

AI Planning and Search

A humble historical summary by Miguel Ángel Martínez

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Uninformed search algorithms

Uninformed search algorithms were a hot topic in classical computer science. Dynamic programming, in the sense of recording a sub-problem solutions and systematically increasing its lengths, can be seen as a kind of breadth-first search on graphs. Dijkstra's solution to the two-point shortest-path problem can be considered as the base of the uniform-cost search.

Chess is one of many classical games that have profited of the using iterative deepening algorithms.

Heuristic search algorithms

Simon and Newell (1958) introduced the idea of using heuristic information in problem solving. Distance to goal and cost calculation came a bit later with Newell and Ernst, 1965.

In 1968, Hart, Nilsson and Raphael presented the A* algorithm, which incorporated the current path cost into the heuristic search.

TensorFlow™

TensorFlow™ is one of the most interesting and recent contribution in AI.

It is an open source software library for numerical computation using data flow graphs. Nodes in the graph represent mathematical operations, while the graph edges represent the multidimensional data arrays (tensors) communicated between them. It was originally developed by researchers and engineers working on the Google Brain Team within Google's Machine Intelligence research organization for the purposes of conducting machine learning and deep neural networks research, but the system is general enough to be applicable in a wide variety of other domains as well.

I would define it as the key piece which has democratize AI, moving it closer to students, researchers and industry.

Planning and search new approaches are arising around this technology. Please find below an interesting example of its uses:

Scalable Planning with Tensorflow for Hybrid Nonlinear Domains

<https://arxiv.org/abs/1704.07511>