

Project

Based on the game connect 4, how can you develop an MCTS tree search algorithm with the UCT rule for exploration/exploitation?

- ▶ Create the environment along with the terminal conditions. Reward is 1 for the winner, -1 for the loser and 0 for draw.
- ▶ The opponent is purely random at all times, the play of the opponent can be seen as part of the transition function (no need of the max/min algorithm).
- ▶ You play the green circles.

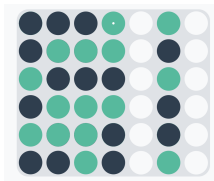


Figure: “connect 4” game, green to play.

- ▶ Bonus of 1 point if you investigate in an interesting way the case from an empty connect 4 game

Project

Your need to provide:

- ▶ A report (limit of 2 pages / approximately 1000 words)
 - ▶ a description of the main parts of your algorithm (4 points)
 - ▶ vizualisation of at least one game (with insight about some winning probabilities for the actions) (3 points)
 - ▶ provide meaningful information about the convergence process (3 points)
- ▶ You should provide the source code of your scripts (python). You are allowed to use existing code (not necessarily easier!) as long as you mention the source explicitly both in the code and in the report.
- ▶ Groups of 2
- ▶ Deadline: Dec 8 23:59.

Hints for the project

Here are the first things you need to do:

- ▶ A way to encode the state of the game.
- ▶ You need to “code” the conditions for a checking winning/losing position.
- ▶ Build a tree structure based on the parent-child relation between two objects.