Optimization and Reinforcement Learning

Final Project Instructions

Payment deadline : 6/25 23:59

Submission Items and Grading Criteria

1. **Code and Trained Model File (60%)**
   - Submit your complete training code and the final trained model.
   - We will run your model and score based on the best game performance.
2. **Written Report (40%)**
   - Your report should include: problem overview, environment setup, state/reward design, model architecture, training process, and result presentation(Best Record).

Topic

Please download the space shooter game code provided on Moodle. Your goal is to design a reinforcement learning (RL) system to **maximize the game score (up to 10,000 points)** through optimized gameplay.

Task Requirements

- You must build your own RL training environment.
- The **state** can be designed by you: use raw game images (single or stacked), or position and velocity vectors, etc.
- **Reward** design is also up to you, but the main training objective is to maximize the final game score at the end of each episode.
- **Do not modify** the game's built-in settings such as HP, damage, or scoring rules.

Violations will result in disqualification.

- During training, you may adjust the FPS or disable rendering to speed up training.
- For final evaluation, you must run the trained model with **visible gameplay at FPS = 60**.
- Grading is based on the best game score achieved by your trained model.