Machine Learning for Crowd Dynamics: Unity ML-Agents Optimization Strategies

Dylan Santiago  
Computer Science Graduate Project/Thesis  
Project/Thesis Advisor: Dr. Reale  
SUNY Polytechnic Institute  
Spring 2024

# Overall Objective:

I want to accomplish building, training, and analyzing a machine learning model that is able to optimize entity movement when operating with a large number of additional entities moving to the same location i.e. Crowd Simulation Optimization. I want to utilize a well-known machine learning package that was made for the Unity Game engine, ml-agent. Hopefully I will be able to use these developed models in future games/projects that I create in the Unity engine.

# Requirements:

## Must-Haves

* Working crowd simulation model that optimizes movement of a large quantity of entities from one point to another.

## Should-Haves

* Video recordings showing the results of the model when trained with various machine learning algorithms.

## Like-To-Have

* Four complex environments to test model(s) on.
* Train model on built-in procedural walking animation model to test if animations change for a large number of entities side by side.