

COS 511: Project Proposal

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We are interested in applying the knowledge of machine learning to the domain of game theory. Many instances of game theoretic applications assume complete availability of information in the games, but this might not be always true [1]. Also, repeated application of a machine learning algorithm to the game might speed-up the achievement of the equilibrium [2]. Sponsored search hosts an online auction among the advertisers to bid for the advertisements that the latter wish to present to the customers. The achievement of the equilibrium state in this case is also an application of the machine learning algorithms to game theory and we expect to get better results since the complete domain knowledge in the game might not be available [3].

As a part of this project study, we plan to study these three papers - [2], [1], [3] - in detail (more related papers, if necessary) and attempt to improve upon the algorithms proposed. If our attempt is successful we plan to apply that algorithm to a real game and test the results and verify the validity of the algorithm compared to the state-of-the-art models.

References

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- [3] Di He, Wei Chen, Liwei Wang, and Tie-Yan Liu. A game-theoretic machine learning approach for revenue maximization in sponsored search. In *Proceedings of the Twenty-Third International Joint Conference on Artificial Intelligence*, IJCAI'13, pages 206–212. AAAI Press, 2013.