3. RL Terminology

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Exercises due May 3, 2023 08:59 -03 Completed

RL Terminology

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A **Markov decision process (MDP)** is defined by

- a set of states $s \in S$;
- a set of actions $a \in A$;
- Action dependent transition probabilities $T(s, a, s') = P(s'|s, a)$, so that for each $\sum_{s' \in S} T(s, a, s') = 1$.
- Reward functions $R(s, a, s')$, representing the reward for starting in state s, taking in state s' after one step. (The reward function may also depend only on s, or only s

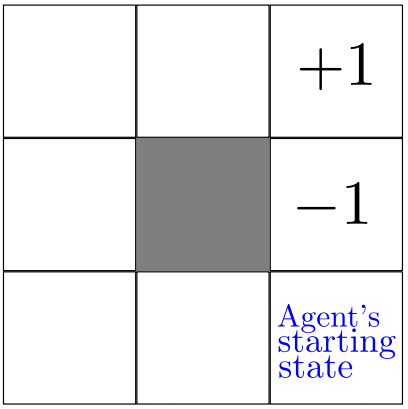
MDPs satisfy the **Markov property** in that the transition probabilities and rewards depe state and action, and remain unchanged regardless of the history (i.e. past states and a

For and ,

For ,

Submit You have used 1 of 2 attempts

Recall the MDP from the lecture.



An AI agent navigates in the 3×3 grid depicted above, where the middle square is not a (and hence is greyed out).

The MDP is defined as follows:

- Every state is defined by the current position of the agent in the grid (and is indepe actions and positions).
- The actions are the 4 directions “up", “down",“left", “right".
- The transition probabilities from state via action to state is given by
- The agent receives a reward of for arriving at the top right cell, and a reward of immediately below it. It does not receive any non-zero reward at the other cells as illu figure.

Markovian Setting

1/1 point (graded)

Let be any given state in this MDP. The agent takes actions starting f

Submit You have used 3 of 3 attempts

Number of States

1/1 point (graded)

Enter the total number of unique states in the MDP described above and depicted by th
(Enter if the number of states is not finite.)

8 ✔

Submit You have used 1 of 3 attempts

Transition Probabilities

1/1 point (graded)

Refer to the MDP described and depicted in the grid on the top of this page.

Assume that the transition probabilities for all the states are given as a table , whose
which represents the transition proba
state when action is taken from the state . **Note:** Note that here, and can
not necessarily reachable by an action in one step.

Enter the number of entries in the table :

256 ✔

Submit You have used 3 of 3 attempts

< Previous Next >

Discussion

- transition probability matrix
  Trying not to give any hints. I feel that the number of actions the AI agent can take in above example is depe
- Question regarding P(s'|s,a)?
  Assuming the agent start state is at the bottom right as shown in the diagram. I have a few questions to ask.
- Transition Probabilities clarification
- Advice: don't try to be too clever with Transition Probabilities exercise
  Seriously, don't try too hard on that question wondering all the "real" possible paths that a robot could take i
- Transition Probabilities
  I'm asking this question because I used all my attempts and didn't get the right result. I'll try not to give any h
- Help needed in the last question?

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