Historical Developments in the field of AI Planning and Search

STRIPS (Stanford Research Institute Problem Solver)

In Artificial Intelligence, STRIPS is Developed by Richard E. Fikes and Nils J. Nilsson in 1971 as a problem solving program that attempts to "find a sequence of operators in a space of world models to transform a given initial world into a model in which a given goal formula can be proven to be true". It was developed as the planning component of the software for the Shakey robot project.

STRIPS was the first major planning system. The most influential element of STRIPS was its representation language. The language is the base for most languages expressing automated planning problems. Action Description Language (ADL) advanced the STRIPS language. A*search usually provides the fastest way for finding a goal state in a STRIPS planning Problem.

PDDL (Planning Domain Definition Language)

Developed by Drew McDermott and his colleagues in 1998. It is a direct descended from STRIPS and ADL. PDDL has become the standard planning domain and problem description language for the International Planning Competition since 1998. PDDL intention was to express the "physics" of a domain, that is, what predicates there are, what actions are possible, what the structure of compound actions is, and what the effects of actions are. The domain definition contains the domain predicates, operators or actions. The problem definition contains the objects present in the problem instance, the initial state description and the goal. PDDL current version 3.0, includes plan constraints and preferences[5]. Having one common language has enabled performance benchmarks and allowed for system and approach comparisons which has resulting in speed up progress in Planning Field.

Situation Calculus

First Introduced by John McCarthy in 1963. Situation calculus represents changing scenarios as a set of first-order logic formula. The main elements of consist of actions, fluents, and the stitutions. Actions form the domain, situations represent a history of actions, and fluents represent the truth value of the current situation[7].

Situation calculus is used for planning by asking for a situation in which a goal is true. Answer extraction is used to find a situation in which the goal is true. This situation can be interpreted as a sequence of actions for the agent to perform. Situation Calculus has its very own programming based on it, GOLOG. Wok in situation calculus has done a lot to define the formal semantics of planning and to open up new areas of investigation. But so far there have not been any practical large-scale planning programs based on logical deduction over the situation calculus. This is because the field has not yet developed effective heuristics for planning with situation calculus.

References

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