AI Lab Specification Document (Period 2)

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November 2024

Plan

Comparing the performance of two game prediction algorithms (Minimax and Markov Chain) to compete against a human-player in rock-paper-scissors.

Programming language used:

Python or C# (depending on which is easier to implement for this particular project)

Other programming languages I am decently proficient in:

C#, R, CSS, JavaScript

Algorithms and data structures being implemented

I plan to implement two separate decision making algorithms, Minimax and the Markov Chain. In regards to the first, my plan is to also use alpha-beta pruning to make my Minimax program more optimised.

What problem is being solved?

The problem I am solving is finding out whether or not there is a notable difference between the success rate of a computer-player implemented through the Markov chain to score points against a human-player, to that of one made with a well optimised Minimax algorithm.

What inputs does the program take, and how are these used?

The program asks the player to choose rock, paper or scissors for as many rounds as the individual chooses to play.

If all works out, the computer-player should start showcasing compentent predictions against a player all the way from round two.

Primary functionality

Both versions of the game will implement the same base rock-paper-scissors game, which I will program myself. The gameplay is quite simple, and it will most likely be visualised through an addon, such as the TKinter for python.

Extra notes

To start, both versions of the program choose a random choice and the algorithm kicks in for the second round.

I have not looked enough into the two algorithms to begin setting goals for the time and space complexities of them. I am aware that handling branches will need to be taken into account for optimisation.

Ideally, the game will include some very simple graphics, which I will draw myself. Just to make it more visually appealing (if I have the time!).

Lastly, the game could be packaged into an .exe file, which would make it more user friendly (this is only for later and my own entertainment).

References

Wikipedia for Minimax: *Minimax wiki*
Wikipedia for Markov Chain: *Markov Chain wiki*
Minimax research paper by Michael van Lent and David Mutchler: *"A pruning Algorithm for Imperfect Information Game"*
Brillian.org on Markov Chains: *Markov Chains explained*