Research Analysis – Gary Yang

Automated planning and scheduling is one of the key fields used in AI that is used to come up with a sequence of actions to achieve a goal. By analyzing the environment's state and with a goal in mind, we can use a set of actions to reach the goal.

STRIPS is an action language that was part of the first major planning system. STRIPS is composed of an initial state, goal state, and set of actions that includes preconditions and post-conditions. The precondition was used to show what the current state is currently in and post-conditions was used to show the after effects of an action being executed.

STRIPS planner also gave life to Shakey, the robot. It was essentially the first robot to be developed with AI. It allowed Shakey to analyze the goals and come up with a plan of actions. In *Shakey the robot*, Shakey was used to fetch a box from another room. The initial state was where there was three room, one where Shakey was in, one where the box was in, and an empty room. The rooms were joined by doors where, room 2 had a box, and room 1 was to the left of room 2 with a robot in it, and room 3 was south of room 2.

The article gives us the answer where what actions were used to achieve the goal from its initial state:

GOTHRU(D1,R1,R2)

PUSHTHRU(BOX1,D1,R2,R1).

Furthermore, PDDL(Planning Domain Description Languages) was developed as a standard for modelling planning problems, which was based on STRIPS. Based on the article, *Progress in AI Planning Research and Applications,* PDDL was one of the languages to emerge

and used to push planners towards solution of problems. Heuristic forward search planner as well emerged with its time efficient planning. There were others, such as Graphplan, that allow for the use of automation of heuristics. Most of the newer planning searches are base of heuristic search.

In conclusion, we can see that heuristic search planning has started to dominate the field of automated planning in AI. It's a technique that we can see has improved over time and has been the base of most of the modern search planners.

Citation:

- *Shakey the robot*, Technical note 323, http://www.cs.uml.edu/~holly/91.549/readings/629.pdf
- Russell, S, and P Norvig. *Artificial Intelligence: A Modern Approach*, Chapter 11: Planning
- Derek Long and Maria Fox, *Progress in AI Planning Research and Applications*, https://strathprints.strath.ac.uk/1850/1/strathprints001850.pdf