Policy Iteration

Quiz, 7 questions

1 point

1.

What are the two main steps in value-based approach to Reinforcement Learning?

- [ ] 2 - extract a reward function from the value function.
- [ ] 1 - estimate a reward function.
- [ ] 2 - extract a value function from the reward function.
- [x] 1 - build a value function.
- [ ] 1 - build a policy function.
- [x] 2 - extract a policy function from the value function.
- [ ] 2 - extract a value function from policy.

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1 point

2.

What is true about policy improvement? Recall that,

total return = immediate reward + the discounted expected return from the next state under policy π.

- [ ] Making several policy improvements in a row may increase the performance of a new policy.
- [ ] An agent acts greedily with respect to the immediate reward only and ignores the remaining expected return under policy π.
- [x] An agent acts greedily with respect to combination of immediate reward and the expected return under policy π.
- [ ] Relying on the estimates of expected return under policy π may lead to deterioration of an agent's performance in some states. This is so because the estimates will no longer valid as soon as policy is changed (improved).

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3.

How many different value functions can correspond to any particular policy function?

- Depends on number of actions.
- One
- Infinite
- Depends on number of states.

1 point

4.

Why we don't need the precise solution of a system of Bellman equations?

- [ ] The solution of such system of equations is intractable on any modern supercomputer. Thus we have to approximate.
- [ ] The system of Bellman equations may have no solution at all. Thus we should be satisfied with an approximation.
- [ ] We want to sacrifice the global optimality for much faster convergence.
- [x] After reaching some precision level further refinements of the solution will not change the result of subsequent policy improvement.

2 points

5.

Generalised Policy Iteration (GPI)

- [x] does not require to perform policy evaluation until its convergence
- [ ] requires to perform policy evaluation until convergence at every iteration.
- [ ] converges to local optimum.
- [ ] depends on initialization.

- [x] converges to global optimum.
- [x] does not require to improve policy in each and every state as long as policy in any state is improved once in a while
- [ ] requires to improve policy in each and every state before subsequent policy evaluation.
- [x] does not depend on initialization.

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1 point

6.

How can we recover the optimal policy solely from q^* function?

- ( ) With max operator.
- ( ) Sample from a distribution that is proportional to q-values.
- ( ) Find the action that is closest in q-value to average q-value over actions.
- ( ) It is impossible without the knowledge of environment dynamics.
- (•) With argmax operator.

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1 point

7.

What is the difference between Policy Iteration and Value Iteration?

- [x] Policy Iteration updates value function until numerical convergence of all its state values before each policy improvement step.
- [ ] Value Iteration updates value function until numerical convergence of all its state values before each policy improvement step.
- [ ] Policy Iteration perform only one iteration of policy evaluation before policy improvement step.
- [x] Value Iteration perform only one iteration of policy evaluation before policy improvement step.

[ ]

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