

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

STRIPS - Stanford Research Institute Problem Solver

STRIPS or Stanford research institute problem solver developed by Richard Fikes and Nils Nelson at the Stanford Research Institute (SRI) was the first major planning system created for SRI's Shakey robot project. STRIPS was rooted in robotics, where the challenge was to build a system to control a robot that was capable of moving objects and navigating an environment with multiple rooms and to solve problems in real-time with the limited hardware available at the time. Its overall control structure was modeled on that of the GPS (General Problem Solver), a state space search system that used means-end analysis.

The representational language used by STRIPS is what is called the "classical" language. AI and planning research has progressed immensely over the years but STRIPS retains many advantages for high level robot AI that it is used in many games developed even today.

ADL – Action Description Language

Action Description Language (ADL) in artificial intelligence language is an automated and planning and scheduling system for robots and is considered an advancement of STRIPS where it relaxed some of the STRIPS restrictions to make it possible to encode more realistic problems. It is an example of an action language that was first proposed by Edwin Pednault in 1987. In terms of computational efficiency, ADL is located between STRIPS and situational calculus where any ADL problem can be translated to STRIPS. It is generally recognized that STRIPS is not suitable for modelling actions in many real-world applications and it is this inadequacy that was the motivation to develop the ADL language. Contrary to STRIPS, the principle of open world applies with ADL where everything not occurring is unknown instead of being assumed as false.

The ADL schema consists of an action name, a parameter list that is optional, and four groups of clauses namely Precond, Add, Delete and Update which are also optional. STRIPS only supports positive literals in the states whereas ADL can support both positive and negative literals.

PDDL – Problem domain description language

The Planning Domain Definition Language (PDDL) was first introduced by Drew McDermott and his colleagues in 1998 and is an attempt to standardize artificial intelligence (AI) planning languages. Having a standard language to describe planning problems would help achieve a more direct comparison of systems thereby allowing faster progress in the field. PDDL is intended to express the "physics" of a domain to predicate what actions are possible, what the structure of compound actions are and the result of these actions. PDDL supports STRIPS and ADL among other planners.

Reference and Citation material

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