中德人工智能研究院Jackal使用说明

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1. 开箱装机

自备优质无线路由器（高带宽）

开箱，拧开上面木板的4个入木螺丝

取出jackal（Sick lms111因为高度问题，并没有紧固在银色304支架上，激光被白色泡沫塑料包裹，安装用的**M5螺丝（4个）粘在纸箱上内部表面上**），激光正面超jackal正前（有开机按钮的一侧为jackal后部）

安装激光（所用的**内六角扳手**，我粘在箱子**外侧面**）（线缆不需要动）

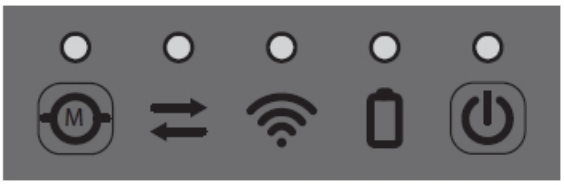
因时间仓促，Axis M10XX摄像头安装，本应在安装位置（上部铁板上）打个孔用螺丝紧固！暂时用的强力胶粘在上表面

2. 硬件说明

Jackal base	1
Sick LMS111	1
Axis M10XX	1
Sony Joy	1
Charger	1

3. 联网说明

- 装入电池，电源按钮开机



依次 **暂停（急停）**、节点启动、接入wifi、电源（亏电亮红）、开关

- VGA 接显示器

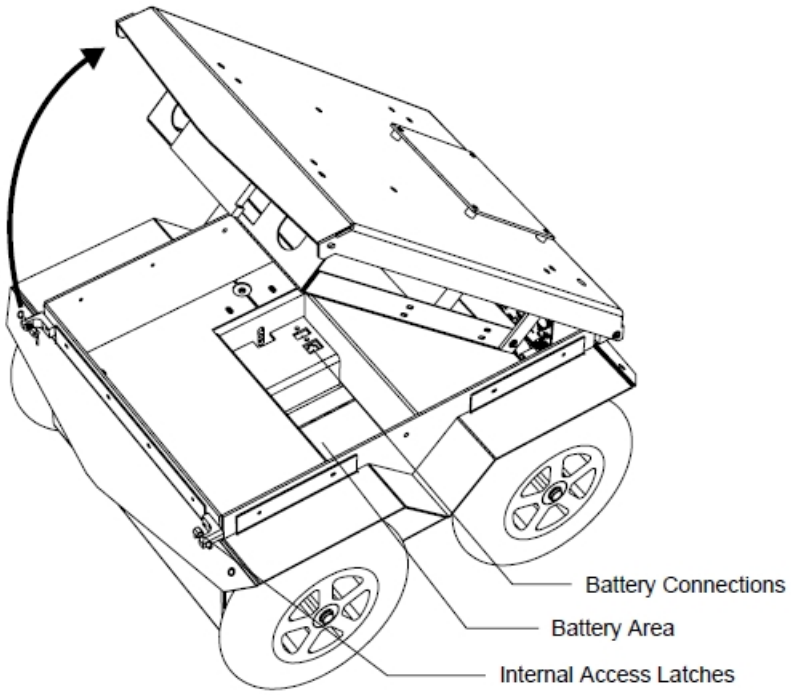


Figure 2: Battery area inside Jackal.

初次开机，请打开Jackal舱盖（有个铁杆像门栓一样的，锁着舱盖和底盘）
舱盖和Jackal 工控机在一起
拧开舱盖一头，2个圆盘一样螺母，就可以看到工控机
接入VGA显示器，接入USB键盘

- 登录信息

Parameter	Value
Robot IP	192.168.1.11
Hostname	cpr-j100-0143
Login	administrator : clearpath
Axis Camera IP	192.168.1.13
LMS111 LIDAR IP	192.168.1.14

