FORSENSE
原极科技

FSS-IMU 的 ROS 驱动使用方法

目录

1. 安装 ROS serial

安装 ROS serial 软件包，本例程依赖 ROS 提供的 serial 包实现串口通信。

首先执行如下命令，下载安装 serial 软件包：

sudo apt-get install ros-melodic-serial

然后输入 roscd serial 命令，进入 serial 下载位置，如果安装成功，就会出现如下信息：

/opt/ros/melodic/share/serial

2. 编译代码

cd serial_imu_ros_v1.1/

catkin_make

source devel/setup.bash

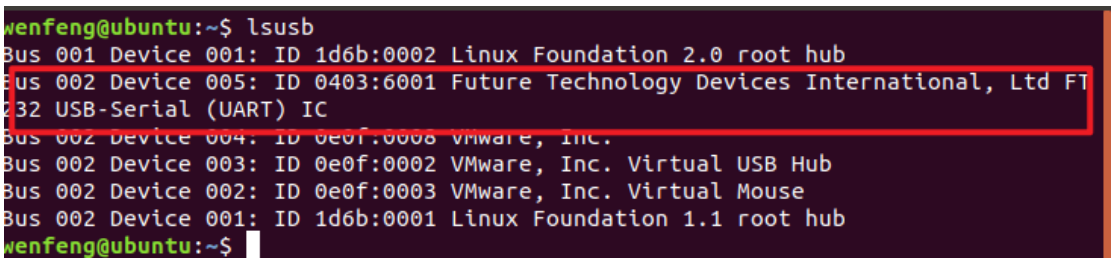
```
File  Edit  View  Search  Terminal  Help
Scanning dependencies of target std_srvs_generate_messages_py
Scanning dependencies of target geometry_msgs_generate_messages_eus
Scanning dependencies of target roscpp_generate_messages_nodejs
Scanning dependencies of target serial_imu_generate_messages_py
[  0%] Built target geometry_msgs_generate_messages_eus
[  0%] Built target std_srvs_generate_messages_py
[  0%] Built target roscpp_generate_messages_nodejs
[  0%] Built target serial_imu_generate_messages_py
Scanning dependencies of target serial_imu_generate_messages_eus
Scanning dependencies of target serial_imu_generate_messages_nodejs
Scanning dependencies of target serial_imu_generate_messages_lisp
[ 25%] Generating EusLisp manifest code for serial_imu
[ 25%] Built target serial_imu_generate_messages_nodejs
[ 25%] Built target serial_imu_generate_messages_lisp
[ 25%] Built target serial_imu_generate_messages_eus
Scanning dependencies of target serial_imu_generate_messages
Scanning dependencies of target serial_imu
[ 25%] Built target serial_imu_generate_messages
[ 75%] Building CXX object CMakeFiles/serial_imu.dir/serial_imu.cpp.o
[ 75%] Building CXX object CMakeFiles/serial_imu.dir/serial_parse.cpp.o
[100%] Linking CXX executable /home/wenfeng/serial_imu_ros_v1.1/devel/lib/serial
_imu/serial_imu
[100%] Built target serial_imu
wenfeng@ubuntu:~/serial_imu_ros_v1.1$
```

编译完成

3. 将 IMU 通过 USB 接入系统

查看是否接入：

lsusb



查看 USB 端口号：

ls /dev/ttyU*

配置打开 USB 转串口权限：

sudo chmod 777 /dev/ttyUSB0

4. 查看 IMU 数据

1、打开另一个终端，执行roscore 开启 ROS

roscore

回到 serial_imu_ws文件夹下 执行

source devel/setup.bash

执行启动 rosrun

rosrun serial_imu serial_imu

```
wenfeng@ubuntu:~/serial_imu_ros_v1.1$ rosrun serial_imu serial_imu
[ INFO] [1695435837.063520266]: /dev/ttyUSB0 is opened.
```

2、打开新窗口

source devel/setup.bash

输入命令查看 IMU 数据

rostopic echo IMU_data

```
File  Edit  View  Search  Terminal  Help
header:
  seq: 4633
  stamp:
    secs: 1695435883
    nsecs: 325995690
  frame_id: "imu"
orientation:
  x: 0.0
  y: -0.0
  z: 0.0
  w: 1.0
orientation_covariance: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
angular_velocity:
  x: 0.00804581212681
  y: 0.0109928844889
  z: -0.00444353149091
angular_velocity_covariance: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
linear_acceleration:
  x: -0.00116058683489
  y: -0.0153694618493
  z: 1.01611483097
linear_acceleration_covariance: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
---
```

