



COMP47590

Advanced Machine Learning

Assignment 2: Going the Distance

Introduction

The emergence of self-driving cars has brought what were previously ideas from science function into reality. For example, the A2RL series (www.a2rl.io) is a race series for a self-driving car platform.

In this assignment we will train a simple self-driving racing car OpenAI Gym Racing environment (<https://gym.openai.com/envs/CarRacing-v0/>). The player's job is to control a small racing car on a simple track.



Tasks

To complete this assignment download the template notebook and complete the tasks within it (highlighted as “#Add code here”).

Notes

The following notes may be useful:

- **Can I Use Scikit-Learn, PyTorch, Tensorflow, Stable-Baselines-3 And Other Python Packages?** Yes, and you absolutely should!
- **It's Taking Forever!** Reinforcement learning can take a long time. If you find things are taking too long feel free to train for shorter amounts of time (but ensure to reflect on this at the end). Submissions will not be penalised for this. Google Colab (<https://colab.research.google.com/>) might be a useful resource for accessing computation (you can also download saved models for local evaluation).
- **Can I Work In A Team?** Teams of up to three people are allowed (and recommended). All team members will receive the same mark. There is no penalty for submitting as a team, and no reward for submitting as an individual.

Submission

The key submission details for the assignment are as follows:

- **Submission date:** Friday 25th April, 2025 before 23:59.
- **Submission method:** Submissions should be made through the module Brightspace site.
- **Submission format:** Submissions should compose a zip file containing the following:
 - Completed jupyter notebook including all code and output.
 - .html export of Jupyter notebook after execution that contains all output
 - any other files required to execute your code (e.g. saved model files)
- **Late submissions:** Late submissions will be penalised at 5% penalty per day.

Marking

Marking of tasks will be based on the following weighting.

- Create & Explore 5%
- Single Image Agent 30%
- Image Stack Agent 40%
- Evaluation 10%
- Reflection 15%