

ECE209AS (Fall 2025)

Computational Robotics

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Problem set 9 | More learning, gaussian processes

Due Tue, Nov 25, 2025 @ 9am PT

Key takeaways

After this lecture, you should understand:

- How different assumptions / constraints on problem statements and datasets result in the different forms of learning problems, and how to identify a suitable approach for a given problem;
- How datasets are used to generate planning algorithms using imitation learning, and the challenges associated with doing so; and
- How Gaussian Processes (GPs) can be used more generally to apply datasets to arbitrary computational problems.

Assignment

- 9(a). Why is it generally difficult to use an inverse reinforcement learning based approach by generating a data set of “inexpert” trajectories of what **not** to do? When might this approach be successful anyway?
- 9(b). Describe some characteristics of an appropriate kernel function $k_{ij} = k(x_i, x_j)$ to use when approximating a value function $V(s)$ using a Gaussian Process regression on a 2D gridworld system with chess bishop system dynamics. That is, what can we say about k_{ij} for various relationships between x_i and x_j ?
- 9(c). Would you be willing to let us use your correct responses as (anonymized) examples for the class?