Research Review

"Deep Blue"<link>

     In this review I will be discussing the paper on written about Deep Blue at IBM. Deep Blue is a artificial intelligent chess playing game agent. This review will go into the specifications of how IBM's Deep Blue game chess agent working with probabilistic searching to figure out what board moves against a real live human Grandmaster chess player is needed to win a game of chess effectively and successfully.

     Deep Blue is a IBM's super chess computer that has won matches against professional players. In this paper two "Deep Blues" was discussed and compared. The original that had several deficiencies which lost the first match against a great chess player and the successor that was updated to beat the great chess player. This machine use a huge parallel system and Software to execute game tree searches. The actual hardware and chip specification are astounding in implementing the alpha-beta quiescence search highly non-uniform also a hardware/software (hybrid) search with parallel search. The chess chip generates moves and evaluate positions with search control keeping track of repeated moves. The software search looked for forced moves, forced expectations, fractional extensions, delayed extensions (isolated forced moves). A credit system was use so if the move appears to be good it would give more credit to that move and search deeper so bad moves would search less. Hardware search was considered fast and simple. The main parameters of the hardware search are the depth of the search and the depth of the offset searches, to detect specific conditions. The parallel search calculates the variations with processor hierarchy, control distribution and synchronization.

     Deep Blue had over 8000 features which could be static, at the beginning of the search, or dynamic, they could change during the search. The evaluation functions was created and tuned by hand. Deep Blue has a large opening book defining the first moves variations, a Grandmasters play database that assign bonus and penalties for moves played and an endgame database with positions with five or fewer pieces.
The time control had two limits, the first limit was the total time divided by the probable number of moves to play taken per move. This limit had a time buffer as reserve. The second limit was used as a panic button if the suggested move had a red flag. Sort of a quality control.

     In conclusion this paper was informative with hardware and chip specifications detailing Deep Blues journey to achieve the intelligence greater than a real human Grandmaster. Successful implementation of machine and code combined with game theory knowledge has made a perfect addition to family of artificial intelligent gaming agents. This paper was very enjoyable and informative especially to someone studying artificial intelligence or awesome gaming machines that win. I would recommend this paper to fellow colleagues to show an actual successful application of a winning artificially intelligent chess game agent. Now if they we need to make one for the one arm bandit that the house will not know about….