

多mems标定方法说明

目的

当一台车上安装多个mems雷达时，将其他雷达标定到主雷达（一般为前方的mems）上，获取其他雷达到主雷达的标定参数。

工具

即原来的[多雷达标定工具](#)，安装方法见[readme](#)。

使用方法

1.前提

- **必须**要有ruby做为参考(reference)，因为一般情况下两个mems之间的重叠部分很小，无法进行匹配；
- 采集标定数据（或者在线标定）要将车**停在相对开阔平坦且目标较多**的场景；

2.标定步骤

以4个mems + 1个ruby为例，其他数量的mems标定方法一样，但是一定要有ruby作为参考。假设前后左右4个mems的点云topic分别为：mems_front/rslidar_packets，mems_back/rslidar_packets，mems_left/rslidar_packets， mems_right/rslidar_packets。ruby的点云topic为：ruby/rslidar_packets。

步骤1.配置驱动如下，启动驱动rslidar_sdk，播放bag包，将上述5个点云topic解析成points，分别为mems_front/rslidar_points，mems_back/rslidar_points，mems_left/rslidar_points，mems_right/rslidar_points

```

common:
  msg_source: 2                                     #0: not use Lidar
                                                    #1: packet message comes from online Lidar
                                                    #2: packet message comes from ROS or ROS2
                                                    #3: packet message comes from Pcap file
                                                    #4: packet message comes from Protobuf-UDP
