A Monte Carlo Markov Chain Technique to Reinforcement Learning

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This project will analyze how a Markov chain Monte Carlo technique can be implemented in reinforcement learning. This underlying Bayesian technique will enable an algorithm to make decisions based off of state changes and probability ratios. I am fascinated by algorithms being able to learn based on the actions taken. This project is inspired by my summer REU project. Although that project was categorized as statistics, I argue that the Bayesian procedure that we developed is a reinforcement learning algorithm. I, however, do not want to steal or copy any of that work and will instead take a broader look into how a Bayesian procedure aided by a Markov chain Monte Carlo can be used in a reinforcement algorithm.

My goal with this theoretical project is to look at the math behind the algorithms and the potential applications this reinforcement learning approach has. Below are some academic sources I have gathered.

References

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[3] R. Salakhutdinov and A. Mnih "Bayesian probabilistic matrix factorization using Markov chain Monte Carlo." *In Proceedings of the 25th international conference on Machine learning (ICML '08).* pp.880-887, 2008 DOI=http://dx.doi.org/10.1145/1390156.1390267

[4] T. Jaakkola, S. Singh, and M. Jordan "Reinforcement Learning Algorithm for Partially Observable Markov Decision Problems" *Advances in neural information processing systems* pp.345-352, 1995