Homework Table based QLearning and SARSA

Assigned 02/06/22

Due: 08/06/22

Total points: 15

You can work in groups of up to 2 people.

**Homework Description**: in this homework, you are going to use table based QLearning and SARSA for two Gym environment you choose. One of them should be cart-pole. Here are the exploration tasks for this assignment.

For each game environment:

1. What is the best way to represent state?
   1. Try at least three different ways of representing the state including directly using the observations, and see how they affect the algorithm’s performance for either Q or SARSA.
   2. For this exploration, you can keep other parameters in Q or SARSA constant
2. Using the best state representation you got from step 1, compare the performance of Q and SARSA.
   1. Vary the learning rate (alpha)
   2. Vary gamma
   3. Vary the exploration policy, i.e., can you do something better than epsilon-greedy?

**Turn in:**

1) the entire project with a readme file for how to run your code

2) report from your explorations

3) discussions on the results of your exploration. In particular, compared the results you got with your previous results using rule based and GA.

Around 10% of your grade will be evaluated based on how well your agent performs against your classmates’.