CS394R Reinforcement Learning: Theory and Practice

Scott Niekum and Peter Stone

Department of Computer Science The University of Texas at Austin

Good Morning Colleagues

• Are there any questions?



• Next step: literature surveys



- Next step: literature surveys
 - Build on proposal



- Next step: literature surveys
 - Build on proposal
- Next week's readings



- Next step: literature surveys
 - Build on proposal
- Next week's readings
 - Learning from human input

• Q-learning: converges to optimal policy in the limit

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time
 - Converges in theory

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time
 - Converges in theory
 - Not particularly useful (scalable) in practice

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time
 - Converges in theory
 - Not particularly useful (scalable) in practice
 - Drives agent to explore *everywhere*

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time
 - Converges in theory
 - Not particularly useful (scalable) in practice
 - Drives agent to explore *everywhere*
- TEXPLORE: avoids visiting all states

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time
 - Converges in theory
 - Not particularly useful (scalable) in practice
 - Drives agent to explore *everywhere*
- TEXPLORE: avoids visiting all states
 - No theoretical guarantees

- Q-learning: converges to optimal policy in the limit
- RMax: converges in polynomial time
 - Polynomial in size of state/action space and mixing time
 - Converges in theory
 - Not particularly useful (scalable) in practice
 - Drives agent to explore *everywhere*
- TEXPLORE: avoids visiting all states
 - No theoretical guarantees
 - Can work well in practice

• Which is more interesting? An algorithm with theoretical guarantees? Or one that can work in practice?