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CPSC 481

Assignment 3

Progress Report:

The bugs in the physics of the car collision has been fixed for the most part. Cars no longer go outside of

the walls, in addition this also improves the checkpoint detection. In terms of the artificial intelligence

that is going to be used for the program, it is being switched from the reinforcement learning algorithm to

a genetic algorithm. The algorithm that I will be using is NEAT or NeuroEvolution of Augmenting

Topologies. The algorithm like any other genetic algorithm, creates a generation consisting of multiple

agents and choosing the best performing network from that. To help me implement the module, I am

using neat-python which is a framework for the algorithm. Switching over to this algorithm will

save both time since it is slightly easier to implement than the Deep Q-Network which requires

saving the states and rewards associated with it.

Implementation of Genetic Algorithm:

The first step in creating a good algorithm is creating a good fitness function. My current approach is to

get the number of checkpoints a car has gone through and adding the inverse of the time elapsed. Using

this approach emphasizes the importance of getting through the track instead of just the time.

The generation sizes will be limited to 15 since the program runs on the CPU which has less resources

available than that of a GPU, which is typically used. The inputs put into the neural network will still

be the collision points and the car position and the goal is to find the best network that goes through the

track. This has been implemented into other games such as Flappy Bird, which produced great results

even with only a few generations. The use of the framework will make this process quick, so it will be

done by the due date.