Research Review
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STRIPS (Stanford Research Institute Problem Solver)

STRIPS is a LISP program developed in the 1970's which tries to satisfy a goal condition by transforming the state of the world. The program was designed to solve problems faced by a robot such as re-arranging objects and navigating through rooms. The world model for the robot is defined by well-formed formulas (wffs). Operators are the foundation from which a solution is built. For example, a robot has the operator push(k, m, n) to push object k from m to n. STRIPS solves the 'framing problem' by separating the processes of theorem proving and searching through the space of the world. Searching the space of the world is accomplished via GPS-like strategy; applying operators which are relevant in order to reduce the difference between a world model and a goal. Theorem proving is accomplished with a search tree. The algorithm heuristically traverses nodes trying to find a solution to the world problem.

Action description language (ADL)

ADL is considered an advancement of STRIPS and was proposed by Edwin Pednault in 1987. ADL is a way to formulate and solve multi-agent, dynamic-world planning problems as classical planning problems. This is accomplished by adding a time parameter to the algorithm. Boundary conditions are introduced in order to determine the course of future events when actions need to be performed in sequential order. ADL combines both the notational methods from STRIPS and situational calculus. However, ADL is semantically different from STRIPS because ADL schemas define transformations on the states themselves. Whereas, STRIPS operators define transformations on the state descriptions. ADL uses the notion of chronicles, or, all that is true, was true, and will be true of the world, from the beginning of time to the end of time. "*Formulating Multi-agent, Dynamic-World Problems in the Classical Planning Framework*" exemplifies the notion of chronicles with a robot landing a spaceship on the moon. The robot can control the attitude and the thrust. Changing either of these parameters will instantiate a new chronicle or state transition. The previous history of the vehicle does not change, only the future.

Planning Domain Definition Language (PDDL)

PDDL was created in 1998 in order to develop a standard set of notations for planning problems. The intended use of PDDL is to define what predicates are, possible actions, the structure of compound actions and the effects of actions. PDDL differs from past planning problem implementations because no "advice" is baked into the notation. Therefore, the notation is expected to be extended depending on the use-case, making the language more flexible.

Works Cited:

Richard E. Fikes, Nils J. Nilsson. "STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving"

Edwin Pednault. "Formulating Multi-agent, Dynamic-World Problems in the Classical Planning Framework"

McDermott, Drew; Ghallab, Malik; Howe, Adele; Knoblock, Craig; Ram, Ashwin; Veloso, Manuela; Weld, Daniel; Wilkins, David (1998). “PDDL – The Planning Domain Definition Language”