CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

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Project Number

S1303

Project Title

The Effects of Alpha-Beta Pruning on the Playing Strength of a Chess Playing Algorithm

Abstract

Objectives/Goals

This project investigates improved computer algorithms to find good chess moves and limit the time spent examining poor moves, more specifically, an algorithm called alpha-beta pruning.

It was believed that alpha-beta pruning would improve the playing strength of the algorithm due to its ability to cut-off nodes that could be assumed to be bad. The algorithm would then be able to spend more time analyzing more important chess boards. Therefore, playing strength should improve.

Methods/Materials

An original chess playing algorithm (min-max search) was modified so that it pruned certain nodes from the game tree that could be assumed to be bad. Both of these algorithms were created in Visual Basic 6. After this modification was completed, the enhanced alpha-beta pruning algorithm and the original min-max algorithm were played against another chess playing algorithm on different levels of difficulty, and humans of varying playing strengths on an online chess site, FICS; all games were completed on the same computer.

Results

The algorithm with alpha-beta pruning was able to defeat multiple opponents that the original algorithm had lost to.

Conclusions/Discussion

It was concluded that the algorithm with alpha-beta pruning played significantly better than the original algorithm due to its ability to analyze boards to an extra depth. Future research should be done to determine the effects of other modifications on chess algorithms (such as an endgame database) on the playing strength of a chess playing algorithm.

Summary Statement

This project investigates improved computer algorithms to find good chess moves and limit the time spent examining poor moves.

Help Received