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The first major planning system was STRIPS (Standford Research Institute Problem Solver); it was a problem solver that used successive representation of the world as collections of first order predicate calculus formulas (Fikes). The solver started with an initial model and then applied sets of operators which would create a derived representation. At each step there is a check for goal completion and the process of applying operators continues until all the goals are satisfied. The set of operators that are applied at each step and that would lead to a state in which all the goals are achieved would be considered a solution to the problem.

STRIP was improving upon existing problem-solving system such as one developed by Green Cordell; As described by Fikes and Nilsson [1] the Green system was too dependent on "formal theorem-proving methods to search for the proper sequence of operators" which made the system inappropriate for solving non trivial problems. The new system would decouple the process of theorem proving from the one that search through the state of world allowing usage of different algorithms for each.

According to Norvig and Russel the main contribution of the STRIP system was the representation language rather than its algorithmic approach.

Building upon the expressiveness of the language introduced by STRIP, Pednault created the Action Description Language. The paper advanced by Pednault makes use of rigorous mathematics so it can achieve "generality of the technique and validity of the results that are obtained" [3]

The main innovation of ADL was the fact that it allows an operator effect to be conditional, "… it enables one to model actions that can affect the world in different ways depending on the circumstances" [3] . ADL schemas are composed from action names with an optional parameter list and four optional clauses that can be applied: Precond, Add, Delete and Update.

At the beginning of the 70s the predominant approach toward automated planning was liner planning, an approach which considered decomposing the problem into subplans and then streamlining the results together. This process had limitation in solving certain type of problems some of them trivial like Sussman anomaly. This lead to the apparition of partial order planning, a process which constructs partially ordered plans and delays the final ordering as much as possible. According to Norvig and Russel [2] the principles behind partial order planning were first formalized by TWEAK even though they appeared earlier in the works of Sacerdoti(NOAH) and Tate(INTER_PLAN). NOAH uses a non linear representation of plans; this applies only to the search space not to the final execution of plan.

References

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