Knowledge Checks

Question 1

1/1 point (graded)

Which two of the following are reasons to use function approximation for reinforcement learning?

- [ ] Function approximation ensures convergence of training for reinforcement learning problems with large state-spaces and continuous state-spaces.
- [ ] Function approximation provides exact representations for large state-spaces and continuous state-spaces.
- [x] Function approximation reduces the computational complexity and memory requirements for training reinforcement learning models for large state-spaces and continuous state-spaces.
- [x] Function approximation improves generalization of reinforcement learning models for large state-spaces and continuous state-spaces.

✔

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

Question 2

1/1 point (graded)

Which of the following is true statements about linear function approximation?

- (selected) Linear function approximation computes the value-state or value-action function using a set of model weights multiplied by functions of state. ✔
- Linear function approximation computes the value-state or value-action function using a set of weights multiplied by strictly linear functions of state.
- Linear function approximation computes the value-state or value-action function using a set of weights multiplied by values of past states.
- Linear function approximation computes the value-state or value-action function using a set of weights multiplied by value of states for future time steps.

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You have used 1 of 2 attempts

✔ Correct (1/1 point)

Question 3

1/1 point (graded)

Which of the following is a correct statement about the bias-variance trade-off for function approximation algorithms?

- (selected) Functions with larger numbers of parameters will generally have higher variance but lower bias, at the cost of higher computational complexity and memory requirements, when compared to functions with fewer parameters. ✔
- Functions with larger numbers of parameters will generally have lower variance but greater bias, and with lower computational complexity and memory requirements, when compared to functions with fewer parameters.
- Functions with larger numbers of parameters will generally have lower variance and lower bias, at the cost of higher computational complexity and memory requirements, when compared to functions with fewer parameters.

- ○ Functions with larger numbers of parameters will generally have lower variance but greater bias, at the cost of higher computational complexity and memory requirements, when compared to functions with fewer parameters.

Submit You have used 1 of 3 attempts

✔ Correct (1/1 point)

Question 4

1/1 point (graded)
Stochastic gradient decent (SGD) methods are used for training function approximation reinforcement learning algorithms for which two of the following two reasons?

- [ ] SGD algorithms operate on one dimension at a time and scale as the number of model parameters squared.
- [x] Since SGD algorithms are iterative they can be used for online training of reinforcement learning function approximation models.
- [x] SGD algorithms operate on one dimension at a time and scale linearly with the number of model parameters.
- [ ] Since SGD algorithms are iterative so they cannot be used for online training of reinforcement learning function approximation models.

✔

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✔ Correct (1/1 point)

Question 5

1/1 point (graded)
What advantage does nonlinear deep function approximation algorithms have over linear function approximation?

- (selected) Nonlinear deep function approximation algorithms model more complex behavior, such as discontinuous functions. ✔
- Nonlinear deep function approximation algorithms are more computationally efficient.
- Nonlinear deep function approximation algorithms have better convergence guarantees.
- Only nonlinear deep function approximation algorithms can use stochastic gradient decent (SGD) solutions.

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✔ Correct (1/1 point)

Question 6

1/1 point (graded)
Which two are advantages of Linear function approximation algorithms over nonlinear deep function approximation?

- [ ] Linear function approximation algorithms model more complex behavior, such as discontinuous functions.
- [x] Linear function approximation algorithms are more computationally efficient.
- [x] Linear function approximation algorithms have better convergence guarantees.
- [ ] Only Linear function approximation algorithms can use stochastic gradient decent (SGD) solutions.

✔

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✔ Correct (1/1 point)

Question 7

1/1 point (graded)

Which of the following is a true statement about the change in model parameter for each step of the stochastic gradient decent algorithm (SGD)?

- ○ The current estimated return minus the estimate future return, all multiplied by the model parameter gradient of the estimated return.
- ○ The expectation of the difference between reward plus estimated future return minus the current estimate of return, all multiplied by the return gradient of the estimated parameters.
- ◉ The expectation of the difference between reward plus a weight times estimated future return minus the current estimate of return, all multiplied by the model parameter gradient of the estimated return. ✔
- ○ The expectation of the difference between reward plus a weight times estimated return minus the current estimate of future return, all multiplied by the model parameter gradient of the estimated return.

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✔ Correct (1/1 point)

Question 8

1/1 point (graded)

What is the advantage of the double deep Q learning (Double DQN) algorithm when compared to the original DQN algorithm?

- ○ The double DQN algorithm is more computationally efficient.
- ○ The double DQN algorithm eliminates the need to find a maximum of the Q function.

- [ ] The double DQN algorithm overcomes the bias caused by using the current model parameter estimates.
- [x] The double DQN algorithm overcomes the bias causes by using the same model parameter estimate twice. ✔

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✔ Correct (1/1 point)