                                                    #5: point cloud comes from Protobuf-UDP
                                                    #true: Send point cloud through ROS or ROS2

  send_point_cloud_ros: true

lidar:
- driver:
  lidar_type: RSM1                                #LIDAR type - RS16, RS32, RSBP, RS128, RS80, RSM1, RSHELIO5
  ros:
    ros_rcv_packet_topic: /mems_front/rslidar_packets
    ros_send_point_cloud_topic: /mems_front/rslidar_points

- driver:
  lidar_type: RSM1
  ros:
    ros_rcv_packet_topic: /mems_back/rslidar_packets
    ros_send_point_cloud_topic: /mems_back/rslidar_points

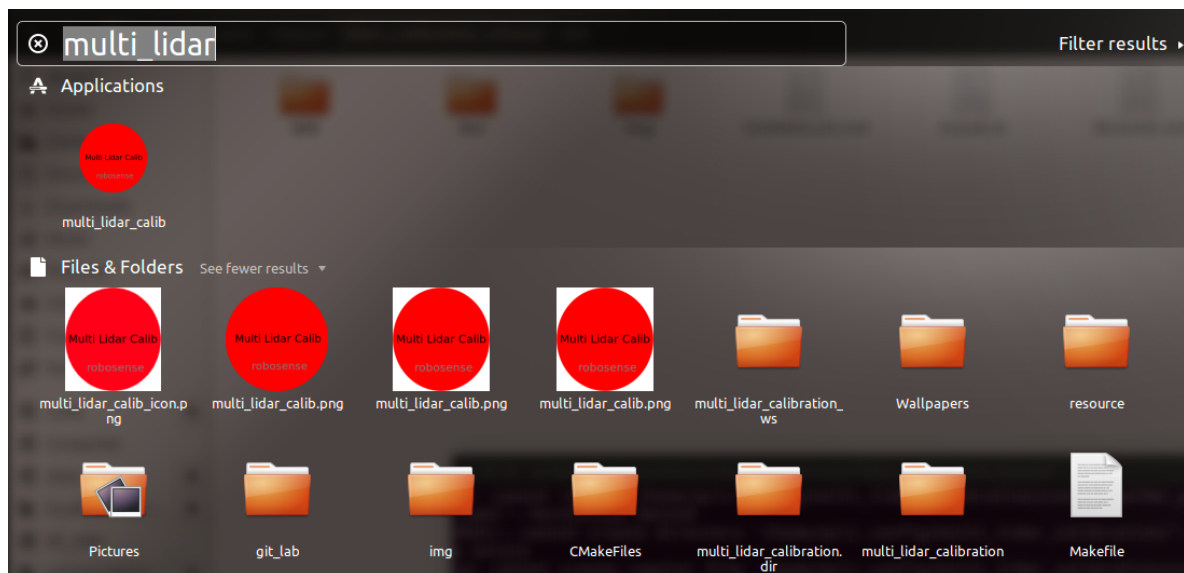
- driver:
  lidar_type: RSM1
  ros:
    ros_rcv_packet_topic: /mems_left/rslidar_packets
    ros_send_point_cloud_topic: /mems_left/rslidar_points

- driver:
  lidar_type: RSM1
  ros:
    ros_rcv_packet_topic: /mems_right/rslidar_packets
    ros_send_point_cloud_topic: /mems_right/rslidar_points

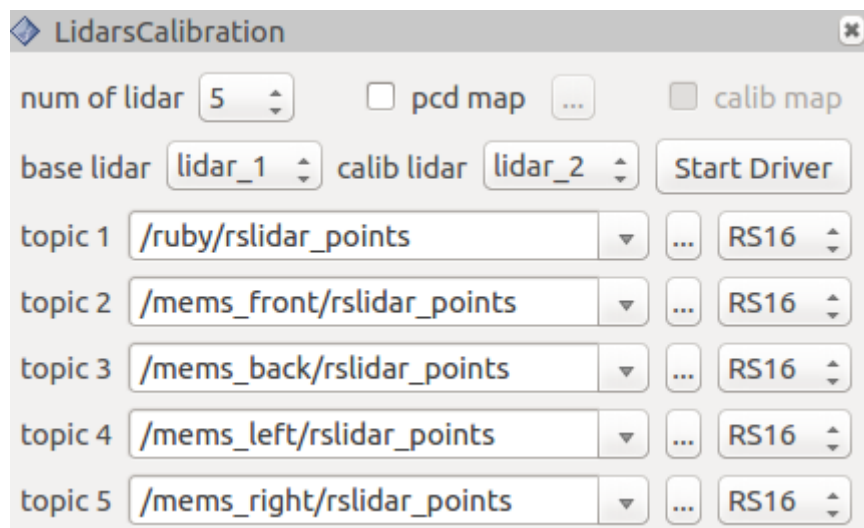
- driver:
  lidar_type: RS128
  ros:
    ros_rcv_packet_topic: /ruby/rslidar_packets
    ros_send_point_cloud_topic: /ruby/rslidar_points

