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CS 370

7-3 Project Two

Instructor Tim

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Design Defense

There are multiple ways to solve a maze. One could trace along the walls or use a single hand to trace the path. One could start at the exit and work their way to the entrance or decide to only make left turn moves. All the noted ways to solve the maze are basically trial and error. The method of trial-and-error learning is based upon the fact that there are no two methods of learning that are the same. Oppong (2022) Though multiple attempts made to meet a situation in various ways until correct responses are found is tail and error. Our intelligent agent attempts to solve the problem of the maze through randomized paths and solutions. Comparing AI to human process, humans could use several ways to solve the problem, but with Ai a methodical approach is taken. Both the AI and human have an equal start and end point, but AI would run through strategic steps to solve the path finder puzzle. AI begins by collecting input data and analyzing start and target points. This process allows the agent to analyze multiple paths until the best solution is discovered to reach the target.

Working with AI we can see that exploitation and exploration are used similarly but are very different. Looking at exploitation, resources are very important, and fully use them can lead to many benefits. With exploration, as we are doing in this course, one can learn from studying through analyzing a subject or theme. Both exploration and exploitation are critical to the AI for functionality but a balance between both is required for the intelligent agent. Greater exploration would lead to a long-drawn-out process for finding a solution and with greater exploitation, the AI wouldn’t gain the necessary knowledge from exploration. Dawson (2024) Through reinforced learning, the best path can be determined by increasing the reward for the path of the shortest length. Through each state the AI moves through, the AI test all possible solutions and finds the shortest route, increasing the granted reward each time.

Utilizing neural networks to implement deep Q-learning for the project two pathfinder puzzle, importing the correct libraries was the first critical step. The next step was to build a learning environment for the neural network within python. Once the environment is set up a learning agent was developed with a reward system and an algorithm was utilized to train the intelligent agent. The final step was testing to ensure the agent followed the set of restrictions and rules with the environment.

Resources

Oppong, T. (2022, January 17). *The trial-and-error method: Learning how to learn is like learning how to paint*. Medium. https://medium.com/personal-growth/the-trial-and-error-method-learning-how-to-learn-is-like-learning-how-to-paint-d1abad18dfc9

Ross Dawson. (2024, June 22). *The exploitation-exploration dilemma’s fundamental role in intelligence and our lives*. https://rossdawson.com/exploitation-exploration-dilemma-intelligence-ai-lives/