

CAP 6629: Reinforcement Learning

Course project 2

Submission: Two files (one report in .pdf and one .ipynb/code).

Please follow the project report guidelines and submit the report with setup, results and analysis.

In project 1, you may realize that when you have a large grid world maze setup, it takes a long time for the agent to learn a value table. One way to eliminate this challenge is to use neural networks to approximate the value function. There are two options provided below and you may choose **either one** to implement.

- A. Based on your results in project 1, you can choose to build a neural network (or deep neural network) to approximate your obtained Q or V table.
- B. You can design another complex grid world example (bigger than 4×3) and develop the QNN (or deep QNN) method based on that.

Either way, you are using a neural network to generate your Q or V value so that you can guide the agent to move to achieve the goal.

Report requirements:

****Any AI-generated content is not allowed in the report and/or code.**

1. Maze Description: Design your own grid world example and describe it at the beginning of the report.
2. Problem Formulation: Define your states, actions, and rewards.
3. Q Network Design: Design and implement your Q network.
4. Pseudo Code: Provide the pseudo code in the report.
5. Results and Discussions: Show the convergence process of mean square error/objective function (and network weights).
6. Reference: cite all your reference here.