本机计算机名：CPR-J100-0187

- 联网（自备优质无线路由器（足够带宽））

输入命令wicd-curses

R 重新扫描网络

→ 设置网络

F10 保存

C 建立连接

Q 退出

Ifconfig 查看jackal ip

- 工作站设置（用户笔记本）

  联网（同一wifi）

  Ifconfig 查看自己的ip

  验证ssh登录jackal工控机

  ssh administrator@JACKAL_IP_ADDRESS

  车--工作站 之间 ROS通信

  在用户笔记本上，打开shell

  vim ~/.bashrc 尾行添加

  export ROS_MASTER_URI=http://CPR-J100-0187:11311 #Jackal hostname

  export ROS_IP=10.25.0.102 # Your laptop’s wireless IP address

  Sudo vim /etc/hosts 添加一行

  JACKAL_IP_ADDRESS CPR-J100-0187

The suggested pattern is to create a file in your home directory called `remote-jackal.sh` with the following contents:

```
export ROS_MASTER_URI=http://cpr-jackal-0001:11311  # Jackal's hostname
export ROS_IP=10.25.0.102       # Your laptop's wireless IP address
```

If your network doesn't already resolve Jackal's hostname to its wireless IP address, you may need to add a corresponding line to your computer's /etc/hosts file:

```
10.25.0.101 cpr-jackal-0001
```

NOTE: You can verify the hostname and IP address of Jackal using the following commands during an SSH session with the onboard PC.

```
hostname
hostname -i
```

