Udacity AI Nanodegree

AI Planning and Search

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Stanford Research Institute Problem Solver

STRIPS is a problem solver and language developed by Richard Fikes and Nils Nilsson in 1971 at SRI International. Like the Planning Domain Definition Language we used to solve the flight cargo scenarios, STRIPS problems are represented via an initial state, conditions, actions, and goals. The objective of the solver is to find a solution that achieves the goal state.

Graphplan

“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. This graph has the property that useful information for constraining search can quickly be propagated through the graph as it is being built. Graphplan then exploits this information in the search for a plan. Graphplan was created by Avrim Blum and Merrick Furst, with subsequent extensions and improvements made by many researchers at many different institutions around the world.” [https://www.cs.cmu.edu/~avrim/graphplan.html]

Simultaneous Localization and Mapping

Simultaneous localization and mapping is used to develop autonomous systems through use of prior information and sensors. The system’s sensors provides feature rich data that are compared against a reference set. Matches form the basis of further actuation of control to further progress towards the target location.

A group at the Yokohama National University developed a method to use only a laser range finder for localization. They performed “...path planning using the A* algorithm to determine the shortest path while avoiding obstacles and minimizing travel distance and rotation.”

[https://www.jstage.jst.go.jp/article/ieejjia/5/3/5_253/_article]

[https://doi.org/10.1541/ieejjia.5.253]