Trajectory Planning and Execution for Navigation on Hybrid Hierarchical Maps

Introduction:

The mapping of large spaces has known some developments recently, with the emergence of hybrid representations. The IRPS (Intelligent Robotic Porter System) project has been using this technique to perform mapping. In this work we present an hybrid simulator that uses the IRPS hybrid topological/metric maps to obtain paths.

Objectives:

- development of an hybrid planner to generate trajectories.
- execute trajectories with the mobile robot.

OOPSMP – Object Oriented Programming System for Motion Planning

- OOPSMP is a package for motion planning that is easy to extend, robust and efficient. It can be used for motion planning research or as teaching tool.
- For local metric planning we take advantage of the motion planning components implemented on OOPSMP, that allows us test and analyse several diferent methods, such as RRT, PRM and others.
- Lines or Columns algorithm was developed to obtain geometric maps used with OOPSMP from occupancy grids.

Conclusions:

• The developed simulator successfully obtains paths in both testing and real maps.
• A method to make the transition between local maps was presented.
• The OOPSMP toolbox adds to the simulator the capacity of extension to new planning methods.
• The OOPSMP toolbox allows to analyse in detail the planning in local maps.
• CARMEN modules allow direct communication with a wide variety of mobile robots.

Contact Person:

Márcio Henriques
marciohenriques84@gmail.com
Rui Rocha
rprocha@deec.uc.pt

Mobile Robotics Laboratory
Institute of Systems and Robotics
ISR – Coimbra