**激光建图运行的程序：**

<launch>

<include file="$(find rbx1\_bringup)/launch/turtlebot\_minimal\_kobuki.launch"/>

<include file="$(find rplidar\_ros)/launch/rplidar.launch"/>

<include file="$(find rbx1\_nav)/launch/gmapping\_demo.launch"/>

<node name="rviz" pkg="rviz" type="rviz" args="-d $(find rbx1\_nav)/nav\_test.rviz" />

</launch>

**Turtlebot驱动程序:**

<launch>

<!-- Turtlebot -->

<arg name="base" default="$(env TURTLEBOT\_BASE)" doc="mobile base type [create, roomba]"/>

<arg name="battery" default="$(env TURTLEBOT\_BATTERY)" doc="kernel provided locatio for battery info, use /proc/acpi/battery/BAT0 in 2.6 or earlier kernels." />

<arg name="stacks" default="$(env TURTLEBOT\_STACKS)" doc="stack type displayed in visualisation/simulation [circles, hexagons]"/>

<arg name="3d\_sensor" default="$(env TURTLEBOT\_3D\_SENSOR)" doc="3d sensor types [kinect, asux\_xtion\_pro]"/>

<arg name="simulation" default="$(env TURTLEBOT\_SIMULATION)" doc="set flags to indicate this turtle is run in simulation mode."/>

<arg name="serialport" default="$(env TURTLEBOT\_SERIAL\_PORT)" doc="used by create to configure the port it is connected on [/dev/ttyUSB0, /dev/ttyS0]"/>

<arg name="robot\_name" default="$(env TURTLEBOT\_NAME)" doc="used as a unique identifier and occasionally to preconfigure root namespaces, gateway/zeroconf ids etc."/>

<arg name="robot\_type" default="$(env TURTLEBOT\_TYPE)" doc="just in case you are considering a 'variant' and want to make use of this."/>

<param name="/use\_sim\_time" value="$(arg simulation)"/>

<include file="$(find turtlebot\_bringup)/launch/includes/robot.launch.xml">

<arg name="base" value="$(arg base)" />

<arg name="stacks" value="$(arg stacks)" />

<arg name="3d\_sensor" value="$(arg 3d\_sensor)" />

</include>

<include file="$(find turtlebot\_bringup)/launch/includes/mobile\_base.launch.xml">

<arg name="base" value="$(arg base)" />

<arg name="serialport" value="$(arg serialport)" />

</include>

<include file="$(find turtlebot\_bringup)/launch/includes/netbook.launch.xml">

<arg name="battery" value="$(arg battery)" />

</include>

</launch>

**激光驱动程序：**

<launch>

<node name="rplidarNode" pkg="rplidar\_ros" type="rplidarNode" output="screen">

<param name="serial\_port" type="string" value="/dev/ttyUSB1"/>

<param name="serial\_baudrate" type="int" value="115200"/>

<param name="frame\_id" type="string" value="laser"/>

<param name="inverted" type="bool" value="false"/>

<param name="angle\_compensate" type="bool" value="true"/>

</node>

</launch>

**Gmapping\_demo:**

<launch>

<include file="$(find rbx1\_nav)/launch/gmapping\_laser.launch"/>

<include file="$(find rbx1\_nav)/launch/tb\_move\_base.launch"/>

</launch>

**Gmapping\_laser.launch:**

<launch>

<arg name="scan\_topic" default="scan" />

<node pkg="tf" type="static\_transform\_publisher" name="link1\_broadcaster" args="1 0 0 0 0 0 base\_link laser 100" />

<node pkg="gmapping" type="slam\_gmapping" name="slam\_gmapping" output="screen" clear\_params="true">

<param name="odom\_frame" value="odom"/>

<param name="map\_update\_interval" value="1.0"/>

<!-- Set maxUrange < actual maximum range of the Laser -->

<param name="maxRange" value="5.0"/>

<param name="maxUrange" value="4.5"/>

<param name="sigma" value="0.05"/>

<param name="kernelSize" value="1"/>

<param name="lstep" value="0.05"/>

<param name="astep" value="0.05"/>

<param name="iterations" value="10"/>

<param name="lsigma" value="0.075"/>

<param name="ogain" value="3.0"/>

<param name="lskip" value="0"/>

<param name="minimumScore" value="50"/>

<param name="srr" value="1"/>

<param name="srt" value="1"/>

<param name="str" value="1"/>

<param name="stt" value="1"/>

<param name="linearUpdate" value="0.5"/>

<param name="angularUpdate" value="0.436"/>

<param name="temporalUpdate" value="-1.0"/>

<param name="resampleThreshold" value="0.5"/>

<param name="particles" value="30"/>

<!--

<param name="xmin" value="-50.0"/>

<param name="ymin" value="-50.0"/>

<param name="xmax" value="50.0"/>

<param name="ymax" value="50.0"/>

make the starting size small for the benefit of the Android client's memory...

