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CS 370

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Project Two Paper

Humans inherently gather data. After this data has been acquired, we then process it and make decisions based on the data we have processed. Just by walking down the street, humans will gather untold amounts of data. It could be the color of a specific car, the smell of fresh baked rolls emanating from a bakery, or loud music coming from a local record store, humans can use this information to make critical decisions. Luckily, this maze would come down to the specific human’s pathfinding abilities. Given enough time, humans would be able to utilize their unique ability to gather data and use it to solve the maze.

On the other hand, our intelligent agent has no sentience and will rely on our programming of it to have any chance of solving this maze. We can help it solve the maze by inputting data that will allow it to try and solve the maze. We could also give it a few different algorithms that it could utilize, like the shortest path or depth first search algorithms. By utilizing these methods above, our intelligent agent will have a much better chance at solving the maze, and we will be able to track its progress through the outputs it gives. Both humans and our intelligent agent are similar in the fact that they both require some form of input to solve problems and make decisions, however humans have the leg up on our agent, as they are autonomous.

Exploration means that our agent will siphon through the whole of the sampling unit and investigate the information within it. Exploitation is our agent pursuing those new areas found during the exploration of the sampling unit. It is important for there to be a balance between the two, because our agent will either pursue regions shallowly because there was not enough exploration, or never pursue newly found regions because there was not enough exploitation. We can also help our agent using reinforcement learning. This can be done by utilizing trial and error scans, which will allow our agent to understand more of the context of the structure in which it is contained, and because of this will utilize the model for its future actions.

Q-learning networks were an important part of this project. By using the Keras libraries along with Tensorflow, I was able to set the groundwork for the project. After a bit more tinkering and tons of trial and error, the environment was ready for training. The agent was then implemented, along with the most optimal strategy. After this, testing began and allowed for the results that were achieved.