In the past decades we have witnessed several major development in the field of AI planning and search such as STRIPS (The Standford Research Institute Problem Solver) - the first major planing system, TWEAK - partial-order planing, heuristic search planer, GRAPHPLAN, BlackBox planer. This paper will describe three of these major developments and highlights the impact on the field of AI.

STRIPS

Developed by Richard Fikes and Nils Nilsson in 1971 STRIPS became the first major planing system. The main goal of STRIPS is to find a one goal that can be achieved in the "world models". The task of solver is to find some composition of operators that transforms initial world into the world that satisfies state goal. STRIPS solver mainly was used for robotics, that which required a huge state model, which could include robot position, boundaries, position of other objects [1]. Unlike other problem-solver STRIPS tries to deal with difficulties by separating them, thus it separates process of theorem proving and searching through a space of world models. In 1971 STRIPS was quite revolutionary planner it gave robots ability to analyze commands and break them down int plan of actions. Despite the revolutionary algorithm that was used in STRIPS, the representational language used by STRIPS planner had much bigger impact on field of AI, which is composed from states, goals and set of actions.

Hierarchical Task Network

The main idea of HTN is that many task in the world are already have a built-in hierarchical structure, for example, a computational task, an administrative task, or a military mission. HTN takes a problem as input and supply a series of steps that solve it. In terms of HTN series of steps is called a plan. What makes HTN is better than other planners is that it allows us to represent the problem as a high level task, and through it's planning process break it recursively in the smaller tasks [2]. One of the main benefits of HTN are a high degree of modularity and fast run time execution. Unlike other algorithms such as behavior trees, HTN can reason about the effects of possible actions, which allows HTN planners to be incredibly expressive in how they describe behavior. HTN has become a base for numerous planning system such as SIPE-2, O-Plan, UMCP, SHOP-2 [3], which allows us to impact a real world problems.

GraphPlan

GraphPlan is an algorithm that was introduced by Avrim Blum and Merrick Furst in 1995. It takes as input a planning problem expressed in STRIPS and produces a sequence of operation for reaching a goal state. The main difference of GraphPlan from other planning algorithms is that at first it contracts a compact structure which is called a Planning Graph and after that begins the search. Some of the benefits of Planning Graph are, firstly, it has polynomial size and can be built in polynomial time, secondly, it is not a state-space graph, which can be huge, but it is essentially a flow in the network flow sense. It is worth to mention that this algorithm uses ideas from total-order and partial-order planning, but differs significantly by presenting planning problem as a graph - a structure that can be easily be annotated, analyzed and played with, which can significantly improve efficiency.

To sum up, for the past decades we have witnessed many new algorithms and approaches such as STRIPS, Hierarchical Task Networks, and GraphPlan, which have helped us significantly improve performance, look at the problems from another side, and increase efficiency in the field of planing and problem solving.

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