Course Project Instruction

January 30, 2024

1 Game Description

The night is dark and full of terrors. Two teams must fight off the darkness, collect resources, and advance through the ages. Daytime finds a desperate rush to gather and build the resources that can carry you through the impending night. Plan and expand carefully – any city that fails to produce enough light will be consumed by darkness.

Codebase: `https://github.com/glmcdona/LuxPythonEnvGym/tree/main`

Game rules: `https://www.lux-ai.org/specs-2021`

2 Installation Guide

1. Make sure you have Python version 3.7 or above.

2. Install Node.js version 12 or above: `https://nodejs.org/en/download/`

3. Clone the project github repo:

   `git clone https://github.com/glmcdona/LuxPythonEnvGym.git`

4. Navigate to the cloned folder and install required package:

   `python setup.py install`

3 Tasks

Non-competitive Design Sharing Presentation: 10%

Non-competitive Beating the Midterm Champion: 10%

Non-competitive Final Report: 30%

Competitive Midterm tournament: 15% (Rank 1) /10% (Rank 2-3) /5% (Rank 4-8)

Competitive Final tournament: 30% (Rank 1) /20% (Rank 2) /15% (Rank 3) /10%(Rank 4-8)

Competitive (Bonus) Least domain knowledge: 10%(1)

3.1 Design Sharing Presentation

Each team will spend 10 minutes in class to present **one** design choice d that you made. This include an **ablation study**: In the case of two player game, an ablation study can be done by competing your algorithm A with $A \backslash b$, and show the win rate of A, taking over n game, n being a number as large as you can afford to train.

3.2 Beating the Midterm Champion

The top team's solution at the Midterm tournament will be used as a baseline for everybody to beat. Notice that beating the top agent is much easier than rank high in the tournament.

3.3 Final Report

A comprehensive description of your algorithm, describe and justify each design choice with an **ablation study** when possible.

For example, if your algorithm consists of 4 modifications on top of the vanilla PPO baseline, e.g. $A = \text{PPO} + x + y + z + p$. Then, in the ablation study you should run 4 sets of experiments:

1. $\text{PPO} + x + y + z + p$ vs. $\text{PPO} + x + y + z$

2. $\text{PPO} + x + y + z + p$ vs. $\text{PPO} + x + y + p$

3. $\text{PPO} + x + y + z + p$ vs. $\text{PPO} + x + z + p$

4. $\text{PPO} + x + y + z + p$ vs. $\text{PPO} + y + z + p$

3.4 Tournaments

The tournaments will be run using the Elo rating system.

3.5 Acknowledgments

You are free to make use of any resource you find online (forum posts, codebases, papers, etc), but you must properly cite them in both your presentation and final report.