AIND-Planning research review: STRIPS and PDDL

The most commonly used languages for representing planning problems, such as **STRIPS** and **PDDL** for Classical Planning, are based on state variables. Each possible state of the world is an assignment of values to the state variables, and actions determine how the values of the state variables change when that action is taken. Since a set of state variables induce a state space that has a size that is exponential in the set, planning, similarly to many other computational problems, suffers from the curse of dimensionality and the combinatorial explosion.

STRIPS is an automated planner developed by Richard Fikes and Nils Nilsson in 1971 at SRI International. Article [1] describes a problem solver, that attempts to find a sequence of operators in a space of world models to transform a given initial world model into a model in which a given goal formula can be proven to be true.

The paper [1] gives a number of ideas on how to improve basic version of STRIPS. Among of them are:

- add a mechanism to decide which node to work on next;
- support the synthesis of more complex procedures than those consisting of simple linear sequences of operators (iterations, etc.)[2];
- getting STRIPS to "learn" by having it define new operators for itself on the basis of previous problem solutions.

The Planning Domain Definition Language (**PDDL**) is an attempt to standardize Artificial Intelligence (AI) planning languages. It was first developed by Drew McDermott and his colleagues in 1998 (inspired by STRIPS and ADL among others).

The article [3] describes the syntax, and the semantics, of the Planning Domain Definition Language (PDDL). PDDL has a great impact on AI Planning and there are a series of its versions and extensions. The latest version of the language is PDDL3.1.

REFERENCES

1. Richard E. Fikes, Nils J. Nilsson (Winter 1971). "STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving"

2. Green, C. Application of theorem proving to problem solving. Proc. Int'l. Joint Conf. Artificial Intelligence, Washington, D.C. (May 1969).

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