-->

<param name="xmin" value="-1.0"/>

<param name="ymin" value="-1.0"/>

<param name="xmax" value="1.0"/>

<param name="ymax" value="1.0"/>

<param name="delta" value="0.05"/>

<param name="llsamplerange" value="0.01"/>

<param name="llsamplestep" value="0.01"/>

<param name="lasamplerange" value="0.005"/>

<param name="lasamplestep" value="0.005"/>

<remap from="scan" to="$(arg scan\_topic)"/>

</node>

</launch>

**tb\_move\_base.launch:**

<launch>

<node pkg="move\_base" type="move\_base" respawn="false" name="move\_base" output="screen" clear\_params="true">

<rosparam file="$(find rbx1\_nav)/config/turtlebot/costmap\_common\_params.yaml" command="load" ns="global\_costmap" />

<rosparam file="$(find rbx1\_nav)/config/turtlebot/costmap\_common\_params.yaml" command="load" ns="local\_costmap" />

<rosparam file="$(find rbx1\_nav)/config/turtlebot/local\_costmap\_params.yaml" command="load" />

<rosparam file="$(find rbx1\_nav)/config/turtlebot/global\_costmap\_params.yaml" command="load" />

<rosparam file="$(find rbx1\_nav)/config/turtlebot/base\_local\_planner\_params.yaml" command="load" />

<remap from= "cmd\_vel" to="cmd\_vel\_mux/input/teleop"/>

</node>

</launch>

附gmapping.launch参数详解

<launch>

<arg name="scan\_topic" default="scan" /> //laser的topic名称，与自己的激光的topic相对应

<arg name="base\_frame" default="base\_footprint"/>//机器人的坐标系

<arg name="odom\_frame" default="odom"/>//世界坐标

<node pkg="gmapping" type="slam\_gmapping" name="slam\_gmapping" output="screen">//启动slam的节点

<param name="base\_frame" value="$(arg base\_frame)"/>

<param name="odom\_frame" value="$(arg odom\_frame)"/>

<param name="map\_update\_interval" value="0.01"/>//地图更新的一个间隔，两次scanmatch的间隔，地图更新也受scanmach的影响，如果scanmatch没有成功的话，是不会更新地图的

<param name="maxUrange" value="4.0"/>//set maxUrange < maximum range of the real sensor <= maxRange

<param name="maxRange" value="5.0"/>

<param name="sigma" value="0.05"/>

<param name="kernelSize" value="3"/>

<param name="lstep" value="0.05"/>optimize机器人移动的初始值（距离）

<param name="astep" value="0.05"/>//optimize机器人移动的初始值（角度）

<param name="iterations" value="5"/>//icp的迭代次数

<param name="lsigma" value="0.075"/>

<param name="ogain" value="3.0"/>

<param name="lskip" value="0"/>//为0,表示所有的激光都处理，尽可能为零，如果计算压力过大，可以改成1

<param name="minimumScore" value="30"/>//很重要，判断scanmatch是否成功的阈值，过高的话会使scanmatch失败，从而影响地图更新速率

<param name="srr" value="0.01"/>//以下四个参数是运动模型的噪声参数

<param name="srt" value="0.02"/>

<param name="str" value="0.01"/>

<param name="stt" value="0.02"/>

<param name="linearUpdate" value="0.05"/>//机器人移动linearUpdate距离，进行scanmatch

<param name="angularUpdate" value="0.0436"/>机器人选装angularUpdate角度，进行scanmatch

<param name="temporalUpdate" value="-1.0"/>

<param name="resampleThreshold" value="0.5"/>

<param name="particles" value="8"/>//很重要，粒子个数

<!--

<param name="xmin" value="-50.0"/>

<param name="ymin" value="-50.0"/>

<param name="xmax" value="50.0"/>

<param name="ymax" value="50.0"/>

make the starting size small for the benefit of the Android client's memory...

-->

<param name="xmin" value="-1.0"/>//map初始化的大小

<param name="ymin" value="-1.0"/>

<param name="xmax" value="1.0"/>

<param name="ymax" value="1.0"/>

<param name="delta" value="0.05"/>

<param name="llsamplerange" value="0.01"/>

<param name="llsamplestep" value="0.01"/>

<param name="lasamplerange" value="0.005"/>

<param name="lasamplestep" value="0.005"/>

<remap from="scan" to="$(arg scan\_topic)"/>

</node>