EECS 476 Mobile Robotics

PS 8

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1. Overview

Adaptive Monte Carlo Localization (AMCL) is a probabilistic localization system for a robot moving in 2D. It implements the adaptive (or KLD-sampling) Monte Carlo localization approach (as described by Dieter Fox), which uses a particle filter to track the pose of a robot against a known map.

1. Main Steps

(1) robot wandering for gmapping

$ roslaunch gazebo\_ros empty\_world.launch

$ roslaunch mobot\_urdf mobot\_startup\_open\_loop.launch

$ rosbag record -O mapData /scan /tf

$ rosrun my\_open\_loop\_console my\_open\_loop\_console

(2)gmapping, saving data

$ roscore

$ rosrun gmapping slam\_gmapping scan :=/ scan

$ rosbag play my\_mapData.bag

$ rosrun rviz rviz

$ rosrun map\_server map\_saver -f my\_gmapping

(3) amcl

$ roslaunch gazebo\_ros empty\_world.launch

$ roslaunch mobot\_urdf mobot\_startup\_open\_loop.launch

$ roscd my\_map

$ rosrun map\_server map\_server my\_gmapping.yaml

$ rosrun amcl amcl

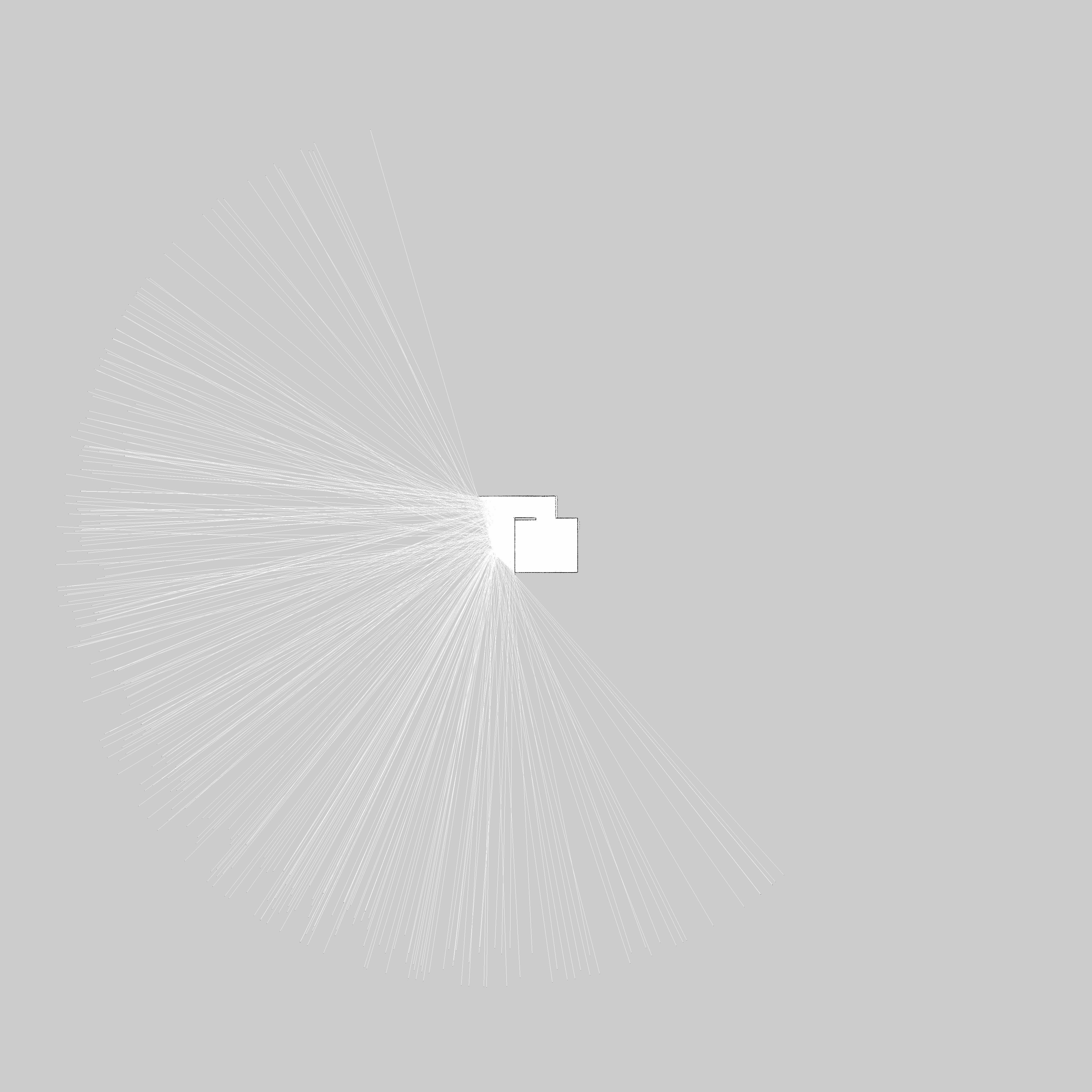
$ rosrun my\_open\_loop\_console my\_open\_loop\_console

Or we can simply use the following launch file:

$ roslaunch my\_open\_loop\_console my\_robot\_moving\_in\_known\_map.launch

1. Results

I designed a path for the robot so that it can wander inside the starting pen model and go outside, which obtained a map as following.



And use the map we can navigate the robot to move more precisely, like what shows in my video,

# my gmapping

https://youtu.be/blJj9HvjlBc

# my robot moving in known map, lin\_steering with amcl feedback

https://youtu.be/-iuHiPGGiBQ

# my robot wandering for gmapping

https://youtu.be/ggXYbUHMpR0