UCS1504 - Artificial Intelligence Lab

Department of CSE, SSN College of Engineering

4. Informed Search Strategies - Maze Application

Greedy Best First Search and A* Search

15.09.2022

Consider the following Maze (3 x 3) for Robot Navigation

(1, 1) A	(1, 2) B	
(2. 1) C	(2. 2) D	(2. 3) E
(3, 1) F	(3, 2) G	(3, 3) H

Initial state: (1, 1) – A, Goal state: (3, 3) – H

Assume that the location (1,3) is not used, since a pit is available in that location. There is a possibility that the Robot may fall into the pit during navigation.

For the given problem description do the following.

1. Find the heuristic distance (estimated) of each state using a Manhattan Distance (MD) function: Given (x1, y1) and (x2, y2) MD= |x1-x2| + |y1-y2|
2. Convert the Maze into its equivalent graph representation by considering the navigation in horizontal and vertical directions.
   Required edge cost (actual) are AB=9, AC=6, BD=5, CD=8, CF=5, DG=6, FG=7, DE=7, EH=4, GH=8
3. Compute and implement the level-by-level search using Greedy Best First Search and A* search from the given initial state to goal state. Compare and analyze the results of both search techniques.
4. Write your inference or learning about:
   Is the heuristic admissible?
   In all levels, is the computed f(n) follows monotonicity property or not?
5. **Optional**: Instead of Manhattan distance apply Euclidian distance function for solving.
   Note: Write the answer of each subdivision in observation.