Homework 3

Matlab

Description:

1 we implemented basic rrt algorithm in matlab env, see code RRT.m, execution demo result see figure 1.

2 we also implemented informed_rrt_star algorithm in matlab. It is not a complete version of informed_rtt, we just change the sample algorithm by samping from a ellipse shape area instead of the whole map, but it should be enough to have shown the power of informed_rrt, see the execution result of figure2 . we seperated code into ellipse_sample.md and informedRRTstar.m

3 RRT_star.m is just created for debug purpose, where most of code in it is same with informedRRTstar.m

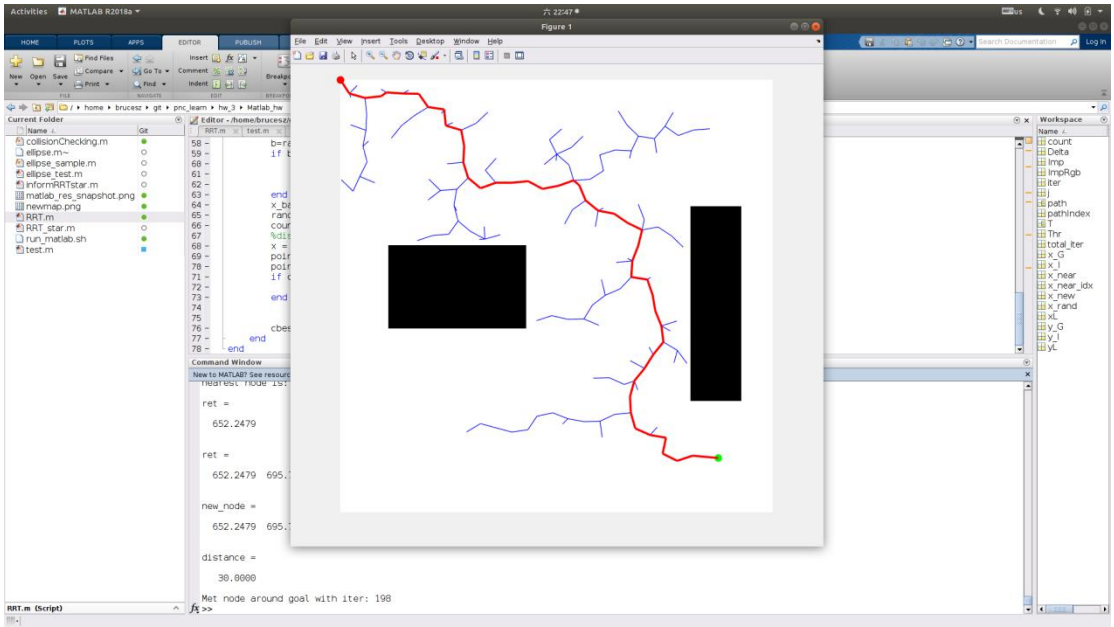


Figure1

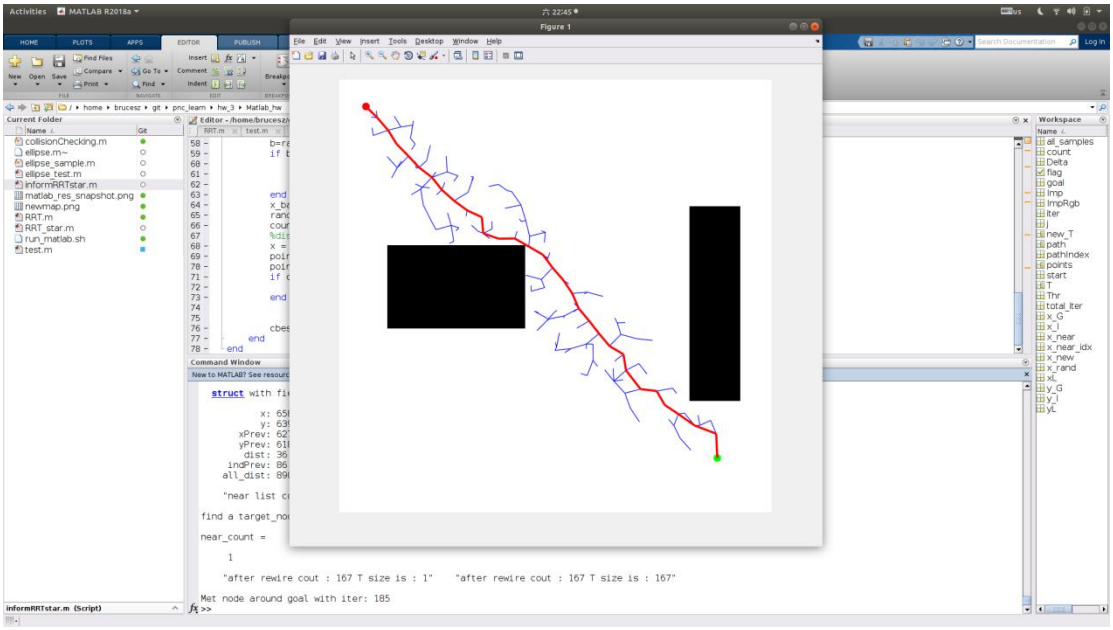


Figure 2

Ros

Description:

