

Lecture 7-2: Localization and Map Making

Introduction to AI Robotics (Sec. 11.1 – 11.4)

Objectives:

- Describe the difference between iconic and feature-based localization
- Be able to update an occupancy grid using either Bayesian, Dempster-Shafer or HMM methods
- Describe the two types of formal exploration strategies

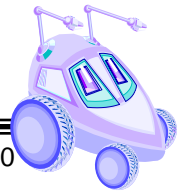
The two remaining questions in localization are:

- _____ (localization)
- _____ (map making)

One way that a robot can localize is to use odometry or _____ but this method causes error accumulation. Eventually, the robot will need to recognize a landmark to reset the odometer or localize relative to a reference point such as GPS. Localization is also a state estimation problem because the robot has to estimate its state from a series of measurements.

There are two broad categories of localization

- _____ - use an occupancy grid (certainty and evidence)
- _____ - used for topological map building



The three localization methods are:

- _____
- _____
- _____

Problems with localization include the fact that estimation is indirect, measurements are noisy and measurements are not available all the time.

When a robot tries to localize itself frame of reference is important.

- local/relative
- global/absolute

The robot's location can be described as

- _____ - distances and angles
- _____ - connections among landmarks

There are two types of map-based localization systems:

- _____ - robot's model of the environment, or a map
- _____ - robot's belief of its position on the map