Summary of Game Tree searching by min/max approximation

The paper focussed on an important aspect of minimax/alphabeta algorithm. On every level we recursively traverse possible moves in a left to right manner/round robin. Is it possible to somehow know which branches will give better results and then traverse them first?

Generalized mean:
It first explains the concept of generalized mean, which included raising to power 'p' of a number before summation and then to '1/p' on the whole sum. This method reduces to geometric mean for p = 0 and arithmetic mean for p = 1. Taking it further, it reduces to max function for p = +inf and min function for p = -inf.
This is a useful insight as this expands the problem domain to real values in the continuous domain.

Approach:
The approach mentioned in the paper involves calculating expected min and max values using generalized mean and the static evaluator functions(heuristics) to estimate min and max for respective nodes and propagating it further up to the root. The algorithm involves putting penalties on branches estimated through the generalized mean to traverse the branches deeper that are expected to give better results.

Results:
All the results were tested on a 2 player perfect game connect four. The research claims that the performance of this approach is better than regular dfs with alphabeta pruning with respect to the number of calls to the move operator. However it performs low when restrained against cpu time.