

CS-171 Wumpus World Final AI Report

Team name chicken dinner

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I. In about 1/2 page of text, describe what you did to make your Final AI agent “smart.”

Our AI can be abstract to three functions, information gathering, reasoning, and action.

In the first part, the agent is able to perceive the information, and then deduce the safe grid on the map. The inference is simple, based on the rule of the Wumpus game. For example, if a undiscovered grid is adjacent to a stench or breeze grid, we can imply this grid is risky, the agent will memorize this property, thus we will not explore such grid until we can affirm it's safety. Other than that, a grid can be classified as safe if the grid is only adjacent to stench grid and Wumpus been killed in the game. After information gathering and reasoning, our AI will have a list of safe grids to explore.

The action part is crucial. To guarantee each step that the AI take is optimal, I define a variable named cost. The cost is determined by the distance between current grid to the target grid, and the direction that agent is facing. Every time, our agent will chose the next lowest cost safe grid as target. Then I will utilize a search algorithm to find the lowest path from current grid to the target grid, this cost is determined similarly to the previous cost I mentioned before. The search algorithm is implemented as an uniformly cost search. These features guarantee, each step the agent take is safe and lowest cost according to the information that the agent memorized.

II. In about 1/4 page of text, describe problems you encountered and how you solved them.

The most of problem we met is how to implement the ideas that we had. I would describe the brainstorm process is both pleasing and interesting, though I realize the complexity of some ideas, the ideas might be trivial related to human mind, but hard to describe. During the implementing phase, mostly I am doing is constantly trying, when I stuck I just go to the bathroom and take a shower. We have stuck on implementing a search algorithm for a long time, but finally successfully implement a uniform cost search in our project, we read through a lot of documentations on the internet and source code to incorporate such algorithm. We also breaks the task to parts, so I and my partner can work simultaneous.

III. In about 1/4 page of text, provide suggestions for improving this project.

After our agent reached 200 points, I realized it is hard to promote the score without considering the possibility. Thus, I think the next improvement of our AI is to do some probability analysis based on the information we had. Sometimes we can not be 100% sure of the safeness of certain grid, but it might highly likely to be safe, thus the possibility will grant the agent more freedom of exploration and potentially improve the score. Also I think this project can be improved in following aspects. By adding more Wumpus in the world, and giving agent more arrows, agent will be forced to consider more carefully about shooting an arrow, thus developer will need to develop a smart method to shoot arrow instead of randomly trying.