Neural AI: Reinforcement Learning

Deep Q-Learning

COMP 741/841 Week 8 - Spring 2024

Agenda

- Lab 4 feedback
- Reinforcement Learning
- Getting started on Lab 6

Lab 4 Feedback and Discussion

- Solution is entirely based on the Google OR CP-SAT implementation illustrated in the n-queens example
- Incremental development is more than multiple commits
  - Don't start incremental commits after completing the problem
  - This is incremental commits, not incremental development
- Docstrings should be descriptive
  - "solves the problem with constraint programming" is not descriptive

CP-SAT Resources

To learn more about see applying CP-SAT to implement optimization problem solutions, see:

- Champion, Antoine. 2020. When you can use constraint solvers instead of machine learning. Medium: Towards Data Science. https://medium.com/towards-data-science/where-you-should-drop-deep-learning-in-favor-of-constraint-solvers-eaab9f11ef45
- Labonne, Maxime. 2022. Introduction to Constraint Programming in Python. GitHub.io ML Blog https://mlabonne.github.io/blog/. https://mlabonne.github.io/blog/posts/2022-05-02-Constraint_Programming.html

Reinforcement Learning

See Reinforcement Learning Notes in Canvas.

Getting Started in Lab 6

See Lab 6 in Canvas

Lab 6 Resources

1. Ngo, Tracey. 2023. Can Machine Learning Solve a Maze? Science Buddies. https://www.sciencebuddies.org/science-fair-projects/project-ideas/ArtificialIntelligence_p008/artificial-intelligence/machine-learning-maze

2. Singh, Anubhav. 2024. Introduction to Reinforcement Learning. https://www.datacamp.com/tutorial/introduction-reinforcement-learning

3. Awan, Abid Ali. 2022. An Introduction to Q-Learning: A Tutorial For Beginners. https://www.datacamp.com/tutorial/introduction-q-learning-beginner-tutorial

4. Lamba, Akshay. 2018. An Introduction to Q-Learning: Reinforcement Learning. freeCodeCamp.org. https://www.freecodecamp.org/news/an-introduction-to-q-learning-reinforcement-learning-14ac0b4493cc/