

Introduction to Artificial Intelligence

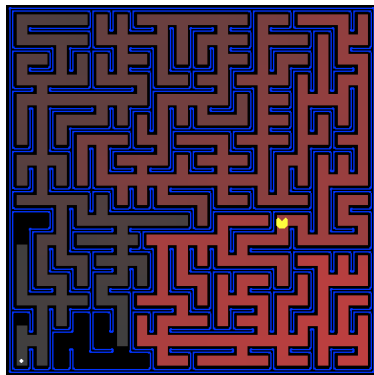
Project 1 – Search in PacMan

Jianmin Li

Department of Computer Science and Technology
Tsinghua University

Spring, 2018

Search in PacMan



- Berkeley PacMan Project

- ▶ <http://ai.berkeley.edu/search.html>
- ▶ <https://s3-us-west-2.amazonaws.com/cs188websitecontent/projects/release/search/v1/001/search.zip>

Berkeley PacMan Project

- Demo

- ▶ keyboardAgent

- ★ `python pacman.py -layout tinyMaze`

- ▶ trivial reflex agent

- ★ `python pacman.py -layout testMaze -pacman GoWestAgent`

- ★ `python pacman.py -layout tinyMaze -pacman GoWestAgent`

- ▶ searchAgent

- ★ `python pacman.py -l trickySearch -p AStarFoodSearchAgent`

- ★ `python pacman.py -l bigMaze -z .5 -p SearchAgent -a
fn=astar,heuristic=manhattanHeuristic`

Basic Tasks

● Finding a Fixed Food Dot

- ▶ Implement DFS algorithm in the `depthFirstSearch` function in `search.py` (2 points)
- ▶ Implement BFS algorithm in the `breadthFirstSearch` function in `search.py` (2 points)
- ▶ Implement the uniform-cost graph search algorithm in the `uniformCostSearch` function in `search.py` (2 points)
- ▶ Implement A^* graph search in the empty function `aStarSearch` in `search.py` (2 points)

Basic Tasks

- Finding All the Corners

- ▶ Implement the **CornersProblem** search problem in `searchAgents.py` (2 points)
- ▶ Implement a non-trivial, consistent heuristic for the **CornersProblem** in **`cornersHeuristic`** (2 points)

- Eating All The Dots

- ▶ Fill in **`foodHeuristic`** in `searchAgents.py` with a consistent heuristic for the **FoodSearchProblem** (3 points)

Bonus

- Suboptimal Search

- ▶ Implement the function `findPathToClosestDot` in `searchAgents.py` (1 points)



Submission

- A 2-3 pages report (either Chinese or English)
 - ▶ Compare how these algorithms perform in Pac-Man environment, e.g. state numbers, time, etc
 - ▶ Discussion
- Zip the files as the following structure
 - ▶ student_id.zip (e.g. 20090112xx.zip)
 - ★ student_id.pdf
 - ★ search.py
 - ★ searchAgents.py

Grading

- Due
 - ▶ 2018/4/10 23:59:59
- Correctness of algorithms (80%)
 - ▶ Different layouts
 - ▶ Check whether your search algorithm returns the right action sequence
- Report (20%)
- Policy
 - ▶ Either in Chinese or English
 - ▶ Discussion is encouraged , but must be written up individually
 - ▶ Do not copy/lend solution from/to others