验证：

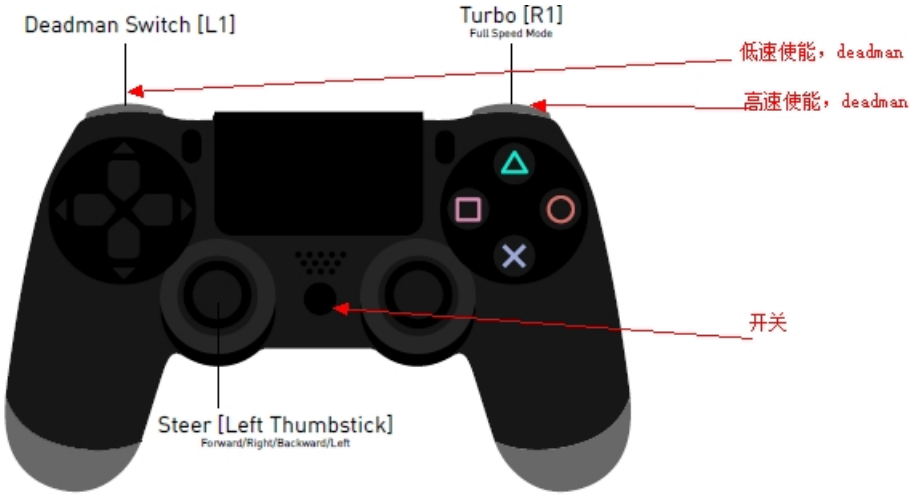
重新打开shell

Rostopic list

Rostopic echo /odometry/filtered

验证成功（有话题且话题有数据），拔掉VGA，Jackal恢复原样

4. 手柄控制说明



打开开关，前方灯闪表示蓝牙搜索配置；**常量代表建立连接**；不亮代表需要充电（micro USB 充电）

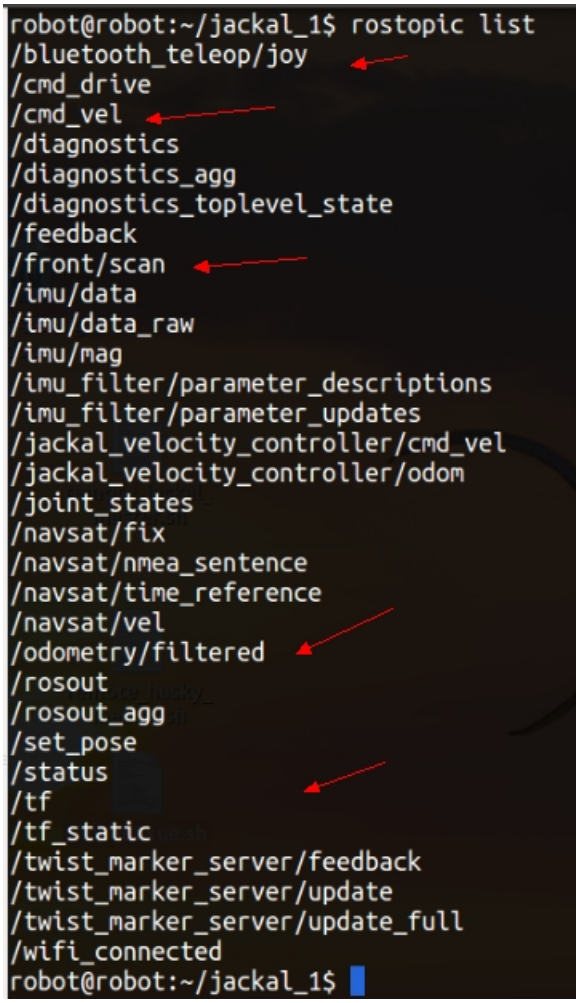
低速遥控试验！！

5. 话题列表说明

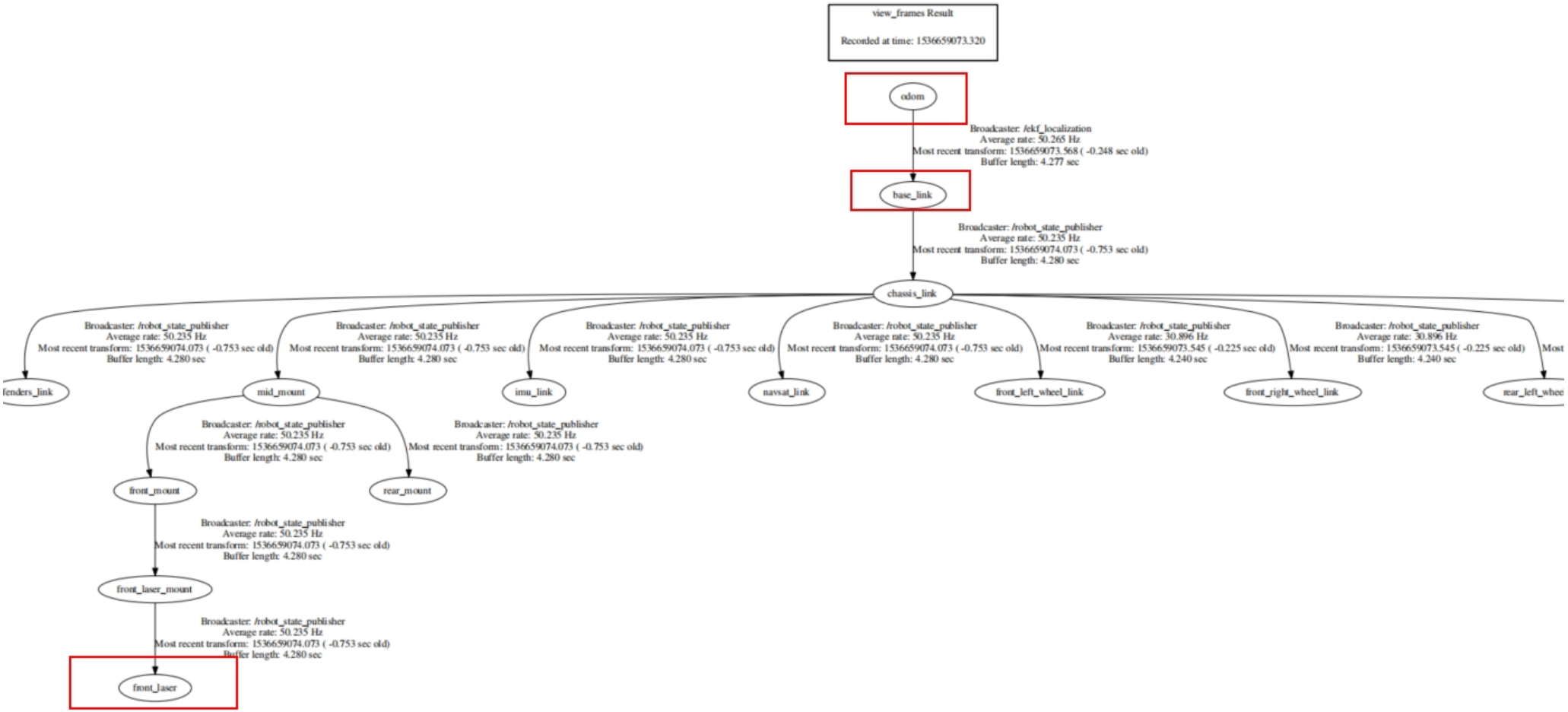
现在话题列表如下所示，重点使用的话题名，箭头标出。

重点说明：**激光话题为/front/scan，激光坐标系为front_laser**

里程计话题为/odometry/filtered，里程计坐标系为odom


robot@robot:~/jackal_1$ rostopic list
/bluetooth_teleop/joy
/cmd_drive
/cmd_vel
/diagnostics
/diagnostics_agg
/diagnostics_toplevel_state
/feedback
/front/scan
/imu/data
/imu/data_raw
/imu/mag
/imu_filter/parameter_descriptions
/imu_filter/parameter_updates
/jackal_velocity_controller/cmd_vel
/jackal_velocity_controller/odom
/joint_states
/navsat/fix
/navsat/nmea_sentence
/navsat/time_reference
/navsat/vel
/odometry/filtered
/rosout
/rosout_agg
/set_pose
/status
/tf
/tf_static
/twist_marker_server/feedback
/twist_marker_server/update
/twist_marker_server/update_full
/wifi_connected
robot@robot:~/jackal_1$

整体tf结构


view_frames Result
Recorded at time: 1536659073.320
odom
Broadcaster: /ekf_localization
Average rate: 50.265 Hz
Most recent transform: 1536659073.568 (-0.248 sec old)
Buffer length: 4.277 sec
base_link
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
chassis_link
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
fenders_link
mid_mount
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
imu_link
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
navsat_link
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
front_left_wheel_link
Broadcaster: /robot_state_publisher
Average rate: 30.896 Hz
Most recent transform: 1536659073.545 (-0.225 sec old)
Buffer length: 4.240 sec
front_right_wheel_link
Broadcaster: /robot_state_publisher
Average rate: 30.896 Hz
Most recent transform: 1536659073.545 (-0.225 sec old)
Buffer length: 4.240 sec
rear_left_wheel
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
front_mount
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
rear_mount
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
front_laser_mount
Broadcaster: /robot_state_publisher
Average rate: 50.235 Hz
Most recent transform: 1536659074.073 (-0.753 sec old)
Buffer length: 4.280 sec
front_laser

6. 导航软件包

在**用户笔记本**上建立工作空间

Mkdir -p jackal_ws/src

Cd jackal_ws

Catkin_make

. Devel/setup.bash

Cd src

Git clone https://github.com/jackal/jackal_robot.git

Git clone https://github.com/jackal/jackal.git

Cd ..

