Project Two Design Defense

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**Analyze the differences between human and machine approaches to solving problems**

Humans may approach the maze in several different ways. The first way is through Trial and Error. This is the most basic method and may take the longest (Loomis et al., 2007). The second is Landmark-based navigation. Humans use knowledge about the environment to help them locate the path needed to be taken. Humans also use shortcuts and Heuristics these use prior knowledge or assumptions to find paths that seems to be faster. Lastly, humans can also use maps or written instructions (Pirolli & Card, 1999).

My intelligent agent is choses a random direction first. It determines if this direction is valid. It then continues this same process until the maze has been completed. Lastly, it will repeat the process over and over until the best possible solution is found.

There are not many similarities between the two approaches. Humans use prior knowledge to base their next movements. On the other hand, AI uses random choices over and over. However, at some point humans will have to make random choices to decide if the next direction is a good one or not.

**Assess the purpose of the intelligent agent in pathfinding**

Exploitation uses known information or resources to make decisions based on what is already known to be effective (Sutton & Barto, 2018). Exploration involves trying new or unknown paths without the use of prior knowledge (Cohen & Axelrod, 2002). It is important to use both of these strategies equally. This is because Exploration begins the initial search, and exploitation will remember the steps that work. As the path is being found each new step is going to need exploration to take it while exploitation will remember it for the next trail.

In reinforcement learning the agent interacts with the environment by taking actions. After each of the actions, the agent receives feedback in the form of a reward or a penalty. For pathfinding, the agent might receive a positive reward when it moves closer to the treasure and a penalty if it moves away from the treasure or hits an obstacle (Sutton & Barto, 2018).

**Evaluate the use of algorithms to solve complex problems**

When implementing the deep Q-learning using a neural network required 4 steps. The first step was to import the necessary libraries needed to perform the operations. The second step that I did was create training environments along with the reward system that will be used. Next I initiated the learning agent as well as used enhanced algorithms for the learning. Lastly, the agent was tested. Using these steps helped my algorithm find the best possible way to navigate the maze and reach the treasure. This is done by maximizing the reward.

**References**

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