

An Information-Driven Navigation Strategy for Autonomous Navigation in Unknown Environments

Redouane Boumghar

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CNRS LAAS - RIA/RIS Group
Université de Toulouse - France
Magellium - Perception and Robotics Dept.



The presentation illustrates a strategy for robot navigation in initially unknown or poorly known environments. The strategy consists in determining the areas in which information is relevant to gather for the robot to reach the goal. The approach relies on a probabilistic reasoning on the currently available information on the environment, and on the models of the vehicle perception and motion abilities. The interest of perceiving a given area is assessed by analysing the way navigation costs are propagated during the search of the optimal path to reach the goal, taking into account the vehicle perception and motion models.

Results illustrate the proposed strategy, and show its pertinence when compared to more classical navigation strategies. The extension towards multiple-robot coordination is straightforward, and is exemplified in the case where an aerial robot assists the robot by acting as a scout, aiming at optimizing the overall mission time.

Experiences carried out during applied research projects (ACTION Project) and the last European land robotics contest (ElRob) will inform about the key-problems encountered when using one or multiple outdoor robots.