Catkin_make

. Devel/setup.bash

#添加环境变量

cd ~/

Vim .bashrc 尾行添加

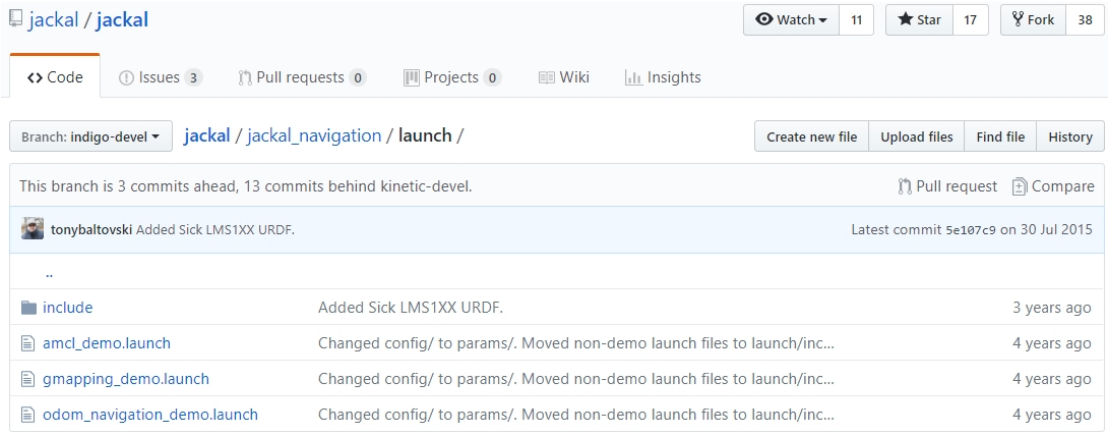
source ~/Jackal_ws/devel/setup.bash

保存关闭

Source ~/.bashrc

可能需要的依赖项

sudo apt-get install ros-kinetic-gmapping ros-kinetic-map-server* ros-kinetic-amcl* ros-kinetic-move-base* ros-kinetic-dwa* ros-kinetic-image-view* ros-kinetic-camera-info-manager* ros-kinetic-image-transport* ros-kinetic-rqt-controller-manager* ros-kinetic-nmea-msgs ros-kinetic-realtime-tools ros-kinetic-rosserial-server ros-kinetic-teleop-twist-joy



#Gmapping 建图

#技巧，手动，慢速，回到初始位置，观察地图，没有扫全的位置，转圈

Roslaunch jackal_navigation gmapping_demo.launch

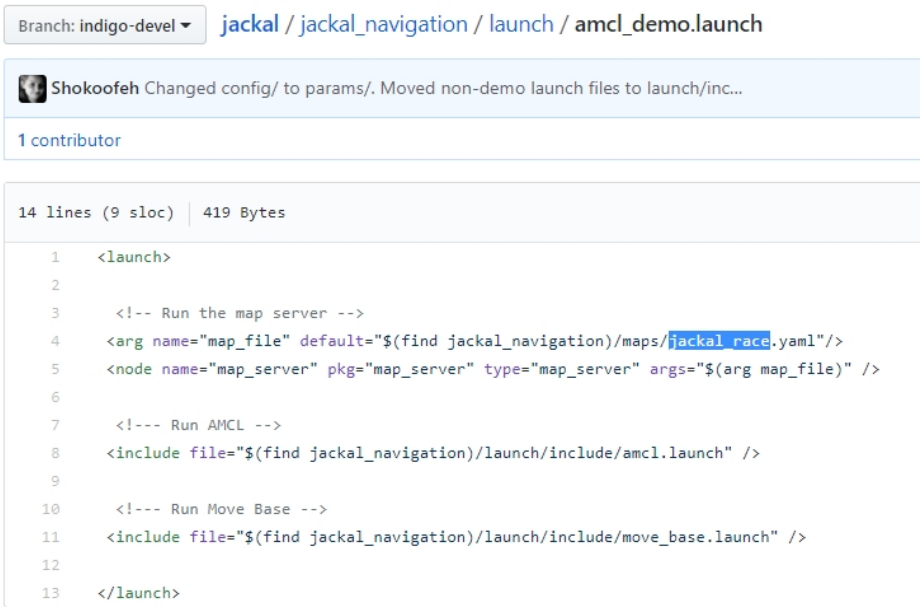
#保存地图

Roscd jackal_navigation/maps

Rosrun map_server map_saver -f <your_map_name> #此目录下有同名文件（.yaml 和 .pgm）

#amcl定位导航

#修改amcl 修改地图配置，修改你保存的地图



#运行amcl

Roslaunch jackal_navigation amcl_demo.launch

Rviz注意添加：

Map 2个，一个全局地图，一个静态地图

Tf

Laserscan

Robotmodel

Path2个，一个全局规划，一个局部规划；

Particles

7. 视频说明

- 当下axis m10XX 需要手动启动

  Ssh administrator@JACKAL_IP_ADDRESS # from your laptop

  Roslaunch axis_camera axis.launch

该包的launch文件通过image_transport 进行图像压缩处理，以便于网络传输

当下话题大概有2个

/axis/camera_info

/axis/image_raw/compressed.

- 笔记本端查看图像

rosrun image_view image_view image:=/axis/image_raw _image_transport:=compressed

参考链接：http://wiki.ros.org/axis_camera

或者将压缩的视频流转换成原始图像视频流，并话题输出（新terminal），尝试在rviz中显示

rosrun image_transport republish compressed in:=/axis/image_raw/compressed raw out:=image_raw

(该命令待确认！)