The field of AI planning and search concerns the realization of strategies or action sequences to accomplish a complex task such as navigating a robot through a terrain or scheduling airplane flights. This brief paper will discuss several major developments in the history of AI planning and search including the STRIPS planning system, the Action Description Language (ADL), the Planning Domain Definition Language (PDDL), and GRAPHPLAN.

The Stanford Research Institute Problem Solver (STRIPS) is an automated planning technique developed by Richard Fikes and Nils Nilsson in 1971. It is also the name used to refer to the formal language of the inputs to the planning system. STRIPS works by searching a space of "world models" (or states) in order to find a model where a particular goal is achieved [1]. A STRIPS instance is composed of an initial state, a set of goal states that the planner is trying to achieve, and a set of actions for which each have a list of preconditions and effects. The STRIPS system was used to control a robot named Shakey that became the first general purpose mobile robot to be able to reason about its own actions. The development of the STRIPS planning system and its execution through Shakey was one of the first major breakthroughs in AI planning and search and made a large impact on AI as a whole, providing the context and motivation for development of the A* search algorithm and the Hough transform used in image processing [2].

The Action Description Language (ADL) relaxed some of the restrictions found in STRIPS to make it possible to encode more realistic problems. [norvig] Some of these relaxed restrictions include the principle of an open world where everything not occurring in the conditions is unknown (rather than assumed to be false), and the allowance of negative literals and disjunctions. Following ADL, the Planning Domain Definition Language (PDDL) was developed with the hope to "encourage empirical evaluation of planner performance, and development of standard sets of problems all in comparable notations" [3]. PDDL has been used as the standard language for the International Planning Competition since 1998 and has continued to evolve over the years. [4] The original version of PDDL separated a planning problem into two parts: a domain description and a problem description. Some of its successors include PDDL+ and NDDL (New Domain Definition Language) which uses a state variable-value formalism [5].

In 1997 the GRAPHPLAN planner was introduced, taking an alternate approach to planning in STRIPS-like domains. GRAPHPLAN took a step back from the popular partial order planners of the day by removing the existance of variables, resulting in a propositional planner. One of the more innovative aspects of GRAPHPLAN was the idea of a Planning Graph. According to the authors, "a Planning Graph encodes the planning problem in such a way that many useful constraints inherent in the problem become explicitly available to reduce the amount of search needed. Furthermore, Planning Graphs can be constructed quickly: they have polynomial size and can be built in polynomial time." [6] In addition to its use in GRAPHPLAN, the Planning Graph can be used to provide useful heuristics that can be used in other search techniques such as A*.

While advancements in AI planning and search continue, there are still many improvements to be made. Many different approaches have shown promise, but most excell only within a certain family of problems. One of the main challenges in the research field is to discover planners that perform well with a wider range of problems. [7]

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