Historical Developments: AI Planning and Search

AI Planning is a branch of Artificial Intelligence that concerns the realization of strategies or actions sequences by agents. The solutions to planning problems are complex and must be discovered and optimized in multidimensional space. The foundation for research in AI planning and Search was laid by investigations into state-space search, theorem proving, and control theory. In terms of major historical developments STRIPS (Stanford Research Institute Problem Solver) was the first major planning system and its architecture was based on General Problem Solver and this framework as been central to research in AI Planning.

The next generation of planning algorithms focussed on partial order planning, which was more efficient and faster than previous planning systems, however this method fell out of favour as better methods emerged. One of the systems that was better than partial order planning was GRAPHPLAN system which was many orders of magnitude faster than partial order planning existing at that time. Graphplan is a general-purpose planner for STRIPS-style domains, based on ideas used in graph algorithms. Given a problem statement, Graphplan explicitly constructs and annotates a compact structure called a Planning Graph, in which a plan is a kind of "flow" of truth-values through the graph.

However over the last decade algorithms for conditional and probabilistic planning has also gained a lot of traction. Over the last year a lot of state of the art research has been done by DeepMind, whereby they have claimed to have created imagination augmented agents trained in a reinforcement learning framework that extract information from the environment to make better decisions. Such a framework has the ability to solve challenging continuous control problems, and also learn elaborate planning strategies. Such models excel in dealing with imperfect environments and have the ability to adapt their planning strategy based on acquired knowledge and change in environment dynamics

References:

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