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CPS 480

Final Project Write-Up

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Artificial Intelligence is one of the most interesting topics to discuss. It’s possible implications on our world are indescribable. I feel very passionate about the progression and future of AI. With that being said, we are a long way from a science fiction depiction of AI. For my final project I wanted to try to break into this area of development, trying to create models that learn without being given instructions on how to complete the task at hand.

I chose an open source game called Gravity Game as a problem space for my AI. It’s a very simple game, briefly you just have to get from one side of the map to the other by clicking somewhere on the screen. There are enemy planets on the map, which will kill you if touched. This appealed to me because I could see right away how I could encode a possible solution, i.e. the x and y coordinates to be clicked. I had a ton of fun developing this application to play the game. I created an Artificial Neural Network that takes in the x, y coordinates of the enemy planets and their gravitational force and outputs where to click on the screen to get to the other side. The weights and thresholds are trained with a Genetic Algorithm. This works to some degree the only problem I see with it is that it would be more efficient to play a one played mode and record all the loses and wins and train the net based off of that data. Which is what I ended up doing. This worked somewhat well although would have worked better if I had collected more human player data.

Other people have done Artificial Neural Networks that have a large number of weights and thresholds and the idea to train these values with a Genetic Algorithm is not a new concept. In fact it’s actually a pretty common beginner project, as there have been many advances in Machine Learning Algorithms since the development of Artificial Neural Networks and Genetic Algorithms. My work here is not far off from a very basic approach to both of these concepts. My Artificial Neural Network is a 69 x 9 x 20 network, which follows a standard 3 layers, forward propagating network. My Genetic Algorithm is pretty standard also. I select partners with a weighted randomness with replacement. I crossover with a rate of 1 by splitting the chromosomes directly in the middle. I mutate one random allele with a rate of one. My approaches here are pretty standard. But I wanted to get an idea of how things worked beyond our other assignments and I believe mission was accomplished. All of these topics continue to be very interesting to me and I’m glad I got to learn about them.