Deep Blue

Deep Blue is the chess machine that defeated then-reigning World Chess Champion Garry Kasparov in a six-game match in 1997 and stunned the world. It was a highly powerful and complex system developed by IBM with many years of research.

The first chess machine project called 'ChipTest' was started in the 1980s at CMU. It then led to 'Deep Thought' which was the first chess machine to beat a Grandmaster in tournament play. In 1989-90, a part of the 'Deep Thought' team moved to IBM research to continue their work towards building a world-class chess machine. This led to the creation of 'Deep Thought 2' which played and won a number of public tournaments too. Then came 'Deep Blue I' which lost to world chess champion Kasparov in 1996, but formed the base for 'Deep Blue II' which finally defeated Kasparov in 1997.

Deep blue system is a massively parallel system with 30 processors containing 16 chess chips each and communicating between each other using a high speed switch. It is capable of searching 100-200 million search positions per second and relies on many of the ideas developed in earlier chess programs including quiescence search, iterative deepening, transposition tables and NegaScout. Some of the important components of 'Deep Blue' system that made it perform better than its predecessors are -

- Complex Evaluation Function which recognizes a massive number of patterns and helps in determining the best move
- Hardware, Software & Parallel non-uniform search logic to optimally perform the searches
- Opening book & Extended book components that had insights about openings & End game databases
- Normal & panic time control logic etc.

So, the success of Deep Blue was not the result of any one factor. Substantial improvements in various components led to this amazing feat.

However, it is clear that there were many areas which could have been even better. The hardware search and evaluation could have been made more efficient and flexible with the addition of an external FPGA. Current research suggests that the addition of pruning mechanisms to Deep Blue might have significantly improved the search. Evaluation function tuning, both automatic and manual, was far from complete. However, it was a major milestone in the field of Artificial Intelligence' and continues to inspire us to pursue further research in this field.