

Assignment No 1: 8 puzzle solve

CSE-0408 Summer 2021

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Abstract—A heuristic function $h(n)$, takes a node n and returns a non-negative real number that is an estimate of the cost of the least-cost path from node n to a goal node. The function $M(n)$ is an admissible heuristic if $h(n)$ is always less than or equal to the actual cost of a lowest-cost path from node n to a goal.

Index Terms—About Heuristic Function, the 8-puzzle problem in Python.

n

Index Terms—The word mostly used in your report.

I. DEFINITION: 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. OBJECTIVE OF HEURISTICS FUNCTION: 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.

II. THE STUDY OF HEURISTICS IN HUMAN DECISION-MAKING WAS DEVELOPED IN THE 1970S AND THE 1980S BY THE PSYCHOLOGISTS AMOS TVCRSKY AND DANIEL KAHNEMAN ALTHOUGH THE CONCEPT HAD BEEN ORIGINALLY INTRODUCED BY THE NOBEL LAUREATE HERBERT A. SIMON. WHOSE ORIGINAL, PRIMARY OBJECT OF RESEARCH WAS PROBLEM SOLVING THAT I SHOWED.

III. HEURISTICS ARE METHODS FOR SOLVING PROBLEMS IN A QUICK WAY THAT DELIVERS A RESULT THAT IS SUFFICIENT ENOUGH TO BE USEFUL GIVEN TIME CONSTRAINTS. INVESTORS AND FINANCIAL PROFESSIONALS USE A HEURISTIC APPROACH TO SPEED UP ANALYSIS AND INVESTMENT DECISIONS. THE INITIAL STATE IS $[[8,1,2],[3,6,4],[0,7,5]]$ AND THE GOAL STATE IS $[[1,2,3],[8,0,4],[7,6,5]]$

IV. CONCLUSION AND FUTURE WORK

In future, what you bring in your project and the idea of your work.

ACKNOWLEDGMENT

I would like to thank my honourable **Khan Md. Hasib Sir** for his time, generosity and critical insights into this project.

V. CODE PICTURE

The screenshot displays a Jupyter Notebook with a Python script for a 2D grid search algorithm. The script is divided into several sections: a main loop, a cost function, node generation, and path finding.

```

# Jupyter Unfiled Last checkpoint 41 minutes ago (autosaved)

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

In [1]: from copy import deepcopy
        from collections import deque, defaultdict

        DIRECTIONS = [(0, 1), (0, -1), (1, 0), (-1, 0), (1, 1), (-1, -1), (1, -1), (-1, 1)]
        SW = [(1, 1), (1, -1), (-1, 1), (-1, -1)]

        # nodeid
        left_down_angle = "\u2193"
        right_down_angle = "\u2192"
        left_up_angle = "\u2197"
        left_up_angle = "\u2196"

        middle_junction = "\u2195"
        top_junction = "\u2191"
        bottom_junction = "\u2193"
        right_junction = "\u2192"
        left_junction = "\u2190"

        bar = "\u2500"
        style_RESET = Fore.CYAN + "\u2500" + Fore.RESET + style_RESET_ALL
        style_DOWN = "\u2500"

        first_line = style.RESET + Fore.CYAN + left_up_angle + dash + dash + dash + top_junction + dash + dash + dash + top_junction +
        middle_line = middle_line + style.RESET + Fore.CYAN + left_junction + dash + dash + dash + middle_junction + dash + dash + dash + middle_junction +
        last_line = style.RESET + Fore.CYAN + left_down_angle + dash + dash + dash + bottom_junction + dash + dash + dash + bottom_junction

        def print_path(path):
            print(first_line)
            for i in range(len(path)-1):

```

The output of the script shows the first few lines of the search process, including node coordinates and costs:

```

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