Individual Capstone Assessment

Alex Turner

Going into this year’s senior design project, I knew that I wanted to try something new; something that would truly round out my experience at UC. My group decided to create a video game that has a retro-style roguelike feel. We aim to use generational machine learning to design enemies that learn to play against you better over time. It will also be a great opportunity to incorporate some thoughtful game and level design, which is something that none of us have done before. Overall, there is much room for learning and new experiences. I believe that our team will gain expertise in new directions and gain experience of working with a small team.

There is a breadth of information learned at UC that is relevant to this project. With all the project management that has been occurring these last few weeks, it feels like I’m back in ENED 1020, except with more knowledge and experience under my belt. STAT2037: Prob & Stats 1 will also be very helpful and integral to the use of machine learning. The knowledge gained from CS3003: Programming Languages will be very helpful for deciding what language we should use for this project. EECE3093C: Software Engineering will be crucial in addition to ENED for project management and planning. Most importantly, AI concepts learned from CS4033: AI Principles and Applications and algorithmic concepts learned from CS4071: Design and Analysis of Algorithms will be crucial for designing enemies that improve over time.

Honestly, there is not significant influence on this project from my co-op experience in terms of work. I spent all my time working at Northrop Grumman. I learned web development in Angular, automated testing orchestration using Python and Gitlab pipelines, and software development using C, but I do not see that playing a role in this project. However, there are non-technical skills that I learned that can be applied to this project. Communication is one of the skills that I strived to improve the most. It is important to communicate clearly and often to other members of the team when developing remotely, especially when help is needed. There are few things worse than spinning your wheels on a project when progress needs to be made. I also expect to use my presentation skills learned from my co-op experience in this project when speaking to our faculty advisor, presenting project ideas to my teammates, and when presenting the finished product.

As stated above, my primary motivation for this project was to try something new. However, doing a video game like this is especially exciting to me because I have played many of the games in the roguelike genre, including *The Binding of Isaac*, *Enter the Gungeon*, *Hades*, and *Risk of Rain 2*. Because I have played these games somewhat extensively, I know things that they have done well and poorly. I also know what concepts they have not included, so that we can more effectively create a unique game. The enemies in these games get harder over time by having larger health pools, dealing more damage, or having a greater range or speed of attacks. We intend to include these features, but using the generational machine learning will hopefully give users a more unique experience.

We expect this game to be composed of multiple pseudo-randomly generated maps. These maps will house different enemy types. From our preliminary meetings, we discussed the enemies having martial and ranged classes with a variety of speeds and shot patterns. But how do we want the enemies to improve over time? We could improve their pathing towards the player based on the player’s movement. We could also include item pickups that the enemies could learn to utilize in addition to the player. In the end, though, we will know that the project is done and that we have done a good job if the game is several rooms long, there are few (if any) bugs, and the enemies noticeably improve over time, hopefully such that the game is sufficiently difficult to complete.