CS-171 Wumpus World Final AI Report

Team name   Madamada

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

First of all, the agent must remember what he encountered in the current world, just like we do. So a record of perceptions in each room is stored inside the class for eliminating potential danger and also mark the safe spaces in order to choose the fastest path back to home. Once the agent perceives a breeze or a stench, he assumes there exist danger in the 4 adjacent rooms of current position, and uses his memory (record of past perceptions) to eliminate excluded dangers and mark any potential dangers. By predicting dangers including non-existing ones that cannot be excluded using current information, the agent can guarantee himself not stepping into dangers. And every time the agent steps into a new room, if no sense of danger is perceived, he marks the 4 adjacent rooms safe, clearing potential dangers previously predicted. The agent will shoot if a possible wumpus is predicted to be in the front, no matter there actually exists or potentially exists one. Because there is a chance that the agent will never exclude all potential wumpus and keep the unique real one. By just shooting, the agent either hears scream and excluded all potential wumpus in the world, or exclude one fake danger along the path. In order to find the shortest path to home once the gold is grabbed or the agent has spent 3.9 moves average on each visited room (which means the agent got stuck or had no new path to explore), I used Uniform-Cost Search on all visited rooms (which means safe). Since Uniform-Cost Search calculates the order of expansion using the actual cost from starting node, it is an optimal search algorithm, which guarantees that the agent will always go back to home using the shortest path. If no action should be applied except for move to another room, the agent will choose the first unvisited and safe room adjacent. If there is no such room, the agent will choose the adjacent and visited room that can be reached using the fewest cost (same direction).

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

When I was working on it in earlier time, I tried to start from different situations and consider what code or judgement should be written to cover this specific situation. But then I realized this is not the way human's intelligence is formed, or this is not what intelligence is about. I could never cover all situations using fixed code. So I started it over to form a more general logic just like how our brain works. If I perceive any sense of danger, I will assume that real dangers are around me, and use what I remember to exclude some danger in certain directions. I also don't think like, if I walked into a wall and perceive a bump, I will turn to what direction. Because the reason I walked to the direction of wall is I need to go to unexplored spaces. So if I cannot go to that direction, I'll simply choose a new way of unvisited spaces to go.

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

The process of uploading files to the server is impossible on my mac. The compatibility of the server and new OS on mac is hard to be fixed. So I had to use an app to manipulate ssh operations. If writing code is not about the server and the program can run locally, since the submission is also via canvas, the necessity of openlab may not be that important. And there is not a platform or space to discuss with other students about what algorithm is appropriate for a certain situation, which makes groups of 1 person hard to get valuable advices or hints. The lecture or discussion should also include some connections between lecture material and how it fits in the project, how these knowledges can help enhance or construct certain intelligent logic.
The guidelines of traversing and operating on the shell is not so informative and complete. Learning these instructions is somehow difficult and asking for help is not easy. Q&A part before each lecture is not a way so effective to help students. A separate time and place for discussing and answering questions will be helpful.