CS3211 Project 2: OthelloX

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1 Research

1.1 A Comparative Study of Game Tree Searching Methods [1]

2 Introduction

2.1 Problem Description

Generating best moves given a board positions for the game of Othello / Reversi.

2.2 Terminologies

1. Depth: move taken by a player

2.3 Minimax algorithm

2.4 Evaluation functions

1. An Evaluation Function for Othello Based on Statistics
2. Evaluation Techniques Wikipedia
3. Temporal Difference (TD) based evaluation function for Othello
4. Multi-ProbCut and New Evaluation Function

1. Complexity
2. Limitations

3 Data Structures & Algorithms

3.1 Storage Techniques

3.2 Search algorithm

1. Best-First Minimax Search

2. Searching for Solutions in Games and Intelligence

3.3 Techniques to improve serialized components

3.4 Techniques to improve parallelization

1. Shared Hash Table
2. Distributed Alpha-Beta Search with Eldest Son Right
3. Lazy SMP
4. Parallel Alpha-Beta
5. Principal Variation Search
6. Dynamic Tree Splitting (DTS)
7. Parallel Mont-carlo tree search
8. Parallel General Game Player

4 Tabulation of data

4.1 Testing scalability of the algorithms

Scaling is measured using change in nodes per second (NPS). Speedup is measured using change in time to depth.

1. Depth of the search 2 - 8
2. Size of board 6x6, 8x10, ..., 26x26

5 Discussion

References

[1] ELNAGGAR, A. A., ABDEL, M., GADALLAH, M., AND EL-DEEB, H. A comparative study of game tree searching methods. *Int. J. Adv. Comput. Sci. Appl. 5*, 5 (2014), 68–77.