注意其中的陀螺数据单位是 rad/s，加速度计的单位是 g。

IMU 本身的坐标系输出是前右下(FRD)，比如 X 轴方向垂直朝向地面，则此轴的加速度计值约为-1g。

ROS 驱动使用的是前左上坐标系（FLU），所以驱动里将坐标进行了转换。

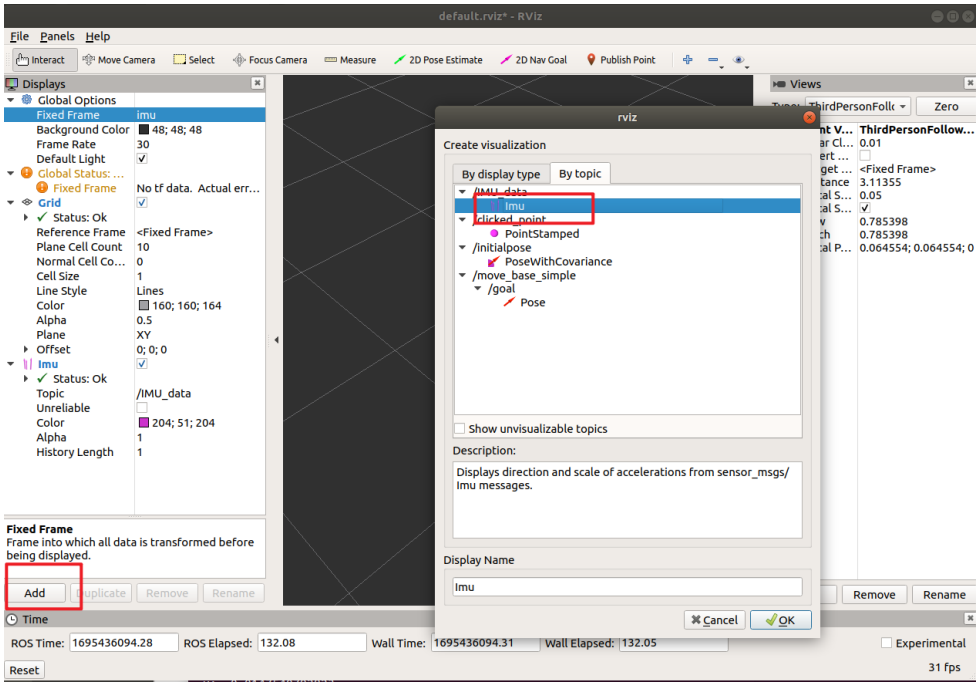
```
/**
 * AHRS帧
 */
if(_parse.id==0x02)
{
sensor_msgs::Imu imu_data;
sensor_msgs::MagneticField mag_data;
imu_data.header.stamp = ros::Time::now();
imu_data.header.frame_id = "imu";

imu_data.linear_acceleration.x = rxdata_union.AHRS_DATA_9axis.imu[0];
imu_data.linear_acceleration.y = -rxdata_union.AHRS_DATA_9axis.imu[1];
imu_data.linear_acceleration.z = -rxdata_union.AHRS_DATA_9axis.imu[2];

imu_data.angular_velocity.x = rxdata_union.AHRS_DATA_9axis.imu[3]*DEG_TO_RAD;
imu_data.angular_velocity.y = -rxdata_union.AHRS_DATA_9axis.imu[4]*DEG_TO_RAD;
imu_data.angular_velocity.z = -rxdata_union.AHRS_DATA_9axis.imu[5]*DEG_TO_RAD;

attitude[0] = rxdata_union.AHRS_DATA_9axis.roll;
attitude[1] = rxdata_union.AHRS_DATA_9axis.pitch;
attitude[2] = rxdata_union.AHRS_DATA_9axis.yaw;


imu_data.orientation=tf::createQuaternionMsgFromRollPitchYaw(attitude[0]*DEG_TO_RAD,-attitude[1]*DEG_TO_RAD,
-attitude[2]*DEG_TO_RAD);

IMU_pub.publish(imu_data);


}
```

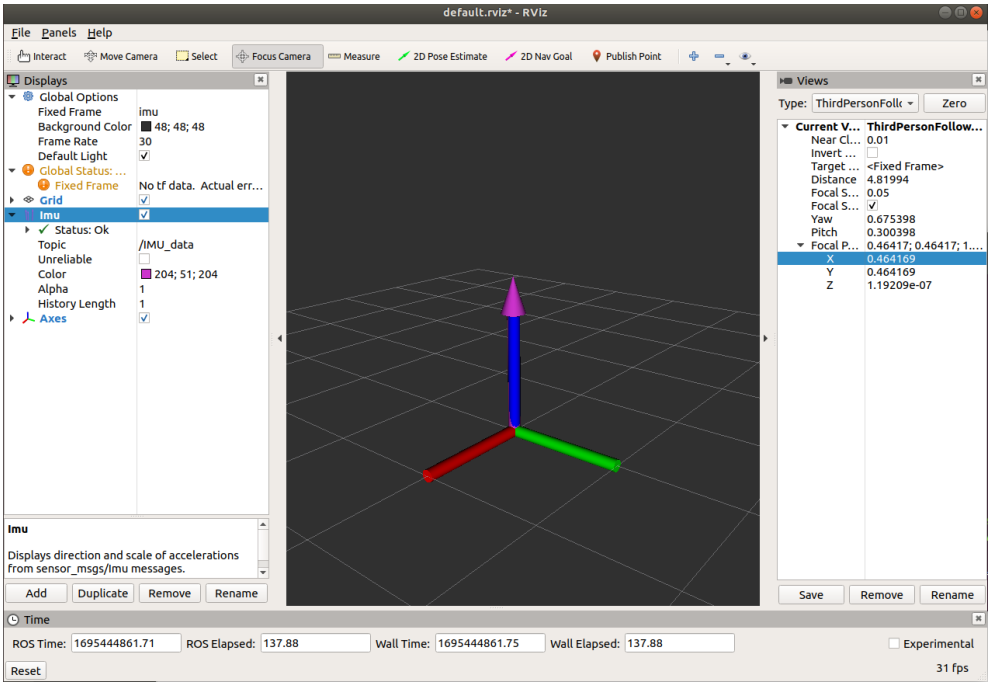
如果需要其他坐标系，可以进行相应修改。

3、使用rviz 查看 IMU 数据，首先安装 imu_tool

```
sudo apt-get install ros-melodic-imu-tools
```

打开 rviz，选择 Fixed_Frame 为 imu，Add 添加 imu，且 Topic 为/IMU_data，则可以显示三轴姿态。





5. 更新记录

版本	日期	状态/注释
版本 1.0	2023.09.20	首次发行