

August 31 - September 6 Seminar Review

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August 31, 2020

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Title: The Teaching Dimension of Reinforcement Learning

Presenter: Xuezhou Zhang

People usually teach in two ways: demonstration and reinforcement. Today's talk studies the sample complexity for teaching by reinforcement named "teaching dimension". The presenter discusses the complexity by cases: 1. the teacher generates the arbitrary state-reward vector and overrides the action; 2. the teacher generates the arbitrary state-reward vector but the agent has "free will" to choose the action; 3. the teacher generates arbitrary rewards and the environment-supported states; 4. the teacher generates only arbitrary rewards, and the states are sampled from the environment. Under different controlling levels, the sample complexity increases as the teacher is less deterministic. The presenter not only finds the theoretical complexities but also provides optimal teaching algorithms (e.g. navigation algorithm) that match the optimal teaching dimensions.

Questions: 1. Can this study help us to choose the teaching strategy in practice?

Possible Answer: In practice, we may first evaluate the sizes of action sets, state space, and other related parameters. Then, we determine the strategy after balancing the theoretical complexity and the our goal.