AI Systems Implementation Project Briefing

Group U03

Project Managers: Mateusz Ajose and Amelie Gonzalez Capdepon.

Area of AI: Reinforcement learning of a physics-based simulation with Bipedal walker (BipedalWalker-v3)

Members: Amelie Gonzalez Capdepon, Bernard Mendoza, Conor Woollatt, Daniel Perry, Mateusz Ajose, Oliver Longley

Project goals:

* To train an AI agent on a simulated environment (<https://gymnasium.farama.org/environments/box2d/bipedal_walker/>)
* Be able to get the bipedal walker to walk forward for a continuous time without falling
* To get it to walk at a reasonable speed
* To be able to walk/run on any terrain

Requirements list:

* Farama Gymnasium within the Box2D environment
* Python and relevant libraries (Keras/AI system, NumPy, Matplotlib, Pandas, etc)
* A powerful enough computer to be able to train the program/access to Raptor

Feasibility analysis:

* Technical Feasibility:

1. Available resources and expertise:
2. The internet: tutorials, forums, python documentation, YouTube
3. Resources from the University, such as lectures and class materials
4. Managing shared code through a platform such as GitHub
5. Potential Technical challenges:
6. Powerful enough computation and time to train the AI
7. Finding a way to train the AI between multiple people
8. The model may learn an inefficient way of walking, so it doesn’t fall but does so at the cost of speed

* Operational Feasibility:

1. Impact on workflows and processes:
2. Pushing updates on the same time without proper communication
3. Using Trello to coordinate work
4. Risks and mitigation strategies:
5. Proper communication between the team before pushing updates
6. Compatibility issues

Project plan:

* Week 1 - Set up Gymnasium and BipedalWalker environment, install dependencies
* Week 2 - Get the skeleton of the program in a good state
* Week 3 - Generally code
* Week 4 - Optimise reward function and hyperparameters
* Week 5 - Introduce elements of randomisation and adjust parameters
* Week 6 - Finish the program/AI testing
* Week 7 - Visualise results, generate final report and presentation