CS394R Reinforcement Learning: Theory and Practice Fall 2007

Peter Stone

Department of Computer Sciences
The University of Texas at Austin

Good Afternoon Colleagues



Good Afternoon Colleagues

Are there any questions?

Logistics

Any lingering questions from last week?

Defines the problem

- Defines the problem
- Introduces some important notation and concepts.

- Defines the problem
- Introduces some important notation and concepts.
 - Returns
 - Markov property
 - State/action value functions
 - Bellman equations

- Defines the problem
- Introduces some important notation and concepts.
 - Returns
 - Markov property
 - State/action value functions
 - Bellman equations
 - Get comfortable with them!

- Defines the problem
- Introduces some important notation and concepts.
 - Returns
 - Markov property
 - State/action value functions
 - Bellman equations
 - Get comfortable with them!
- Solution methods come next

- Defines the problem
- Introduces some important notation and concepts.
 - Returns
 - Markov property
 - State/action value functions
 - Bellman equations
 - Get comfortable with them!
- Solution methods come next
 - What does it mean to solve an RL problem?

Art more than science

- Art more than science
- States, actions, rewards

- Art more than science
- States, actions, rewards
- Rewards: no hints on how to solve the problem

- Art more than science
- States, actions, rewards
- Rewards: no hints on how to solve the problem
 - Dependent on next state (p. 66)

- Art more than science
- States, actions, rewards
- Rewards: no hints on how to solve the problem
 - Dependent on next state (p. 66)
- Discounted vs. non-discounted

- Art more than science
- States, actions, rewards
- Rewards: no hints on how to solve the problem
 - Dependent on next state (p. 66)
- Discounted vs. non-discounted
- Episodic vs. continuing

- Art more than science
- States, actions, rewards
- Rewards: no hints on how to solve the problem
 - Dependent on next state (p. 66)
- Discounted vs. non-discounted
- Episodic vs. continuing
- Exercises 3.4, 3.5 (p.59)

• What is it?

• What is it?

• Does it hold in the real world?

- What is it?
- Does it hold in the real world?
- It's an ideal
 - Will allow us to prove properties of algorithms
 - Algorithms may still work when not provably correct

- What is it?
- Does it hold in the real world?
- It's an ideal
 - Will allow us to prove properties of algorithms
 - Algorithms may still work when not provably correct
- Exercise 3.6

• Consider the week 0 environment

- Consider the week 0 environment
- For some s, what is V(s)?

- Consider the week 0 environment
- \bullet For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?

- Consider the week 0 environment
- \bullet For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?
- ullet Construct V in undiscounted, episodic case

- Consider the week 0 environment
- \bullet For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?
- ullet Construct V in undiscounted, episodic case
- Construct Q in undiscounted, episodic case

- Consider the week 0 environment
- \bullet For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?
- ullet Construct V in undiscounted, episodic case
- Construct Q in undiscounted, episodic case
- What if it's discounted?

- Consider the week 0 environment
- \bullet For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?
- ullet Construct V in undiscounted, episodic case
- Construct Q in undiscounted, episodic case
- What if it's discounted?
- What if it's continuing?

- Consider the week 0 environment
- \bullet For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?
- ullet Construct V in undiscounted, episodic case
- Construct Q in undiscounted, episodic case
- What if it's discounted?
- What if it's continuing?
- Exercises 3.10, 3.11, 3.17