

Research Review - Historical Developments In The Field Of AI Planning And Search

STRIPS

Planning in the field of AI, did develop from the theoretical aspects like state-space search, theorem proving, and control theory and the practical needs for robotics, scheduling and other domains.

STRIPS was the first major planning system. It was the planning component in the shakey robot project at SRI. The system used a theorem proving subroutine to determine the truth of preconditions for actions. Almost all new planning system are based on the STRIPS language. In 1986 the ADL (Action Description Language) relaxed some of the restrictions of STRIPS language and made it possible to solve more realistic problems.

Since 1998, PDDL has been used as the standard language for planning problems.

WARPLAN

In the 1970s problem decomposition was done by computing a subplan for each subgoal and then connecting these sub plans together, this approach was called linear planning. Unfortunately this approach was not complete because a complete planner need to allow interleaving of actions from different sub plans.

A solution for this problem was goal regression planning, were the steps in a totally ordered plan were reordered so to avoid conflicts between subgoals. The planner which implemented this approach was WARPLAN, it was implemented in a logical programming language called PROLOG.

AlphaGO

AlphaGO is a very new development. It uses Monte Carlo Tree Search. The problem in the game of GO has a huge search space. So they used a new approach of an heuristic function and strategy function.

They trained two neural networks, a value network for evaluating the current board (which player will win probably on the current board) and a strategy network which calculates a set of next moves. So for planning AlphaGo create a set a possible winning moves with the strategy network, and they are evaluated by the value network, based on the outcome the next move will be chosen. With this approach it was possible to beat the best human players.