Udacity Artificial Intelligence Project3: Implement a Planning Search Research Review

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The development of AI Planning and search field is built upon three major mile stones: Invention of planning system, Partial order planning, and GRAPHLAN.

The very first planning system, STRIPS was a planning software component used in Shakey, the robot developed by Stanford Research Institute. Its action representation influenced almost all planning action languages like ADL and PDDL. ADL is designed to deal with more realistic problems by removing STRIPS's constraints. Then the system evolved to PDDL, which is computer-parseable standardized syntax.

Domain of the search and planning was tied to totally ordered action sequences until mid-70's. To solve totally ordered problem, it used linear planning. However, it had soon been discovered that it is incomplete. The complete planning solution should be capable of interleaving. In partial-order planning, the totally ordered plans are divided into subplans that has no conflicts from each other. After so many years of research, Chapman came up with a clear and complete planning solution, TWEAK.

Then there is a graph planning system. Blum and Furst's GRAPHPLAN system was faster than the partial-order planning. There are many different graph planning system such as IPP, SGP, and LPG the winner of 2002 AIPS planning competition. Planning graphs can be implemented with many ways.

There are still a lot of studies to find out the optimal planning and search techniques such as binary decision diagram. Partial-order and graph planning are widely used, but it still has a lot of drawbacks that could be improved.

[1] Russell, Stuart J., and Peter Norvig. *Artificial Intelligence: a Modern Approach*. 2nd ed., Prentice-Hall, 2010.

[2] Stanek, Mirek. "Historical Intro to AI Planning Languages – Machine Learnings." *Machine Learnings*, Machine Learnings, 26 Mar. 2017, machinelearnings.co/historical-intro-to-ai-planning-languages-92ce9321b538.