Graded Assignment: Graded Assignment: Describe Three MDPs

You passed!
Congratulations! You earned 11 / 12 points. Review the feedback below and continue the course when you are ready.

AI Grading

Your assignment has been graded by AI. View your scores below.

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MDP

Submitted on May 19, 2025

PROMPT

Create an MDP. Remember to describe the states, actions and rewards. Make sure your three MDPs are different from each other.

A camera-based auto-grading system is designed to scan and evaluate paper sheets containing multiple-choice answers. For each question, the system must detect the student's selected option from the scanned image and compare it to the ground truth.

The scoring mechanism is defined as follows:

- **+5 points** are awarded for each correctly identified answer.
- **−20 points** are penalized for each incorrect detection (i.e., detecting a wrong or non-existent answer).

The objective of the auto-grader is to **maximize the total score** by accurately detecting the student's marked answers while minimizing false detections or misreads.

Key Assumptions:

- Each answer sheet contains a fixed number of multiple-choice questions.
- There is exactly one correct answer per question.
- The camera system may encounter noise, distortion, or ambiguous markings, which can lead to incorrect detections.

Goal:

Develop or optimize a detection strategy or algorithm that **maximizes grading accuracy** by correctly identifying as many answers as possible while avoiding misclassification penalties.

RUBRIC

Did the learner describe an MDP, and is it different than their other submissions?

- 0 points — No
- **1 point** — Yes

Are the **states** well-specified? Namely are they Markov and so can be used as MDP states.

- 0 points — No
- **1 point** — Yes

Are the **actions** well-specified? Namely can they used as actions in an MDP.

- 0 points — No
- **1 point** — Yes

Are the **rewards** well-specified? Namely to satisfy the requirements in the definition of an MDP with the described state and action set.

- 0 points — No
- **1 point** — Yes

PROMPT

Create an MDP. Remember to describe the states, actions and rewards. Make sure your three MDPs are different from each other.

A bus operates in a network of stations, where its goal is to transport passengers efficiently. Every unit of distance traveled incurs a cost of **-1 point**, while each **passenger successfully picked up or dropped off earns +20 points**.

The objective is to determine an **optimal route and sequence of actions** that maximizes the total score by minimizing travel distance and maximizing the number of passengers transported.

Key rules:

- The bus starts at a specific location.
- Passengers are located at various stations, each with a defined destination.
- The bus may pick up or drop off any number of passengers at a station.
- Each move between stations incurs a point penalty proportional to the distance traveled.
- Successfully delivering or picking up a passenger at the correct location grants a reward of 20 points per passenger.

The challenge is to balance the cost of movement with the reward of serving passengers, identifying the most effective path and decisions under these rules.

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PROMPT

Create an MDP. Remember to describe the states, actions and rewards. Make sure your three MDPs are different from each other.

The air conditioner runs in a bedroom, where it's goal is to adjust the thermostat to the user's preference. Every unit of power used costs 1 point, and if the user have to manually adjust the thermostat, the machine receives -10 points.

The objective is to find the most optimal conducting pattern that satisfies the user need and minimize the power usage

Key rules:

- The use time of the air conditioner may vary
- Every unit of electricity (Example: Watt) used charges a point penalty.
- Any interference from the user result in a loss of 10 points

The challenge is to effectively adapt to the user's preference while balancing the power usage to the lowest.

RUBRIC

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- **1 point** — Yes

If you're unsatisfied with your scores, you can start a new attempt for your assignment or switch to have your assignment graded by your peers.

Start new attempt | Switch to peer grading

Comments
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