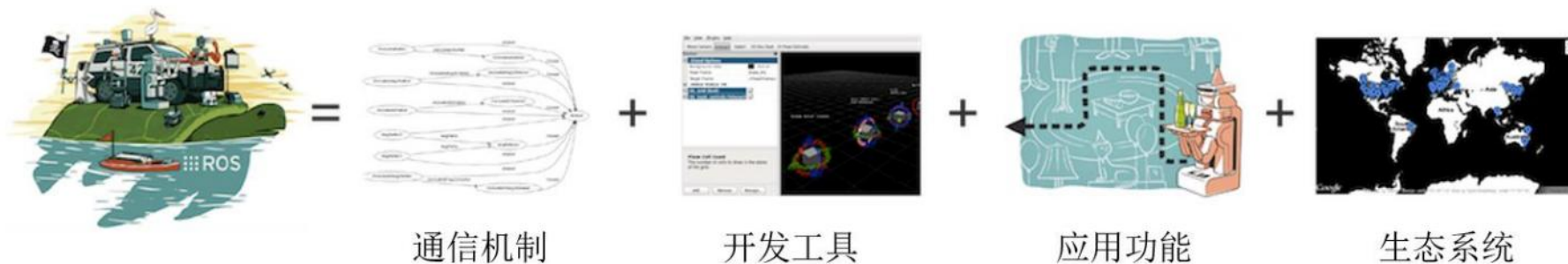
■ 应用功能

➤ Moveit API: 官方文档



The screenshot shows the MoveIt tutorials website. The browser address bar displays the URL: `docs.ros.org/en/melodic/api/moveit_tutorials/html/doc/getting_started/getting_started.html`. The page features a dark sidebar on the left with the MoveIt logo and a version selector set to "Moveit 1 - Melodic". The sidebar lists various tutorial topics, with "Getting Started" expanded. The main content area is titled "Getting Started" and includes a section for "Install ROS and Catkin" with terminal commands: `rosdep update`, `sudo apt-get update`, and `sudo apt-get dist-upgrade`. Below this, it instructs to install catkin with the command: `sudo apt-get install ros-melodic-catkin python-catkin-tools`. The page also includes a "Tutorials Version: Melodic" notice and a link to "Edit on GitHub".

■ ROS是什么



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■ ROS机器人功能包



Motoman
(SIA5)/SIA10d/(SIA20)



Universal Robots
UR5/(UR10)



Kinova Jaco



ABB IRB 2400



Kawada Hiro



Robotnik XL-Terabot



HRP 4



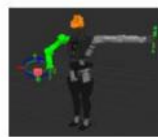
Pioneer P3AT



PR2



Baxter Research Robot



BDI Atlas



Robonaut/Robonaut2



Schunk 7-DOF



Aldebaran NAO



Care-O-Bot



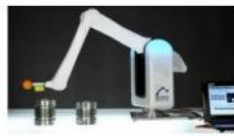
HRP-2



Comau NM45



Fanuc m10ia



BioRob Arm



KUKA LWR/LBR



Schunk Dextrous Hand



Aldebaran Romeo



CKBot



Denso Robot (vs060)



