Project two

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Design Defence

Starting off the steps that a human being would take to solve this maze is looking at the start and the finish line. Because in a simple maze there is usually only one path to take and you want to know your starting point and ending point. You would then view the whole maze and begin your line drawing stopping at every intersection and scouting ahead to see which is the right path. This is slightly different from how an AI approaches this situation. The AI does not get to scout really and has to randomly select an input. Either up , down , left , or right. This does not always get a good outcome the first couple iterations but after running it multiple times it will start to learn and pick up on the movements required to complete the task. Then the Agent prints the output of the optimal path to complete the maze. The way that humans approach this problem and the way that AI approach this problem are similar, but not exactly the same. They both need to choose an input path to go down, but the way each approaches this is different. Humans can use their eyes to scout ahead and choose which is the best path, the process for humans to go through the maze if it was a real life sized maze would actually be more similar to the AI if that was the case. The AI has to randomly choose an input and see if it will allow them to go that way. It does that for every input and eventually it finds its way to the end, running the bot multiple times will allow it to learn the maze better, solving it better and faster each time.

There are two different ways the AI can start to learn, exploration and exploitation. Exploration is basically the “correct” way to solve the maze. It is the way that we want the AI

to solve it, by listening to the rules and getting to an outcome. It looks for the correct fastest path to the exit, it might search the maze a bit in the beginning but ultimately its not going to need to go down every single path to find the exit in a maze this simple. Exploitation is another way the AI could learn to solve this problem but it is incorrect. It will follow all the rules given to it but it will find loopholes and glitches and other shenanigans. Basically solving the maze in a way that it was unintended to be solved by. It does this by searching the entire maze then eventually pinpointing a path to the exit even if it glitches or is not really following the rules. Reinforcement learning helps determine the best path to the goal because the best path can only be determined after lots of trials and experimenting with different options. Trial and error and multiple iterations are the best way to find the absolute best path to the goal. In this instance the goal is getting the pirate to the treasure.

The way I implemented deep Q learning using the neural networks on this game was by first importing the necessary libraries. Then building the environment and creating the agent with a reward system, this is the +1 for good input, -1 for a bad input. You design the AI to want to get the +1 as much as possible and it will learn . You then Test and Test and Test again until the AI learns to the point that you would like it to be at. Running this code and experimenting multiple times is the only way to learn. This is in real life too, you have to constantly keep at something until you get better and better at it. The main reason AI can help advance us is because they can learn faster than us humans can.