

CPCS331 – Artificial Intelligence – Spring2020 -Project I

[ Using Alpha Beta, MinMax and MCTS algorithms ]

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Part I: Proposal

1. Problem description

Dots and Boxes is a simple game for 2 players with a pencil and paper. The game problem starts with an empty grid of dots on paper. Each player takes turns adding a single vertical or horizontal line between two unjoined adjacent dots. When player completes the fourth side of a 1×1 box earns one point and takes another turn. The game ends when no more lines can be placed.

1. AI Methods to solve Dots and Boxes Game
2. Performance Measurement
3. Implementation Code
4. MCTS Algorithm Description

Monte Carlo Tree Search (MCTS) is a tree search technique in the field of Artificial Intelligence. It is an algorithm that combines the classic tree search implementations alongside machine learning principles of reinforcement learning.

In tree search, there’s always the possibility that the current best action is actually not the most optimal action. In such cases, MCTS algorithm becomes useful as it continues to evaluate other alternatives periodically during the learning phase by executing them, instead of the current perceived optimal strategy. This is known as the ” exploration-exploitation trade-off “.