



THE UNIVERSITY OF
CHICAGO

DEPARTMENT OF STATISTICS

Master's Student Presentation

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“Oracle-Guided Reinforcement Learning for Partially Observed Environment”

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Abstract

In the complex and dynamic world of Reinforcement Learning (RL), acquiring comprehensive knowledge about the environment is challenging. This thesis explores the use of oracle-guided strategies to augment the learning process of RL agents, particularly in partially observed environments. An innovative training pipeline is proposed that leverages the guidance of an oracle agent to enhance the performance of two widely used RL algorithms: Proximal Policy Optimization (PPO) and Deep Deterministic Policy Gradient (DDPG). To validate the efficiency of the proposed method, a variety of cooperative and competitive scenarios are meticulously experimented with, delivering promising results. Furthermore, a proof sketch of global optimal convergence for the non-convex local agent in policy gradient methods is provided. This work hopes to explore the way of integrating global information from an oracle agent into the local learning process of RL algorithms and opens new avenues for efficient and robust policy optimization in partially observed environments.