Andres Torres

CS 370

04/13/25

Project 2

* **Analyze the differences between human and machine approaches to solving problems.**
  + Describe the steps a human being would take to solve this maze.

Human minds approach problem-solving using a concept known as heuristics. Heuristics are strategies based on experience that are applied to the most obvious options. In decision-making, humans mainly rely on four elements: insight, concepts, goals, and identifying trends. These methods allow individuals to make swift decisions without having to analyze all the vast amounts of information.

* + Describe the steps your intelligent agent is taking to solve this pathfinding problem.

The intelligent agent in the Treasure Hunt game uses a simple method to take on the puzzle. It picks a random direction, making sure it’s a legitimate option within the outlined limits. The agent continues this method until the puzzle is completed. Afterward, it repeats the whole process until the best solution is found.

* + What are the similarities and differences between these two approaches?

The two methods have some similarities. People make choices based on past information, regardless of its relevance. Machines select actions randomly and continue to repeat them. Due to time and capacity constraints, humans cannot evaluate all possibilities, so they go for what seems most favorable at the time of decision-making.

* **Assess the purpose of the intelligent agent in pathfinding.**
  + What is the difference between exploitation and exploration? What is the ideal proportion of exploitation and exploration for this pathfinding problem? Explain your reasoning.

Exploitation is usually seen in a negative context but is interpreted here as fully utilizing available resources. Exploration seems less focused on resource use. Finding a balance between these two is important because they work well together. Exploration helps uncover new resources and exploitation decides how to use those resources after they are discovered.

* + How can reinforcement learning help to determine the path to the goal (the treasure) by the agent (the pirate)?

Reinforcement learning is used to find a path to a goal by configuring the environment such that the goal state is connected to a reward. Other states are tied to lesser rewards or penalties. The agent navigates the environment by performing actions and receiving feedback to find the best actions that will result in achieving the goal.

* **Evaluate the use of algorithms to solve complex problems.**
  + How did you implement deep Q-learning using neural networks for this game?

To implement deep Q-learning with a neural network in this game, I included crucial components needed. I started by importing the necessary libraries for processing. I continued by creating training environments and developed a reward system. I then made a learning agent and used algorithms for learning. I finally tested the agent in the environment.

**References**

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