Reinforcement Learning
Homework 1
Markov Decision Process Examples

February 3, 2025

Instructions

Total Points: 100
Deadline: February 10, 2025
To calculate your homework grade, we will average the points earned from all homework assignments throughout the semester and take 15% of that Average.
Submission: Submit your solutions as a PDF document named "FirstName LastName Homework 1.pdf" by the deadline.

Problem: Markov Decision Process (100 Points).

Describe three example tasks of your own that fit into the MDP framework, identifying for each its states, actions, and rewards. Make the three examples as different from each other as possible.

Grading Criteria
You will be graded on each MDP separately (33.(3) for each). The grading criteria is:

- That you have described an MDP and that it is different than your other two.

- That you have described the MDP's states.

- That you have described the MDP's actions.

- That you have described the MDP's rewards.

An example of an MDP could be a self driving car. The states would be all of the sensor readings that car gets at each time step: LIDAR, cameras, the amount of fuel left, current wheel angle, current velocity, gps location. The actions could be accelerate, decelerate, turn wheels left, and turn wheels right. The rewards could be -1 at every time step so that the agent is encouraged to get to the goal as quickly as possible, but -1 billion if it crashes or breaks the law so that it knows not to do that.