Assignment No 01: puzzle solve algorithm

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Abstract—**Heuristic is a function which is used in Informed Search, and it finds the most promising path. It takes the current state of the agent as its input and produces the estimation of how close agent is from the goal. The heuristic method, however, might not always give the best solution, but it guaranteed to find a good solution in reasonable time. Heuristic function estimates how close a state is to the goal. It is represented by h(n), and it calculates the cost of an optimal path between the pair of states. The value of the heuristic function is always positive.**

n

I. Introduction

We can solve Heuristic function by the eight puzzle problem.It is also known as the name of N puzzle problem or sliding puzzle problem.

N-puzzle that consists of N tiles (N+1 titles with an empty tile) where N can be 8, 15, 24 and so on. in these types of problems we have given a initial state or initial configuration (Start state) and a Goal state or Goal Configuration.It is played on a 3-by-3 grid with 8 square blocks labeled 1 through 8 and a blank square. Your goal is to rearrange the blocks so that they are in order. You are permitted to slide blocks horizontally or vertically into the blank square. The following shows a sequence of legal moves from an initial board position (left) to the goal position (right).

II. Variants Of Heuristic Function

1. Best First Search Algorithm(Greedy search)
2. A* Search Algorithm
Best First Search Algorithm(Greedy search) Greedy best-first search algorithm always selects the path which appears best at that moment. It is the combination of depth-first search and breadth-first search algorithms. It uses the heuristic function and search. Best-first search allows us to take the advantages of both algorithms. With the help of best-first search, at each step, we can choose the most promising node. In the best first search algorithm, we expand the node which is closest to the goal node and the closest cost is estimated by heuristic function.

A* Search Algorithm:

A* search is the most commonly known form of best-first search. It uses heuristic function h(n), and cost to reach the node n from the start state g(n). It has combined features of UCS and greedy best-first search, by which it solve the problem efficiently. A* search algorithm finds the shortest path through the search space using the heuristic function. This search algorithm expands less search tree and provides optimal result faster.

III. Rules of solving puzzle

Instead of moving the tiles in the empty space we can visualize moving the empty space in place of the tile. The empty space can only move in four directions (Movement of empty space)
1. Up
2. Down
3. Right or
4. Left
The empty space cannot move diagonally and can take only one step at a time.

IV. Conclusion

The heuristic function is a way to inform the search about the direction to a goal. It provides an informed way to guess which neighbor of a node will lead to a goal. There is nothing magical about a heuristic function. It must use only information that can be readily obtained about a node.

Acknowledgment

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