```

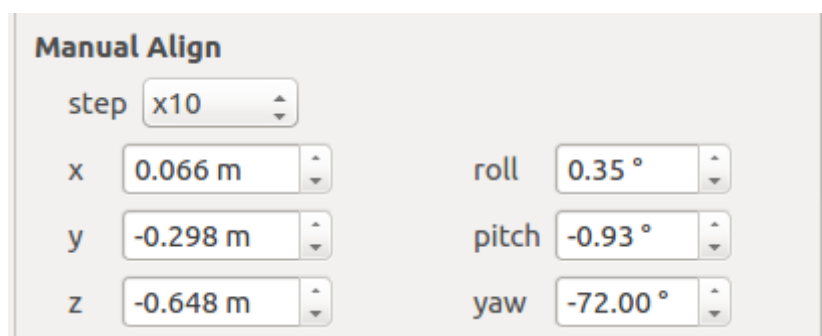
2.启动多雷达标定工具multi_lidar_calib



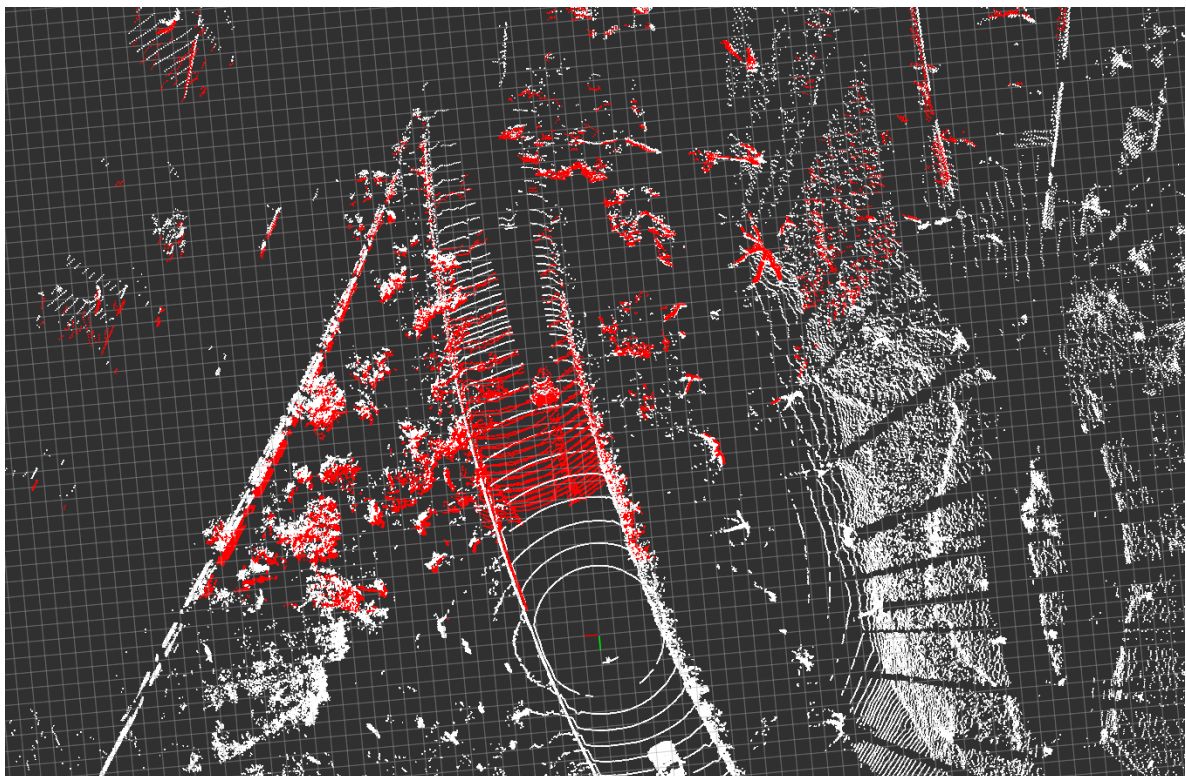
3.设置雷达数量，此时为5个，topic 1~topic 5设置如下，即上面解析出来的points，base lidar设置为lidar_1，即将所有雷达先标定到ruby上。



