Team:

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Category:

Interactive game prototype

What type of project are you doing: interactive game prototype, interactive design tool, or non-interactive data analysis? If you want to do a project outside of these categories, talk to the TA or Instructor prior to your proposal.

Theme:

AI as Player / Adviser

What "AI as ..." theme are you expanding? You may create a new roles for AI in games if you like. If you are creating a new theme, describe the theme in a sentence or two.

Overview:

Create an AI for Minesweeper that can both play and advise a human player. The AI can be toggled between player and adviser. As well as using a selected algorithm or a set of algorithms. As a player the AI will try its best to solve the given puzzle. Its goal is not to solve it as fast as possible but to win more often than it loses. As an adviser the AI will assist the human player by suggesting the best possible move.

In a paragraph or two, what do you propose to do?

Novelty:

The ability to choose which algorithm(s) to use allows human players to gauge how well they’re playing. We will be using old algorithms and new algorithms, and the combination of algorithms will help the AI solve the puzzle to the best of its ability. The closest project we have discussed in class would be Constraint-based Level Generation. Given these constraints posed by the mechanics of Minesweeper, can we reach a state in which satisfies the constraints.

What's different about what you want to do than what's been done before? Your project must do more than simply re-implement some algorithm of the past in it's original context (e.g., you can't make a bot for Go using MCTS). You may, however, apply an old algorithm to a new problem of your own selection. What is the closest project or technology we have discussed in class, or, if you are attempting a new theme, briefly describe the traditional non-AI methods in that area.

Value:

People who have played or want to play Minesweeper with the intention of getting better at the game. Players will see what techniques are used in order to solve more complex situations.

If your project is successful, who might care? (There must be someone!) Describe who's job or experience might be changed by knowing about your project (players, level designers, data analysis, etc.) and how.

Technology:

Cheat Engine

- **Find game information in memory**
  - **Puzzle Dimensions**
  - **Tiles**
  - **Flags Available**
- **Execute Lua scripts**
  - **Save tiles to a file**
  - **Modify game memory**

[Insert Name] Library

- **Handle mouse events**
  - **Detecting mouse states / positions**
  - **Sending mouse stats / positions**

[Insert Name] Library

- **Handle display of information through GUI**

What significant external languages, libraries, engines, or datasets do you plan to use? Use external resources where appropriate to

extend your creative reach, but keep in mind the risk of having to learn someone else's system on short notice. Briefly mention your team's past experience with that external technology.

Breakdown:

If your project involves easily separable parts (user interface, back-end search algorithms, data visualization, etc.) which team member will do which part or will that part be developed together using a pair programming protocol?

General Information:

This is the version of [Minesweeper] we are currently using.

Algorithms:

Obvious Bomb Checker

- **Searches for numbered tiles and checks if number matches the number of neighboring unclicked tiles**

Neighbor Satisfied Checker

- **Searches for unclicked tiles and checks if neighboring tiles have been satisfied**

Probability Checker

- **Searches for unclicked tiles and adds up neighboring numbered tiles**
- **Create a new grid containing probabilities for each tile?**

Overlay Checker

- **Find the different configurations mines can be, overlay the results, and see which mines share a common spot**

Linear Algebra / Matrices

- **Math**

Approaches:

Create Minesweeper using a language of our choice and appropriate libraries.

- **Our AI / Driver will have direct access to the game**

Use the above version of Minesweeper.

- **Our AI / Driver can be written in a language of our choice**
    - **Preferably a language we are comfortable with**
    - **Has the ability to handle mouse events not only within its own window**

- **Interact with the game**
    - **Library that can handle mouse events**
    - **Lua + Assembly to modify game memory**

- **Retrieve game information**
    - **Cheat Engine to find tiles in memory**
    - **We will know where bombs are, but this information will be limited to the AI**

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9
9
B 1 E E E E E E E
1 1 E E E E E E E
E E E E E E E E E
1 2 2 2 1 1 E E E
W B B W ! 1 E E E
W B W W W 2 1 1 1
W W W W B W W B W
B W W W W W W W W
W W W B W W W B W
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TODO

Find a library that can handle mouse events

Suggestions