Assignment: Minesweeper Game Solver

September 7, 2023

1 Objective

In this assignment, you will implement a Minesweeper game solver using logic and knowledge-based agents. You will need to complete the provided Python code by filling in the gaps and implementing specific functions and logic.

2 Instructions

2.1 Part 1: Minesweeper Class

1. Implement the `won` method in the Minesweeper class. This method should return True if all mines have been flagged by the player, and False otherwise.

2.2 Part 2: Sentence Class

1. Complete the `known_mines` method in the Sentence class. This method should return a set of all cells in `self.cells` that are known to be mines based on the count. If the count of mines equals the number of cells, all cells in `self.cells` should be considered mines.

2. Implement the `known_safes` method in the Sentence class. This method should return a set of all cells in `self.cells` that are known to be safe based on the count. If the count of mines is zero, all cells in `self.cells` should be considered safe.

2.3 Part 3: MinesweeperAI Class

1. Implement the `mark_mine` method in the MinesweeperAI class. This method should mark a cell as a mine and update all knowledge accordingly.

2. Finish the `mark_safe` method in the MinesweeperAI class. This method should mark a cell as safe and update all knowledge accordingly.

3. Complete the `add_knowledge` method in the MinesweeperAI class. This method is called when the Minesweeper board provides information about a safe cell and its neighboring mine count. You should update the knowledge base based on this information and make additional inferences.

4. Implement the `make_safe_move` method in the MinesweeperAI class. This method should return a safe cell that hasn't been chosen yet.

5. Finish the `make_random_move` method in the MinesweeperAI class. This method should return a random move that hasn't been chosen and is not known to be a mine.

6. Implement the `mark_safe_or_mines` method in the MinesweeperAI class. This method should consult the appropriate knowledge to mark cells as safe or mines based on the current knowledge base.

7. Complete the `inference` method in the MinesweeperAI class. This method should compare sentences in the knowledge base and construct new sentences to make logical inferences.

3   Note

You may need to test your code with different Minesweeper boards to ensure its correctness and efficiency.

Detailed instructions about the logic of the game can be found at: Minesweeper Assignment Instructions