

Battle Sheep AI

Group 1

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The background features a light cream color with abstract watercolor washes in shades of light blue and light green. Scattered throughout are small, dark blue dots of varying sizes. A thin, dark blue line curves across the right side of the image, ending in a series of three loops.

01

MCTS Structure

MCTS Structure



Tree Search

Best action
Tree policy



Tree Node

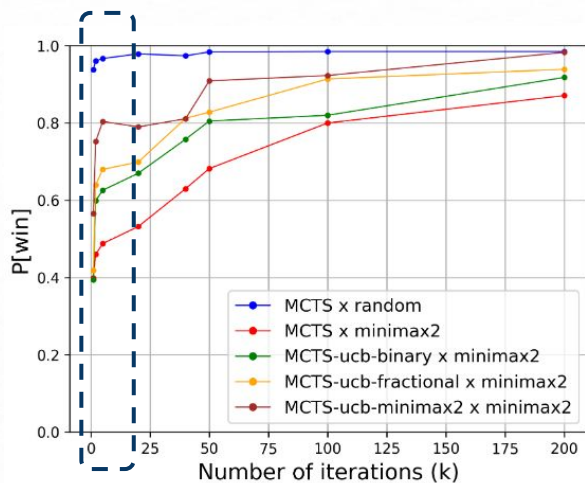
Best child
Child score



Node State

State information
Legal move

Strategie



The part we are interest

01

Exploration and exploitation

- Upper Confidence Bound

02

Increase number of simulations

- Fixed depth
- Get state information faster

UCB-Reward



One Turn

Simulate from current player
to player 4



Simulation Depth

Simulate **N** turns

Terminate State Score

Maximum depth / Game ended
Return every player score



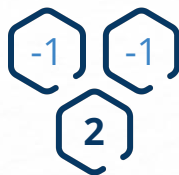
Reward Function

Argmax of every player score -
last place score





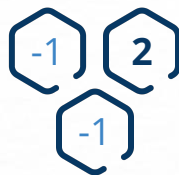
Board



Dir 1



Dir 2



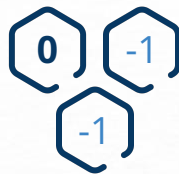
Dir 3



Dir 4



Dir 5



Dir 6

Direction Board

We can use those boards with binary operation to quickly get the information we need



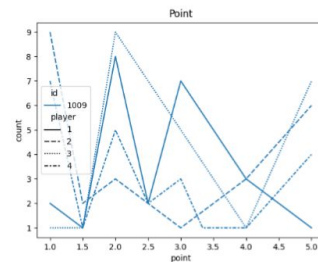
02

Experiments

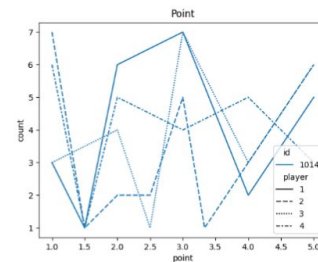
Agent Testing

Run total 96 games

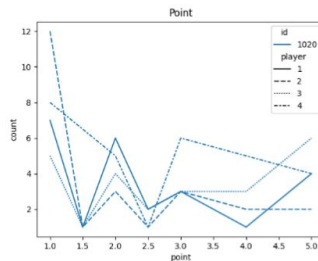
Finding best C_param and Depth



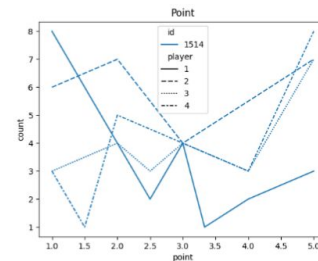
(a) Agent 1009



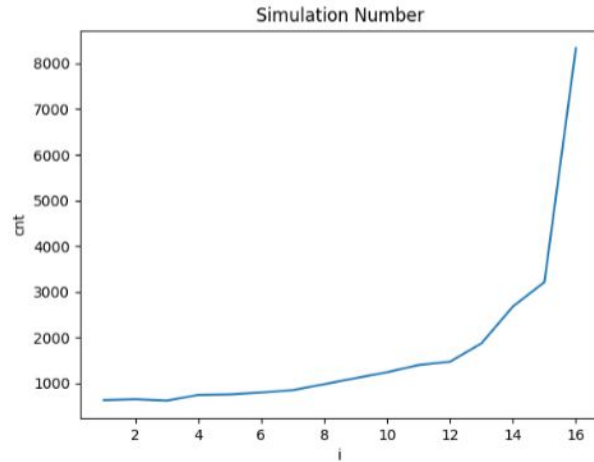
(b) Agent 1014



(c) Agent 1020



(d) Agent 1514



Simulation Number

Old version: About 100 in first turn
New version: About 700 in first turn

Agent Characteristic

Tend to connect area
Not aggressive