1 we implemented the code needed to call ompl according to the guide of comments , all 7 places of change .

2 changing planning algorithm is very easy (from rrt to rrt_star, to informed_rrt_star). Just changing line between 196-198 is enough. Figure 3 show the demo result of rrt algorithm; Figure4 and figure5 shows the demo result of rrt_star from two angles of view; Figure 6 and figure7 show the demo result of informed_rrt_star from two angles of view .

3 results shows that the path generated by informed_rrt is more close to the obstacle which means the length of path can be more short.

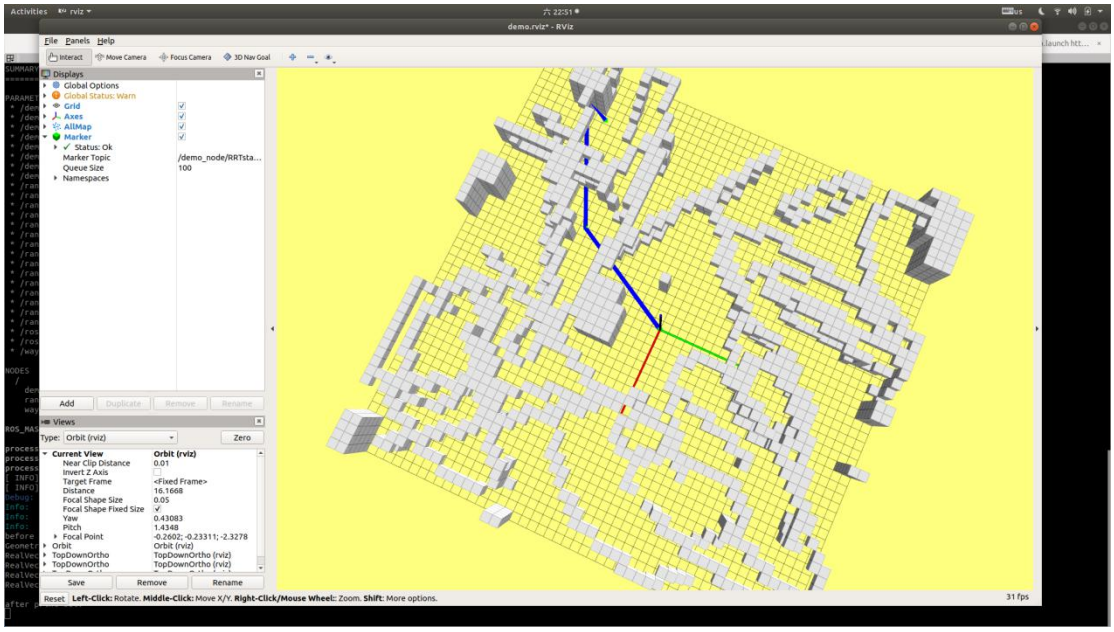


Figure 3

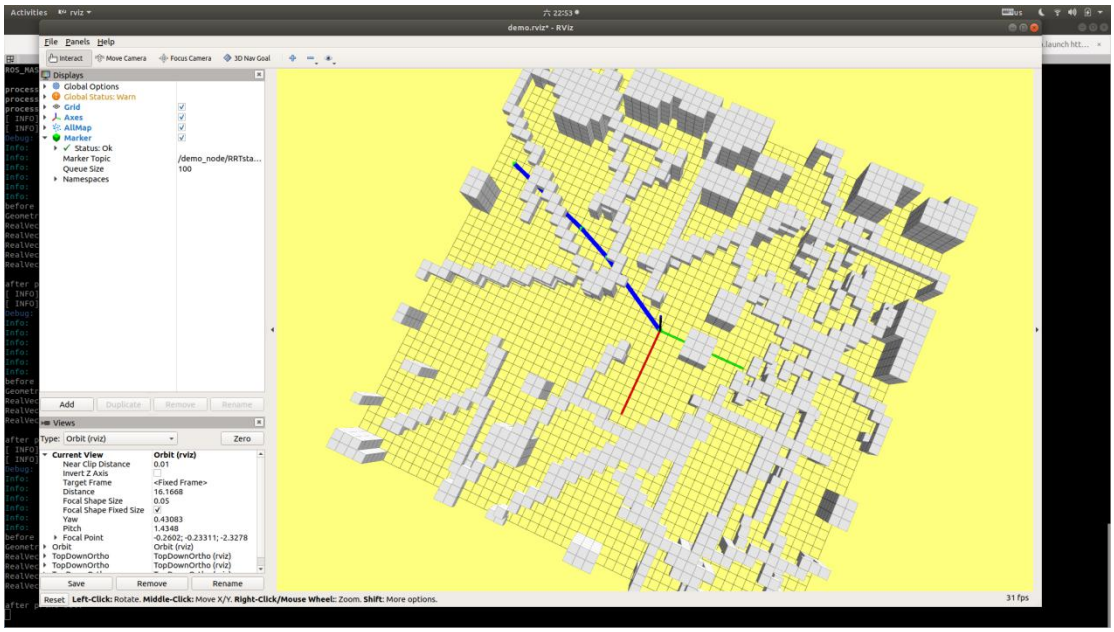


Figure 4

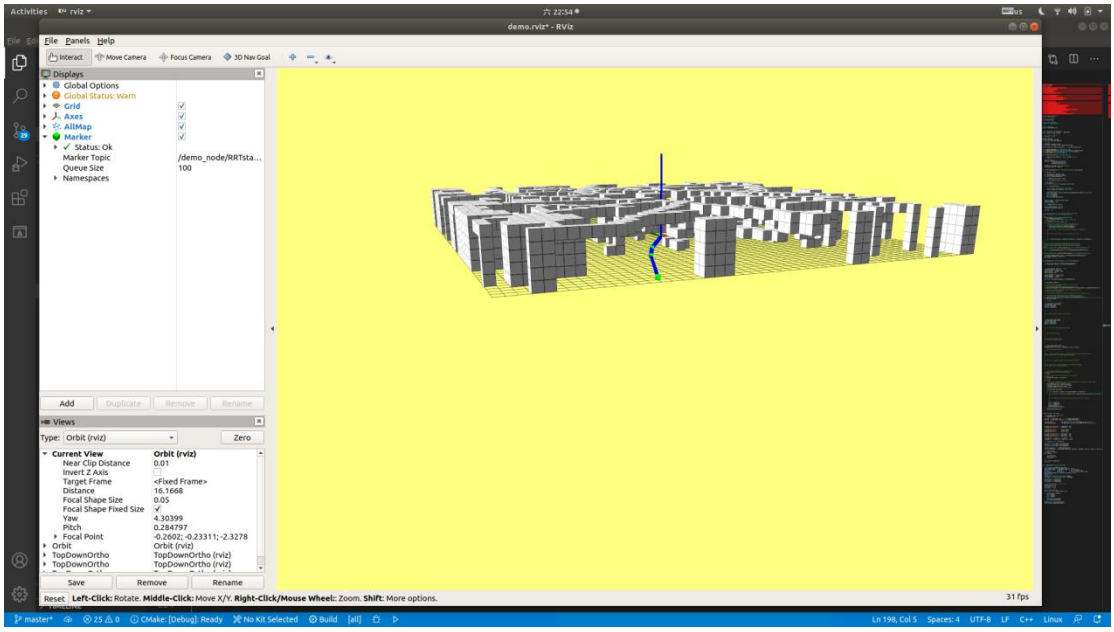


Figure 5

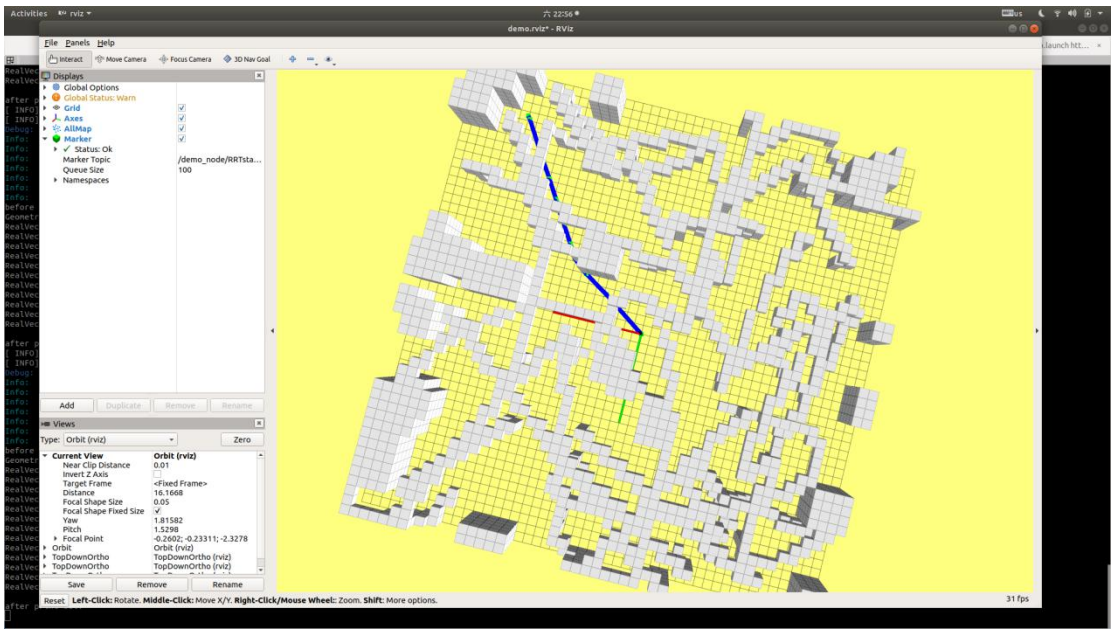
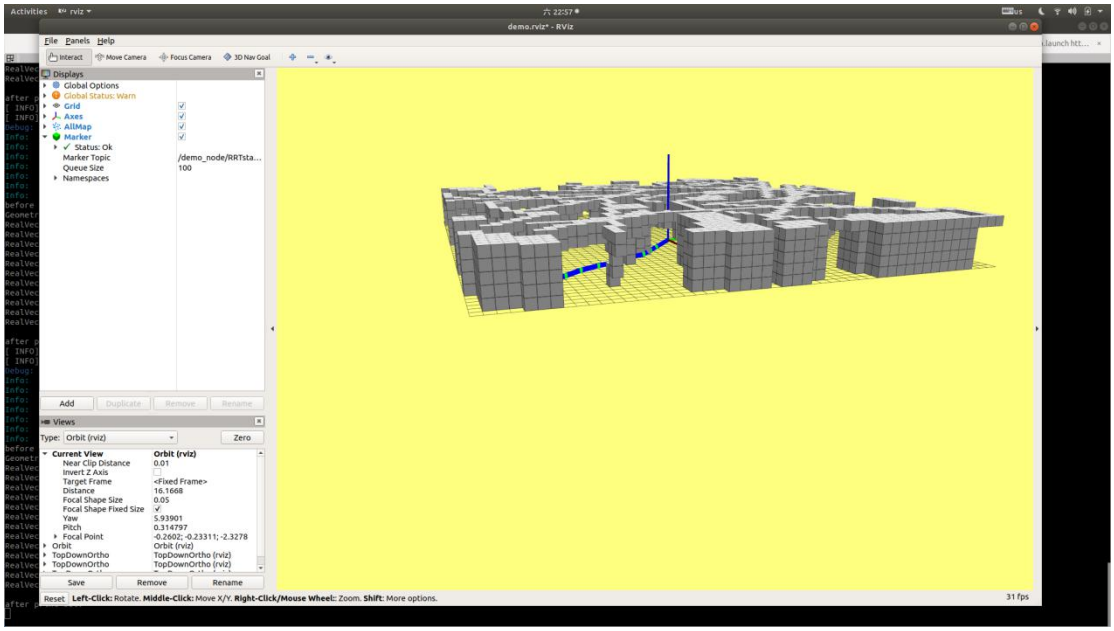


Figure 6


Activities
rviz
demo.rviz* - RViz
File Panels Help
Interact
Move Camera
Focus Camera
3D Nav Goal
Displays
Global Options
Global Status: Warn
Grid
Axes
AllMap
Marker
Status: Ok
Marker Topic
/demo_node/RRTsta...
Queue Size
100
Namespaces
Add
Duplicate
Remove
Rename
Views
Type: Orbit (rviz)
Zero
Current View
Orbit (rviz)
Near Clip Distance
0.01
Invert Z Axis
Target Frame
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Distance
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Focal Shape Size
0.05
Focal Shape Fixed Size
Yaw
5.93901
Pitch
0.314797
Focal Point
-0.2602; -0.23311; -2.3278
Orbit
Orbit (rviz)
TopDownOrtho
TopDownOrtho (rviz)
TopDownOrtho
TopDownOrtho (rviz)
Save
Remove
Rename
Reset
Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel: Zoom. Shift: More options.
31 fps

Figure 7