

Adversarial Isolation game playing event

Introduction

Using alpha-beta pruning with opening book for the first 4 depth.

Questions

Describe your process for collecting statistics to build your opening book. How did you choose states to sample? And how did you perform rollouts to determine a winner?

10 random rollout was simulated for each state in the first 4 depth and each win is rewarded 1 point and a loss is rewarded -1 point The move with the highest score is chosen

What opening moves does your book suggest are most effective on an empty board for player 1 and what is player 2's best reply?

best and worst 5 moves was analyzed by running through each first move 100 times and recording number of wins using random choice.

The best opening moves are

-74

+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
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+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+

-94

-94

5 of 6

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Result

I used a random action agent as a baseline to compare against alpha-beta pruner and alpha-beta pruner with openbook. I have also included a q table open book only algorithm for comparison

algorithm	win % (1000 trials)	loss % (1000 trials)
random action	6.3	93.7
alpha beta pruner	42.8	57.2
openbook +abpruner	51.9	48.1
q table (openbook) only	27.5	72.5

We can conclude that openbook + alpha beta pruner is the best algorithm out of the tree.

Evaluation

Book can be made deeper and the scoring of openbook can be constructed with minimax random policy instead of outright guesses if resources and time are available. Furthermore, symmetry techniques can be used to reduce the search requirment and improve the odds while deeplearning techniques can be used if GPU is available.