Lecture 8-1:   Localization and Map Making

***Introduction to AI Robotics* (Sec. 11.5 – 11.8)**

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Objectives:

- Describe the difference between iconic and feature-based localization

- Be able to update an occupancy grid using either Bayesian, Dempster-Shafer or HIMM

  methods

- Describe the two types of formal exploration strategies

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_____ was designed t improve obstacle avoidance and is quasi-evidential where it scores certainty based upon sonar data.

There are two probabilistic localization classes:

_____- uses an explicitly defined probability distribution across all robot positions.

_____ - uses a Gaussian probability density representation of robot position and scan matching for localization.

Robot position update is based upon _____ and _____ sensor values. The two step process involves a <u>action update</u> and a <u>perception update.</u>

The Markov localization system has the ability localize the robot from an initially lost belief state which is the key distinguishing features.

State two differences between Markov and Kalman filter localization techniques.
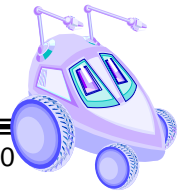
Kalman filter localization is a fusion of the robot's predicted position based upon odometry and information gained from the sensor measurements. The final pose estimate is a weighted sum of the pose estimates observed and prediction and robot position estimated based on odometry and observation positions.
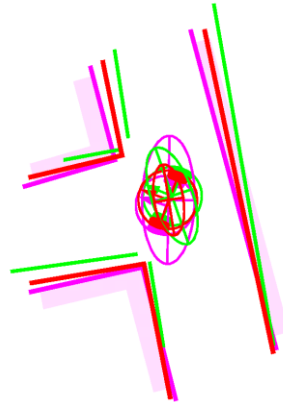
Map building can be

- _____ or

- _____

Map building is required to incorporate newly sensed information in the existing world model, contain information to estimate the robot's position and provides information to do path planning and navigation tasks.

Most environments are a measure of <u>predictable</u> and <u>unpredictable</u> features. There are two measures of quality for map making based upon metric and topological correctness. These can be distinguished between the two types of graph construction.

There are two types of maps: road map, graph construction and cell decomposition

identify set of routes within free space	discriminate between free and occupied cells