

CS-368 Reinforcement Learning
Handed on: December 2, 2024
Due Date: December 25, 2024 (11:59PM)
Assignment 3

Instructions:

- What to hand in: A full report answering all the questions. You can copy paste the screenshot of your codes. Make sure the code is readable. The code should be properly commented on explaining important details. Results/plots from the console wherever necessary should be shown (mandatory). A few lines to explain the screenshots.
 - You should hand in your assignment as below (follow the same naming convention and subdirectories)
 - firstname-lastname-assignment-3.zip
 - assignment-3-report.pdf
 - code-files
 - files.py
 - ...
 - ...
 - Remember Turnitin plagiarism detection software will be used. Therefore, don't put yourself in any trouble.
 - Assignment 3 is mapped on **CLO-3**.
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In this assignment, your task is to implement the value-based approximation RL algorithms in Python and test them using the open-source Python library “Gymnasium” which provides single agent reinforcement learning environments that include implementations of several famous and interesting environments.

- Discount factor, gamma, $\gamma = 0.85$
 - Exploration factor, epsilon, $\epsilon = 0.2$
 - Number of Episodes = 2500
 - Batch Size = 32
 - Replay Memory Size = 100,000
1. **(100 points)**. Solve the Lunar Lander problem given in the Gymnasium library using the Deep Q network algorithm. You must use deep neural network to find optimal Q values. Plot the returns for every 100 episodes, the MSE (network loss) and discuss the plots. Additionally, you can also plot the mean scores of episodes, and other plots to show the learning process and results.