**Abstract**

We will be looking into the paper ‘An Analysis of Alpha-Beta pruning’ by D.E. Knuth and R.W. Moore and how it has had a lasting influence in the field of computing. This paper will investigate how An Analysis of alpha-beta pruning influenced the Monte-Carlo tree search, Deep Neural networks and IBM’s Deep Blue chess AI.

**Introduction**

The paper by D.E Knuth and R.W Moore[\crite{pruning}] investigates a technique called “alpha-beta pruning” that is generally used to speed up the tree search process which can be used to play games like chess. D.E Knuth and R.W Moore felt it was necessary to present a new expository account of the method as papers that came before such as “Experiments With a Multipurpose, Theorem-Proving Heuristic Program”[\cite{slagle}] are somewhat vague and did not expose deep cutoffs. In another article by Slagle and Dixon [\cite{slagleAndDixon}] it clearly indicates the possibility of deep cutsoffs but the paper had to resort to a rather complicated description to explain the alpha-beta technique, as it seems difficult to communicate verbally or in conventional mathematical language.

D.E. Knuth and R.W. Moore found that it was superior to express the alpha-beta method in an algorithmic language (or pseudocode) although to their knowledge at the time there where two papers published that expressed the alpha beta method in an algorithmic language. One of which “Elements of Combinatorial Computing”[\crite{wells [Section 3.3] }] wasn’t even the full alpha beta procedure, it was incapable of making deep cutoffs and the other by Dahl and Belsnes [\cite{dahl [Section 8.1]}] was presented using label parameters, making it hard to prove. Not only can Knuth and Moore’s paper be proven by induction it clearly demonstrates the branch-and-bound strategy (F1) and the alpha-beta strategy (F2) procedures [\crite{pruning}] which allows for deep cut-offs, using an algorithmic language.

**Lasting Influences**

An Analysis of Alpha-Beta Pruning by D.E. Knuth and R.W. Moore has had an influence in computing since it was published.

**Negascout**

Negascout is a tree search method developed from scout

**Parallel Search (SSS)**

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**Deep Blue**

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**Conclusion**

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**Refs**

[Slagle]

[SlagleAndDixon]

[pruning]

[Wells]

[dahl]