


COMP 141: Probabilistic Robotics for Human-Robot Interaction

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Today

- Overview of Syllabus
- Filtering (chapter 2 of PR)
- In-class activity / exercise

Syllabus

- Any questions?

Course Projects

- Q & A

Reading Assignment

- Chapter 3: Kalman and Information filters

Robot Interaction

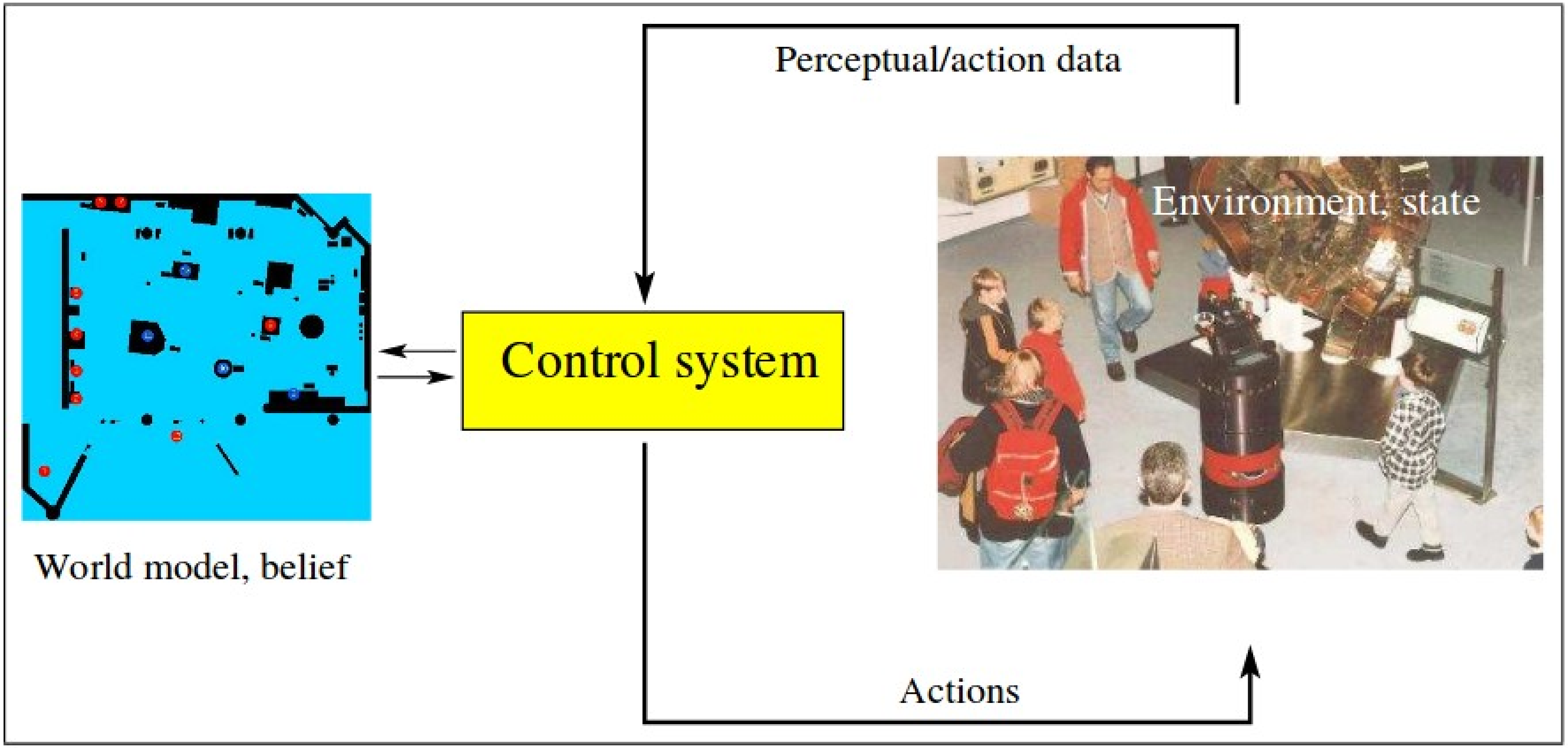

Figure 2.1 Robot Environment Interaction.

Preliminaries and Example

(on board)

Bayes Filter Example

Algorithm Bayes_filter($bel(x_{t-1}), u_t, z_t$)**:**

  for all x_t do

    $\overline{bel}(x_t) = \int p(x_t \mid u_t, x_{t-1}) \; bel(x_{t-1}) \; dx$

    $bel(x_t) = \eta \; p(z_t \mid x_t) \; \overline{bel}(x_t)$

  endfor

  return $bel(x_t)$

In-Class Exercise

- Form a small group (2 to 3, max 4)
- Pick up a piece of paper

In-Class Exercise

- A robot uses a range sensor that measures from *0m* to *3m*. Assume that the actual ranges in the robot's environment are uniformly distributed in that range.
- The sensor can be faulty and when it is, it constantly outputs a range of below *1m*, regardless of the true range. The **prior probability** that the sensor is faulty is *0.01*
- The robot queried its sensor N times, and each time, the reading was below 1m. What is the **posterior probability** of a sensor fault, for N =1, 2, …, 10. Formulate the corresponding probabilistic model.