Game Tree Searching by

Min/Max Approximation

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*A humble summary by Miguel Ángel Martínez*

The idea

The paper introduces a new technique for searching in game trees, based on the idea of approximating the min and max operators with generalized mean-value operators.

This technique tries to solve the need of a method which will always expand the node that is expected to have the largest effect on the value.

The approach

The major reason why the generalized means are used is because they are more suitable for a *sensitive analysis* than the min or max functions.

The assumption

Most of the familiar games as one increases the search depth, the accuracy of the algorithm seems to improve. However, there are *pathological* games for which increasing the depth seems to yield less accuracy. This algorithm assumes that is used in non-pathological games.

The context

The paper also describes a well-known iterative search heuristic: *MiniMax*.

The solution

It is presented a penalty-based iterative search method which make uses of estimates as the values of the different sub-trees. Nonnegative *penalties* will help to distinguish edges representing bad and good moves. The algorithm will expand the node which has least penalty.

The results

The initial experimental results leads to the following conclusion:

* MiniMax Approximation approach can produce play superior to that produced by MiniMax Search with Alpha-Beta Pruning, for the same number of calls to the underlying *move* operator.
* When CPU time is the limiting resource, MiniMax Search with Alpha-Beta Pruning seems to play better.