Module 4: Critical Thinking

Informed Search Heuristics with SimpleAI

Nolan Byrnes

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Professor Bingdong Li

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The program I created allows the end user to create an 8-puzzle, and the program will solve the 8-puzzle provided using the A-Star search method. The A-star search algorithm is one that is Admissible, Complete, and Optimal. Unlike an uninformed search, the a-star algorithm selects the next best node using the heuristic function as a guide. The A-Star search algorithm is “complete, meaning that it finds a solution, and optimal, meaning that it finds the solution with the lowest path cost” (Mayefsky, et. al., 2004, para. 4).

The heuristic function of the A-star search algorithm tells the program which move would take us closer to the goal. The heuristic function that I used in my implementation was the Manhattan distance heuristic, which is ”the sum of absolute values of differences in the goal’s x and y coordinates and the current cell’s x and y coordinates respectively” (GeeksForGeeks, 2029, para. 11). My implementation of the A-star search algorithm is admissible because it is always optimistic in the heuristic. The Manhattan Distance heuristic that is used always underestimates the true distance that each of the pieces must move, since in order for them to move, they have to slide around in order to reach its destination (Mayefsky, et. al., 2004, para. 5). Some of the disadvantages of the A-Star search is that is memory intensive because it stores all the nodes to memory as it is traversing down the tree looking for the solution. It also relies on the heuristic function, and so if the heuristic function is not accurate, or poorly designed, it can significantly reduce the performance.

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**REFERENCES**

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