Research Analysis

There have been numerous advancements that have impacted the field of artificial intelligence (AI) over the last millennia or so. It is important to note that the name '*artificial intelligence'* was first used in 1956 [1] where it was used in the '*Dartmouth Summer Research Project on Artificial Intelligence'*, a summer workshop which is now considered to be the seminal event for AI as a field. The three developments that I think are important for their impact in the field of AI and in particular in the field of AI search include the development of STRIPS (Stanford Research Institute Problem Solver), the development of planning graphs and finally IBMs Deep Blue defeating the then world chess champion, Gary Kasparov.

In 1971 Richard Fikes and Nils Nilsson developed STRIPS, a problem solver or automated planner which forms the basis of most of the current action languages. An action language is more commonly used to create formal models and in this case a formal language is a set of strings of symbols together with a set of rules that are specific to it. A STRIPS instance is composed of 3 characteristics, an initial state, a specification of the goal states and a set of actions which include preconditions. [2]

In 1977 Avrim Blum and Merrick Furst introduced a new algorithm that was based on planning graph analysis. The new planner was named Graph plan which planned in STRIPS-like domains. The basis of this approach was to explicitly construct a compact structure they called a '*planning graph'* instead of searching with standard planning methods [3]. The use of planning graphs allows a means of getting the shortest path to the solution.

In 1997 AI gained further mainstream exposure when Deep Blue beat the then world chess champion, Gary Kasparov. The impact of a computer beating a human being in a game of chess, often thought to be a highly intellectual distinctly 'human' ability sent the world into a media frenzy. The reasoning for Deep Blue's win was based on quiescence search, iterative deepening, the use of transposition tables which are predominantly used to speed up the search of the game tree and is essentially a form of memorization and NegaScout, a directional search algorithm for computing the minimax value that can be faster than alpha-beta pruning.

[1] Dartmouth workshop. (n.d), from https://en.wikipedia.org/wiki/Dartmouth_workshop

[2] STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving. (n.d.),from https://aigamedev.com/open/article/strips-theorem-proving-problem-solving/

[3] Fast planning through planning graph analysis. (1997). Retrieved from http://www.sciencedirect.com/science/article/pii/S0004370296000471

[4] Deep Blue. (n.d.). Retrieved from http://stanford.edu/~cpiech/cs221/apps/deepBlue.html