Three historical developments in the field of AI planning – STRIPS, ADL and PDDL – are presented in this review.

1. STRIPS

STRIPS (Stanford Research Institute Problem Solver) is a classical planning language developed by Richard Fikes and Nils Nilsson in 1971. It was originally a name given to the automated planner in the robot, Shakey, created at the Stanford Research Institute (SRI). Later, the formal language used for the inputs to this planner adopted the same name. The STRIPS language has a format that consists of an initial state, a set of actions and a goal condition. An initial state in STRIPS is a conjunction of positive literals that represent true facts at a specific time and a goal is a conjunctions of ground literals describing the world state that the planner is trying to reach. Actions (also known as operators) in STRIPS have three components – action description, preconditions and effects. Here, an action is essentially what the agent returns to the environment. Also, preconditions describe the world state that must be met (i.e. all variables are TRUE) in order to perform the action and effects describe the world state after the action. (Fikes et al. 1971; Russell and Norvig 2009) Due to its way of representing planning problems, STRIPS became very popular in the AI field that it is now the base of most of the automated planning languages in use today.

2. ADL

In 1987, ADL (Action Description Language) was proposed by Edwin Pednault as an extension to the STRIPS language to represent more realistic problems. Unlike STRIPS, the effects of an operator in ADL are conditional. This is to address the limitation that, in STRIPS, operators cannot "model actions whose effects depend on the situations in which they are performed" (Pednault 1994). Therefore, ADL does not take the assumption that unmentioned literals are false, but rather adopts an open world assumption where everything not occurring in the condition is considered unknown. Moreover, ADL is more expressive than STRIPS – for example, it allows negative literals, quantified goal variables and conditional effects – all unsupported by STRIPS.

3. PDDL

PDDL (Planning Domain Definition Language) is a standardised form of planning language inspired by STRIPS, ADL and other representational planning languages. It was first developed in 1998 by Drew McDermott as the official language for the International Planning Competition (IPC) series. The use of this common language was instrumental in making the competition possible as it enabled direct comparisons of performance between planners.(Ghallab et al. 1998; Long et al. 2003) Since its proposal in 1998, PDDL has evolved and increased in expressive power. For example, in the 5th IPC competition, Derek Long and Alfonso Gerevini proposed PDLL3 (an extension to PDDL2.2). Here, PDDL3 incorporates the concepts of (i) strong constraints and goals and (ii) soft constraints and goals, where (i) must be satisfied for a plan to be valid, whereas the satisfaction of (ii) is not necessary.(Gerevini et al. 2009)

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