

Exploration of Unknown Environments by an Autonomous Mobile Robot: Candidacy Exam Syllabus

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Abstract

In this talk I will focus on the use of a mobile robot for autonomous exploration of an initially unknown environment. Here, by “exploration” I mean a task whose final or intermediate result is a model of this environment. I will consider the following aspects:

- mobile robot sensors for environmental modeling
- types of explored environments
- types and structure of environment models
- approaches to model updates
- handling uncertainties

There has been a lot of work done in the area of environmental modeling by mobile robots. To fit the requirements of the candidacy exam for scope and effort I had to make the following restrictions explicit:

- I will only consider the perception and modeling modules of the robot architecture. Planning, navigation, obstacle avoidance, and control are beyond the scope of my talk
- I will include localization only when it is done simultaneously with and inseparably from modeling
- I will not consider exploration strategies or view point planning
- I will not consider multi-robot systems

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