4.将前方mems即lidar 2标定到ruby上，calib lidar设置为lidar_2，先根据雷达安装位置手动调整使前方mems大致和ruby对齐



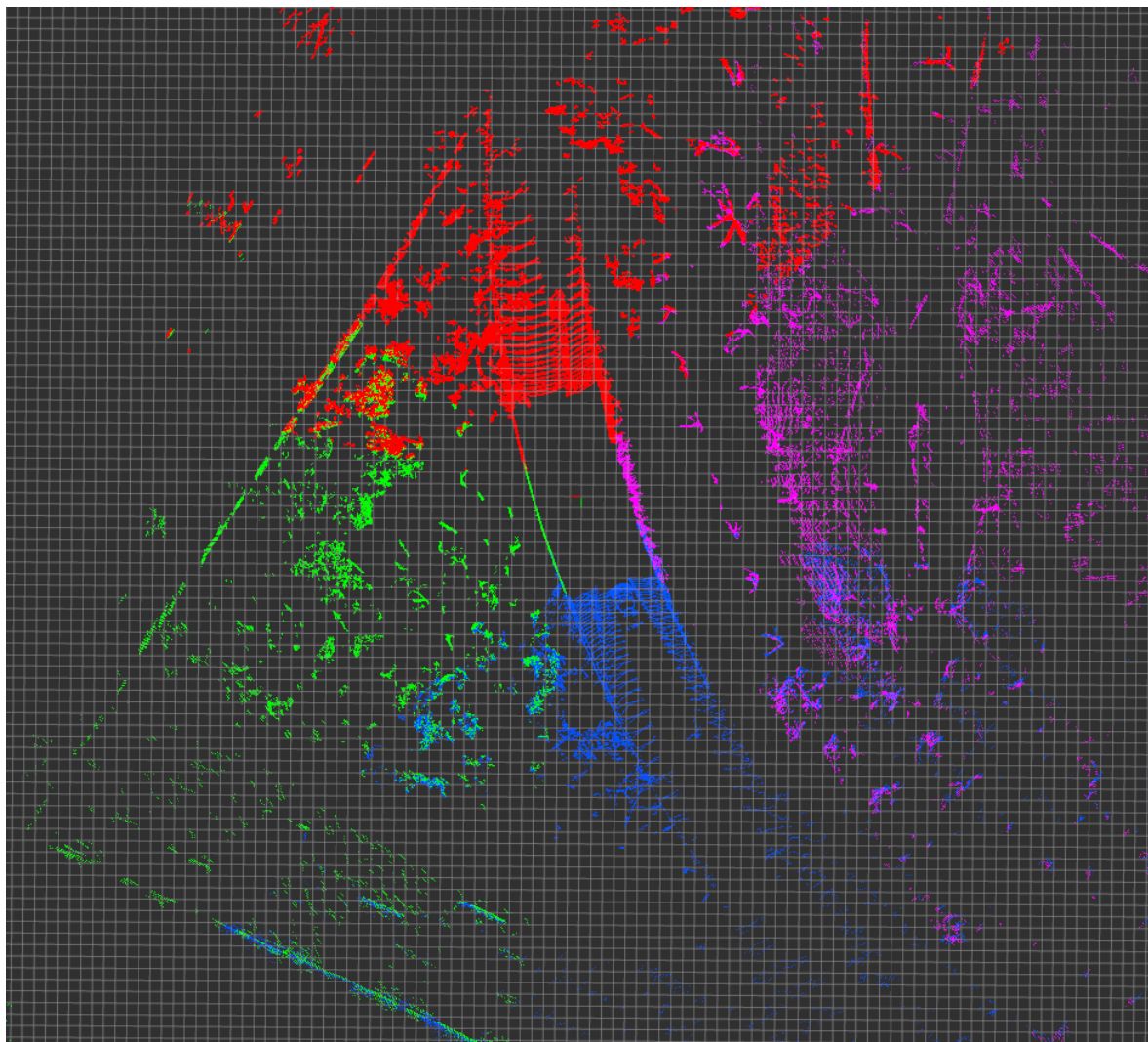
效果如下：



然后使用多次点击Auto Align的align按钮，直到上面的参数不再变化或者变化很小为止。至此，前方mems已经精确地标到了ruby上。



5.将后方mems即lidar_3标定到ruby上，calib_lidar设置为lidar_3，然后执行和步骤4一样的步骤，将后方mems精确地标定到ruby上。左侧雷达和右侧雷达标定方法也相同，至此，获得了所有4个mems到ruby的标定参数。



6.需要的是右后左3个mems到前方mems的标定参数，这时，只需将base lidar切换为前方mems即lidar_2即可，现在的参数就变成了所有雷达到前方mems的参数。

num of lidar ☐ pcd map ... ☐ calib map

base lidar calib lidar

7.点击保存，即可获得标定文件。

Save

File Name

Save Dir ...

8.标定参数文件内容如下：

```

base_lidar_index: 2
calibration:
- parent_frame_id: lidar_2
  frame_id: lidar_1
  x: -0.5228906869888306
  y: -0.2554779648780823
  z: 0.3321031033992767
  roll: -0.01650057684081204
  pitch: 0.01602167448146358
  yaw: 1.271433240004466
- parent_frame_id: lidar_2
  frame_id: lidar_2
  x: 0.4035895168781281
  y: -0.4188603758811951
  z: -0.3326351344585419
  roll: 0.02017496457808713
  pitch: 0.0110421347784719
  yaw: -1.271456330269684
- parent_frame_id: lidar_2
  frame_id: lidar_3
  x: -1.392253041267395
  y: -0.2416660785675049
  z: 0.07278791069984436
  roll: 0.01141605174206493
  pitch: 0.007128065277877478
  yaw: -3.09014041226372
- parent_frame_id: lidar_2
  frame_id: lidar_4
  x: -0.8802306652069092
  y: 0.2984839677810669
  z: 0.08277127146720886
  roll: 0.007396089590221242
  pitch: 0.02744407481186505
  yaw: 1.654418279807575
- parent_frame_id: lidar_2
  frame_id: lidar_5
  x: -0.828
  y: -0.797
  z: 0.15
  roll: -0.01099557459
  pitch: -0.05358160951
  yaw: -1.67830865488

```

其中frame_id为lidar_3, lidar_4, lidar_5的参数即分别为后、左、右mems到前方mems的标定参数。