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Design Defense

**Human vs. Machine Intelligence**

Human problem-solving depends on cognitive faculties such as intuition, creativity, and reasoning. When confronted with a maze, humans employ visual analysis to examine the arrangement, recognize possible routes, and simulate different strategies to attain the goal. Humans employ deductive reasoning, discernment of patterns, and experimentation to adjust their approaches to prior encounters and clues from their surroundings. On the other hand, machine intelligence utilizes computational methods and algorithms to address issues. In the context of maze navigation, machines employ a process of assessing the maze, evaluating the available possibilities, and adhering to pre-established rules and logical principles to make judgments. Although machines may lack creativity and intuition, they possess exceptional abilities in carrying out repeated jobs with accuracy and efficiency. The primary distinction resides in the cognitive approach: people demonstrate adaptability and sensitivity to context, whereas robots depend on pre-established rules and algorithms. When faced with the labyrinth problem, a complex maze with multiple paths and dead ends, people rely on intuition and adaptability to explore various pathways. In contrast, robots rely on pre-established algorithms to navigate the maze effectively.

**Purpose of Intelligent Agent**

An intelligent agent uses pathfinding to efficiently navigate complex environments like mazes and reach a treasure-symbolized, predefined destination. The agent intends to use computational techniques and algorithms. One is deep Q-learning, a reinforcement learning algorithm that aims to maximize the cumulative reward, make well-informed decisions, and acquire knowledge through environmental interactions. The intelligent agent's objective is to automate the process of identifying paths, thereby minimizing the requirement for human involvement and facilitating the exploration of extensive state spaces. The agent autonomously investigates various paths and identifies the most efficient routes, providing an automated solution to pathfinding difficulties with minimal human intervention. The maze problem necessitates that an intelligent agent act as a computerized navigator. It utilizes algorithms to determine the most optimal route from the starting point to the treasure.

**Evaluating Algorithms**

Algorithms are critical in addressing complex issues such as maze navigation because they provide a systematic framework for exploring possible solutions. Reinforcement learning techniques, like deep Q-learning, progressively enhance the agent's strategy for discovering paths by utilizing feedback from the environment. Assessing the efficacy, efficiency, and scalability of these algorithms entails examining their performance in solving pathfinding tasks with diverse labyrinth designs and levels of complexity. Although algorithms offer benefits such as automation and scalability, they also have limitations, such as the need for significant processing resources and data. Algorithms are generally highly effective tools for resolving intricate issues, although their efficacy depends on variables such as the problem's difficulty and the quality of the input data. When solving maze problems, evaluating algorithms is crucial for determining the most effective and dependable method of finding a path. This evaluation considers computational efficiency and the ability to adapt to various labyrinth designs.

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