Research Review
AI Planning & Search: Historical Developments

1st Development: STRIPS (1971)

STRIPS (*Stanford Research Institute Problem Solver*) is an automated planner developed by Richard Fikes and Nils Nilsson in 1971 at SRI International [1]. A STRIPS instance consists of a world with fully known initial state, goal state which planner is trying to reach, and a set of actions for which there are pre-conditions and post-conditions, that can be represented using a Planning Domain Definition Language(PDDL). The task of the problem is to find a sequence of actions that transform the initial state into the goal state. Breadth first search (BFS) finds the most optimal solution to a STRIPS problem.

2nd Development: Graphplan (1997)

Graphplan is an algorithm for automated planning developed by Avrim Blum and Merrick Furst in 1995 [2]. Graphplan takes as input a planning problem expressed in STRIPS and produces, if one is possible, a sequence of operations for reaching a goal state. The idea is to create a novel Planning Graph instead of greedily searching to reduce the amount of search needed to find the solution from straightforward exploration of the state space graph. Like in BFS, the algorithm guarantees that the shortest plan will be found.

3rd Development: Heuristic Search Planner (HSP, 1998)

In artificial intelligence, the hierarchical task network, or HTN [3], is an approach to automated planning in which the dependency among actions can be given in the form of networks. It is based on the idea that many tasks in real life have a built-in hierarchical structure that help escape from exponential explosion. HSP networks are broken down into a set of tasks: primitive tasks (similar to actions in STRIPS), compound tasks composed of a set of simpler tasks, and goal tasks (similar to goals in STRIPS)

The above 3 are major advancements in the field of AI Planning and Search. STRIPS provided the foundations on which advances could be made, Planning Graph was a novel data structure, and finally HSP provided an automated approach to general planning problems.

Reference:
1. *Richard E. Fikes, Nils J. Nilsson (Winter 1971). "STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving" (PDF). Artificial Intelligence. 2 (3–4): 189–208. doi:10.1016/0004-3702(71)90010-5. PAPER*
2. A. Blum and M. Furst (1997). Fast planning through planning graph analysis. Artificial intelligence. 90:281-300 PAPER
3. Wikipedia;PAPER