Research Review
on historical developments in the field of AI planning and search

STRIPS, as the **first major planning system** ①, attempts to find a sequence of operators in a space of world models to transform a given initial world model into a model in which a given goal formula can be proven to be true②. **The language STRPS uses has achieved more influences** that the algorithms itself. The Action Description Language(ADL) designed later has made it possible for STRIPS to solve more complicated problems. As a total order planning algorithm, it tries a new action at a specific plan position, which needs to be in a total-order with respect to the plan's other actions. Later, partial-order planning was designed. It can detect conflicts and protect achieved conditions from interference. Partial-order planning then **dominated the next 20 years of research**①.

In 1996, UNPOP was developed to attract researchers' attention from partial-order planning to **state-space planning**. Bonet and Geffner's Heuristic Search Planner(HSP) was the **first to make state-space search practical for large planning problems** ① . Then, FF, the most successful state-space searcher to date, FASTDOWNWARD and LAMA has won a lot of competitions and proven that state-space search deserves more research on.

GRAPHPLAN, a **break-through** for field of planning, was **orders of magnitude faster** than the partial-order planners of that time①. It can not only be a good algorithm to find good plans itself, but also can **come up with good heuristic for other planners**. Also as a constraint-based approach, SATPLAN was also very well researched. According to Helmert's analyses, GRAPHPLAN and SATPLAN are best for NP-hard domains. But they have trouble in domains with many objects①.

Alongside the history of exploring planning algorithms, lots of approaches has been designed and tested. Researchers are dedicated to find a functional language to represent the problem domain, to design an efficient algorithm to plan and search, to come up with admissible heuristic functions to help search.

① *Artificial Intelligence: A Modern Approach* by Norvig and Russell
② *STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving.*