大作业计划报告

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本次强化学习期末大作业我选择“选取一个具体研究方向，进行前沿工作综述调研报告”

题目

多智能体强化学习研究综述

研究计划

对多智能体强化学习相关知识进行研究学习，了解其发展背景、理论知识及相关算法、以及它的发展趋势、应用前景。

内容大纲

1. 简介：包括其背景、发展趋势、热点等进行简述
2. 理论知识：相关算法介绍
3. 目前遇到了哪些挑战
4. MARL的应用和前景

研究方法

对一些权威期刊、会议上的相关论文进行研读，并继续挖掘其参考文献。

初步结果

1. 初步了解多智能体强化学习是什么：多智能体强化学习是多智能体系统研究领域中的一个重要分支，它将强化学习技术、博弈论等应用到多智能体系统，使得多个智能体能在更高维且动态的真实场景中通过交互和决策完成更错综复杂的任务。
2. 与单智能体的区别：在现实问题中，单智能体的决策能力远远不够。使用一个中心化的智能体解决问题时，会遇到各种资源和条件的限制，导致单个智能体无法应对错综复杂的现实环境；而使用多个智能体相互协作可以解决很多问题
3. 相关算法分类
4. MARL的应用和前景：机器人系统、人机博弈和自动驾驶。

重要参考文献

下面列举目前搜集到的相关参考文献

理论文献

1. DU W, DING S F,et al. Summary of Multi-agent Reinforcement Learning[J]. Computer Science, 2019,46(08).(in Chinese)

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3. Pablo Hernandez-Leal, Bilal Kartal, and Matthew E. Taylor. Is multiagent deep reinforcement learning the answer or the question? A brief survey. // CoRR, abs/1810.05587, 2018.

4. LITTMAN M L. Markov games as a framework for multi-agent reinforcement learning[M]. New Brunswick: Machine Learning Proceedings, 1994:157-163.

应用领域

1. GU S,LILICRAP T,SUTSKEVER I,et al. Continuous deep q-learning with model-based acceleration[C] // International Conference on Machine Learning. New York City:ICML Press, 2016:2829-2838
2. FOERSTER J, ASSAEL I, DE FREITAS N, et al.Leearning to communicate with deep multi-agent reinforcement learning[C] // Advances in Neural Information Processing Systems, Spain:NIPS Press,2016:2137-2145
3. DUAN Y, CHEN X,HOUTHOOFT R, et al. Benchmarking deep reinforcement learning for continuous control[C] // International Conference on Machine Learning. New York City: ICML Press, 2016:1329-1338
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6. LEIBO J, ZAMBALDI V, LANCTOT M, et al. Multi-agent reinforcement learning in sequential social dilemmas [C] // Proceedings of the 16th Conference on Autonomous Agents and Multi-agent Systems. Singapore: AAMAS Press, 2017:464-473
7. JIN J, SONG C, LI H, et al.Real-Time Bidding with Multi-Agent reinforcement Learning in Display Advertising[J/OL]. https://arxiv.org/abs/1802.09756
8. PEROLAT J, LEIBO J Z, ZAMBALDI V, et al. A multi-aget reinforcement learning model of commmon-pool resource appropriation[C] // Advances in Netural Information Processing Systems. Los Angeles: NIPS Press, 2017: 3643-3652