Machine, Data and Learning (CS7.301)

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Solving Problems by Searching

Informed Search Algorithms (contd.)

We can use as an admissible heuristic for a problem the cost of a solution to the relaxed problem.

Another class of informed search algorithms are local search algorithms. These are used for problems that require us to find a configuration satisfying some constraints, like the n-queens problem. The path to the goal is irrelevant in these cases.

Hill-climbing search is a strategy that continually finds a local maximum, and uses this to reach the peak. However, this has the disadvantage that it might get stuck in a local maximum.

Simulated annealing search is a way to escape the local maxima. It allows some undesirable moves, but it gradually decreases their frequency. If the "temperature" T decreases slowly enough, then simulated annealing will find a global optimum with probability approaching 1.

Local beam search is another such algorithm. It keeps track of k states rather than just one, and picks the k best states out of all the successors of these k states.

Genetic algorithms are another class of search algorithms. They form successor states by combining two parent states, starting with k randomly generated states. There is a fitness function that lets us evaluate the states.
We can also incorporate random mutations.