Research Review

1. **STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving** (http://ai.stanford.edu/~nilsson/OnlinePubs-Nils/PublishedPapers/strips.pdf)

STRIPS (Stanford Research Institute Problem Solver) was developed by two Stanford researchers named Richard E. Fikes and Nils J. Nilsson. This model is one of the most innovative approaches back then that "search a space of 'world models' to find one in which a given goal is achieved." The task of the model is to find a combination of operators to transform an initial world model into one that satisfies a given goal. The highlight of the STRIPS is that it has been adopted by many researchers in the artificial intelligence domain to support further studies, as shown in the following reviews.

2. **Fast Planning Through Planning Graph Analysis** (https://www.cs.cmu.edu/~avrim/Papers/graphplan.pdf)

Merrick L. Furst and Avrim L. Blum introduced a brand-new idea called the Planning Graph based on STRIPS in 1997. The highlight of using Planning graph is that instead of searching greedily, this approach explicitly encodes constraints in the planning graph so that the overall computing cost could be reduced. Planning Graph also have two distinguish features. First feature is that because Planning Graph is built on STIRPS, as long as a valid plan exists in STRIP formula, the plan exists in the Planning Graph as a subgraph. The second feature is that it requires specifying mutually exclusive relationships amongst different actions.

3. **Heuristic Search Planning** (https://bonetblai.github.io/reports/aips98-competition.pdf)

Heuristic Search Planning is also based on STRIPS. It is designed to address a common problem with heuristic search. As mentioned in our lecture, heuristic searching commonly is designed from a relaxed version of the problem. While it works most of the time, some problems can be NP-hard to compute. Heuristic Search Planning, however, addresses this issue by estimating the optimal value of the relaxed problem and directly extracting heuristics from the STRIPS encoding.

Summary

As we can see from the overview above, STRIPS lays a very crucial foundation and math work for the domain of AI planning. Both Planning Graph and Heuristic Search Planning are based on STRIPS ground work. Planning Graphs made it possible to reduce overhead cost of computing for planning significantly, and Heuristic Search Planning helped make it possible to address problems that are NP hard to compute.