Learning to Dispatch: A Reinforcement Learning Framework for Train Networks

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Abstract.

1 Introduction

2 Problem Background

2.1 Train Dispatch Problem

2.2 Deep Reinforcement Learning

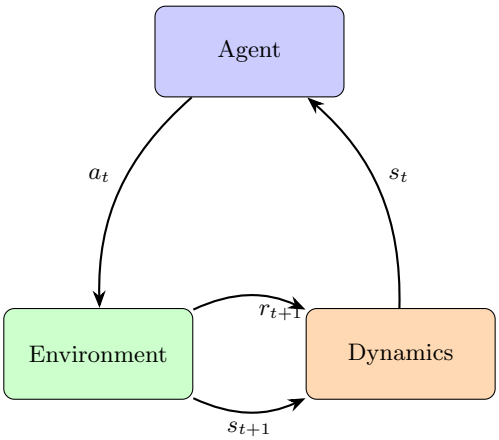

Fig. 1. The reinforcement learning framework.

Markov Decision Processes

Deep Q-Network

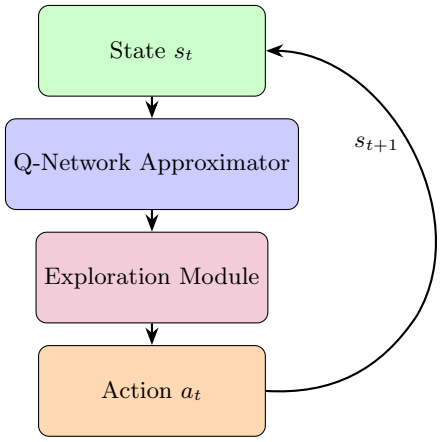

Fig. 2. The Deep Q-Network action selection and feedback loop.

2.3 Graph Neural Networks

3 Related Work

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4 Formulation

4.1 Train Operation Graphs

4.2 Resource Conflict Graphs

4.3 State Space

4.4 Action Space

5 Preliminary Agent Results

5.1 Deep Graph Q-Network Agent

5.2 Solutions

6 Conclusion and Future Work

6.1 Future Work

6.2 Conclusion

7 Appendix

References

1. F.-X. Devailly, D. Larocque, and L. Charlin, "Ig-rl: Inductive graph reinforcement learning for massive-scale traffic signal control," *IEEE Transactions on Intelligent*

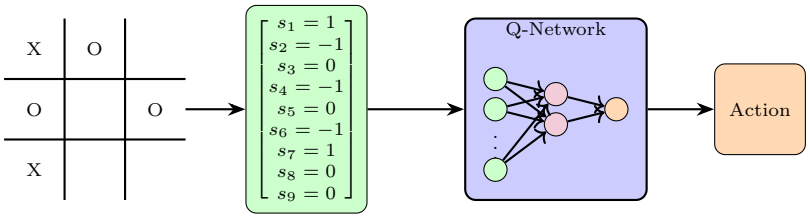

Fig. 3. Illustration of a Q-Network processing a Tic-Tac-Toe board state.

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