Project Evaluation Report

Artificial Intelligence for Games

Academy of Interactive Entertainment

Lewis Comstive, July 2021

# Project Overview

Use this section to give a high-level overview of your project and its development.

Briefly (in one or two sentences) describe what your project is.

Then address the following questions in report form (i.e., write well-formed paragraphs that have a logical flow, taking note to avoid spelling or grammatical errors).

* Did development adhere to your pre-planned timeline?
* What A.I. algorithms did you implement, or attempt to implement?
* What difficulties did you have in implementing these algorithms?  
  Possible difficulties worth mentioning might include:
  + Difficulty in understanding all details of the algorithm
  + Difficulty with programming / debugging
  + Performance issues, including memory management
  + Unexpected or incorrect agent behaviour
* If you did not experience difficulties implementing the A.I algorithms, then explain why you feel these algorithms were easy to implement

*Slime Survival™* is a simulation involving innocent slime creatures that are just trying to live in harmony, until *skeletons* start attacking and destroying their population!

Initial development of the application went well, which was then stretched out over many tedious hours. With the plan to implement behaviour trees as the “brain” of the NPCs, accompanied with A\* (AStar) for pathfinding around a grid-based map, I went full steam ahead and developed the pathfinding first – to stress test was a 1000x1000 unit grid that a single point could use A\* to navigate to any other point within a few frames.

Next on the list was implementing behaviour trees, which had very little information on implementation but rather *a lot* of higher-level concepts (predominantly Unreal Engine’s system…).  
Gamasutra came in clutch as per usual, with [Chris Simpson’s article](https://www.gamasutra.com/blogs/ChrisSimpson/20140717/221339/Behavior_trees_for_AI_How_they_work.php) it started making more sense and I was able to develop (*what I believe is*) a solid, flexible framework that used a map per tree as a contextual pool of information for each node (*akin to a blackboard, but per AI instead)*.

# Performance Analysis

Use this section to analyse the performance of your algorithm(s) or techniques.

Provide a brief description of the memory footprint of your agent class(es). Explain if this is efficient or could be improved upon.

Analyse you A.I algorithm and identify any performance bottlenecks or places for improvement. If possible, list the efficiency of your algorithms using Big O notation.

Possible topics for inclusion in this section are:

* Is it efficient for a lot of agents to use the same pathfinding algorithm?
* Should pathfinding be done every frame?
* How can you improve the performance of your pathfinding algorithm in the context of your game?
* Are all your algorithms efficient? Why/why not.
* How many agents could you have in your game before you start seeing performance issues, and have you tested this?

# Future Improvements

Did you get enough time to completely implement your A.I. as planned? What work did you not complete (and why)?

Can you see ways to improve your program/algorithms?

Were your algorithms good choices? Do you plan to use them in future projects (why/why not)?

There is no word limit for this report, but it is expected that you provide enough detail for 1 to 2 full pages.