

AI for Games: Individual Project

Submission Date: Wed 13th May 2020

Rubric

In this assessment you will develop an AI system for a game and write a report about its development. You must submit the assessment individually and the AI system and source code must be your own. However, you may choose coordinate with other students in so far as your AI Systems may be designed to complement each other when included within the same game. If this is the case, it must be made clear in your report what this collaboration was.

The following are examples to suggest the sort of AI systems that might be developed:

- An AI to control an agent or multiple agents in the game world
- An AI controlled player for the game
- A procedural content generation system to generate content for the game
- An AI director to manage gameplay
- A combination of multiple such systems

The development of the game beyond its AI is not included within the assessment. In principle you may use a pre-existing game, develop your own, or collaborate with others in the development of one. However, before committing to a game you must check with the module leader that your intended game is suitable.

You will submit a git repository containing the following things.

- A report describing your AI system and its development.
- A playable version of the game including your AI system
- Source code for the AI system developed along with all configuration files and documentation required to build it.

This assessment is worth 100% of the overall mark for the module.

Deliverables:

The following three items are the deliverables for this assessment:

1. An Assessment Report of up to 30 pages of A4
2. Source code, configuration files, and build documentation
3. A playable build of the game that includes your AI system

Assessment Report

This assessment is largely judged on the basis of a report on the AI that was developed, with other deliverables supporting and providing context for this report. The maximum length for this report is 30 pages, including screenshots, graphs, class diagrams, etc.

The report that you deliver will contain the following:

- An introduction, which gives an overview of a game and the AI system which was created for this game.
- An implementation report that outlines how said AI system was built.
- A discussion of the approach that was taken, including a judgement regarding the success of the approach taken, a discussion of its limitations, and suggestions for alternative approaches.

Playable build

An executable file, or a URL to a playable build of the game containing the your AI system should be included with this assessment, in order to contextualize and evidence the issues discussed in the assessment report.

If the game is distributed as an executable file, this file must be included in the git repository for the project.

If the game is playable in-browser, this may be hosted on a personal web-page, for example using GitHub pages, or on a game portal, such as itch.io. A URL to this must be supplied in the git repository for the project.

This game must be able to run on the computers in CD/102, if necessary using a browser specified in the your README.md file. If this is not the case, marks may be deducted from the project.

If there are legitimate reasons for which the above cannot be provided (e.g. the use of a commercial game), you must arrange with the module leader a suitable alternative for assessment.

Source Code

The complete uncompiled source code of the AI System should be included in the git repository in order to contextualize and evidence the content discussed in the assessment report.

This should include any configuration files and documentation necessary to build the project. Specifically expected are:

- A README.md file in the root of the repository giving instructions on how to build your code, as well as any instructions required for configuring or running the built game to demonstrate your AI system. If the game is playable at a URL, this URL should be included here.
- A LICENSE.md file in the root of the repository giving a license or copyright statement for your code.

If this is not included in the assessment submission, marks may be deducted from the project.

Part 1: Assessment Report

The Group Assessment Report will consist of:

- Introduction (worth 20% of the total mark)
- Implementation Report (worth 40% of the total mark)
- Discussion (worth 40% of the total mark)

Part 1.1: Introduction

You will introduce both the game that you are targeting for AI development work and the AI that you have develop for this game.

You must describe:

- The game that you have designed an AI system for
- The intended behaviour of your AI System
- What artificial intelligence techniques you selected to use in order to build an AI system for this game
- Why you selected these specific techniques, in terms of both desired behaviour, feasibility of implementation within the time available, and the runtime requirements of the system

Marking Criteria:

- Clear explanation of the game that was selected (25%)
- Clear description of the intended behaviour of the AI system (25%)
- Clear explanation of the techniques selected for use in developing the AI system for this game (25%)
- Justifiable description of why these techniques were selected (25%)

Part 1.2: Implementation Report

You will describe the practicalities of the implementation work that you did in order to build an AI System for the game selected.

You must describe:

- The architecture of the AI system that you developed, the specific algorithms used, and the source code that implements this architecture, e.g. with reference to applicable classes and class diagrams
- The design decisions that you made during the development of the AI system that had a significant impact on the process of development or the final product, and a justification for why you made those decisions
- The technology that was used to implement this AI system, including a description of any software development frameworks or libraries that were used during development

Marking Criteria:

- Clear description of the AI system architecture using the terminology taught during the course (30%)
- Clear justification of major design decisions taken during the development of the AI system with reference to the desired behaviour, game experience, feasibility of implementation, and runtime requirements of the system (30%)
- Clear evidence of significant and complex artificial intelligence coding and development work (40%)

Part 1.3: Discussion

You will describe both how successful the implementation work described in the previous section was, and outline alternative approaches which may be more fruitful in solving the same problem, or other further work.

You must describe:

- The overall success of the approach in terms of the desired behaviour and the resulting game experience
- The overall success of the approach in terms of feasibility of implementation within the time available
- The overall success of the approach in terms of the runtime requirements of the system, such as memory usage and computing time.
- What the limitations of the approach that was taken were.
- Suggestions for alternative approaches for achieving the desired behaviour that are more feasible, less time-consuming, or require less resources at runtime.

Marking Criteria:

- Clear understanding how the selected techniques and the implementation effected the behaviour of the system and a judgment of how this impacts the game experience (50%)
- Clear understanding of how the approach taken influenced the feasibility of implementation and the runtime requirements of the system (25%)
- Clear understanding of alternative approaches that could be taken to solving the same problem and discussion of the pros and cons of these techniques (25%)

Part 2: Playable Build (Potential Mark Adjustment)

Your submission should include a playable game with your AI system included. This may be an executable file or a URL to a version playable in browser.

Any reasonable requirements for running and configuring the game should be described in the your README.md file.

This game is important in evidencing the work that was described in Part 1. If the game is not submitted – or cannot be run with reasonable effort – then your mark will be adjusted. It is your responsibility to ensure that the game can be run for assessment.

Part 3: Source Code (Potential Mark Adjustment)

You should submit the full source code for your AI along with all other source code, libraries and/or configuration files required to build the submitted playable build. This should be included in the Git repository that is submitted. Instructions for building the project should be included in the submitted Git repository.

This code is important in evidencing the work that was described in Part 1. If the source code is not submitted then your mark will be adjusted.