KUKA OmniROB



Hoap3



Cyton Veta



TUM Rosie



Rob@Work



Hubo



Korus Homemate Robot

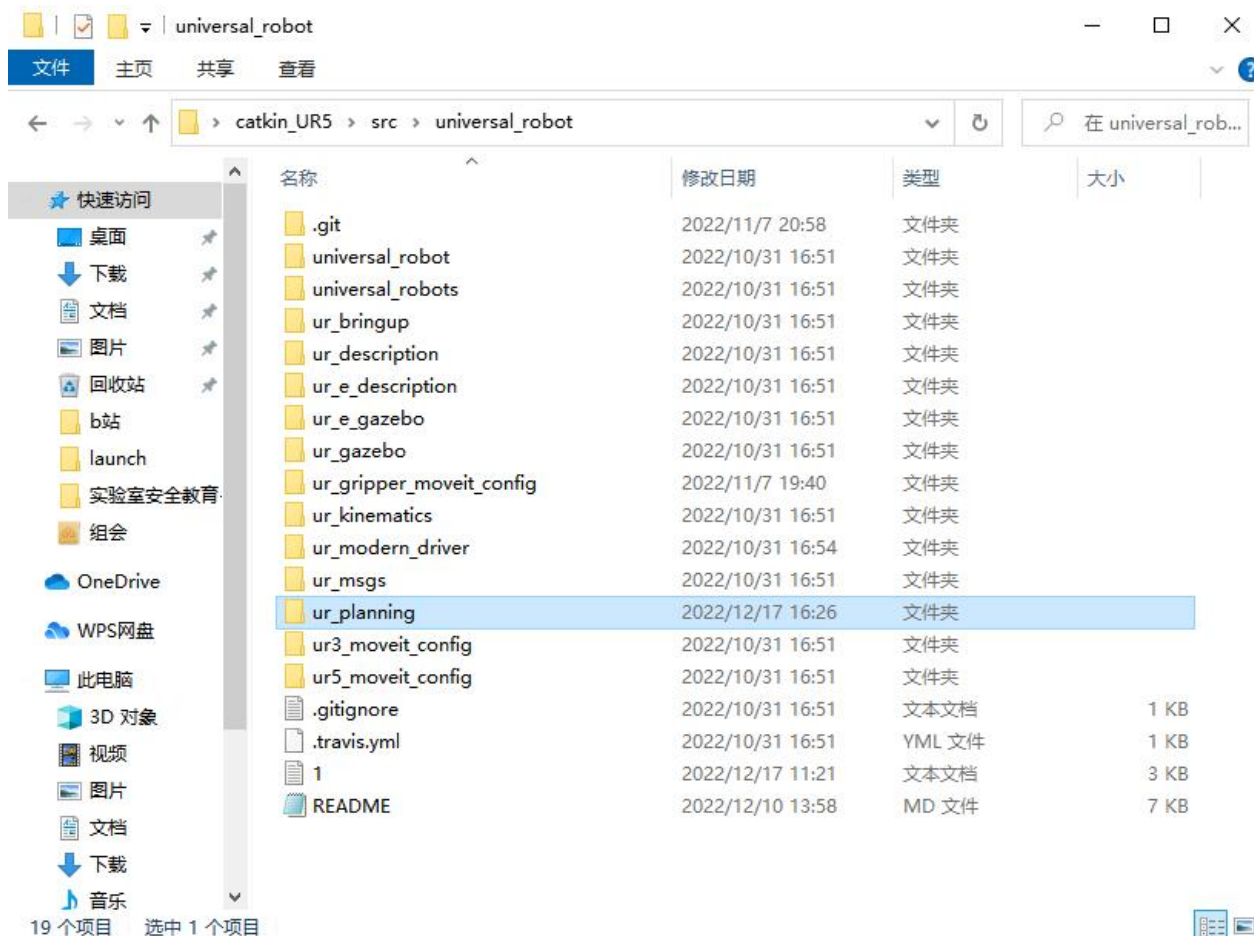


Katana

ros-melodic: `git clone https://github.com/ros-industrial/universal_robot.git`

ros-noetic: `https://blog.csdn.net/Dawn_yc/article/details/114791755`


■ UR机器人功能包



ros-melodic: `git clone https://github.com/ros-industrial/universal_robot.git`


ros-noetic: https://blog.csdn.net/Dawn_yc/article/details/114791755















■ 其他机器人功能包

 Kinovarobotics / **kinova-ros** Public

[Code](#) [Issues 8](#) [Pull requests 2](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#)

[melodic-devel](#) [9 branches](#) [6 tags](#) [Go to file](#) [Add file](#) [Code](#)

 felixmaisonneuve Update README.md 1c2404f on Dec 9, 2022 [749 commits](#)

	.github/ISSUE_TEMPLATE	Update feature-enhancement-request.md	3 years ago
	kinova_bringup	change support email address	last month
	kinova_control	change support email address	last month
	kinova_demo	change support email address	last month
	kinova_description	change support email address	last month
	kinova_docs/kinova_comm/html	Delete docs for Kinova C++ API and modify README.md	6 years ago
	kinova_driver	change support email address	last month
	kinova_gazebo	change support email address	last month
	kinova_moveit	Update README.md	last month
	kinova_msgs	change support email address	last month
	.gitignore	Melodic support (#219)	3 years ago
	Example	Create Example	4 years ago
	LICENSE	added license file	4 years ago
	README.md	clarify readme so users clone the correct branch	2 months ago

■ 其他机器人功能包

epfl-lasa / iiwa_ros Public

<> Code Issues 10 Pull requests 4 Actions Projects Security Insights

master 19 branches 1 tag Go to file Add file <> Code

costashatz Merge pull request #96 from epfl-lasa/edit_license 70f91d5 on Dec 9, 2022 210 commits

iiwa_control	Add Matthias to license	last month
iiwa_description	Add Matthias to license	last month
iiwa_driver	Add Matthias to license	last month
iiwa_gazebo	Add Matthias to license	last month
iiwa_moveit	Add Matthias to license	last month
iiwa_ros	Add Matthias to license	last month
iiwa_tools	Add Matthias to license	last month
.gitignore	Added macOS files to gitignore	3 years ago
.gitmodules	Remove submodules	3 years ago
CONTRIBUTING.md	Added CONTRIBUTING page	3 years ago
LICENSE	Added license	3 years ago
README.md	Add Matthias to license	last month
add_license.py	Add Matthias to license	last month

教程视频会持续更新

敬请期待！