CS395T Reinforcement Learning: Theory and Practice Fall 2004

Peter Stone

Department or Computer Sciences The University of Texas at Austin

Week3a: Tuesday, September 14th

Good Afternoon Colleagues



Good Afternoon Colleagues

• Are there any questions?





• No class on Thursday





- No class on Thursday
- Use that as an opportunity to do a programing assignment!



• 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
- Dicounted vs. non-discounted



- Art more than science
- States, actions, rewards
- Rewards: no hints on **how** to solve the problem
- Dicounted vs. non-discounted
- Episodic vs. continuing



- Art more than science
- States, actions, rewards
- Rewards: no hints on **how** to solve the problem
- Dicounted 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
- 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
- For some s, what is V(s)?
- OK consider the policy we ended with
- Now, for some s, what is V(s)?
- Construct V in undiscounted, episodic case



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



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



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

