

Local Search Algorithms



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Local Beam Search 局部束搜索

- Keeping just one node in memory might seem to be an extreme reaction to the problem of memory limitations.

在内存中仅保存一个节点似乎是对内存限制问题的极端反应。

- Local beam search keeps track of k states rather than just 1.

而局部束搜索保持 k 个状态而不仅仅为1。

- It begins with k randomly generated states.
- At each step, all the successors of all k states are generated.
- **If** any one is a goal, the algorithm halts, **else** it selects the k best successors from the complete list, and repeats.

In a local beam search, useful information can be passed among the parallel search threads.

在局部束搜索中，有用的信息能够在并行搜索线程间传递。

Example: Travelling Salesperson Problem (TSP) 旅行推销员问题

Keeps track of k states rather than just 1. Start with k randomly generated states. $k=2$ in this example.

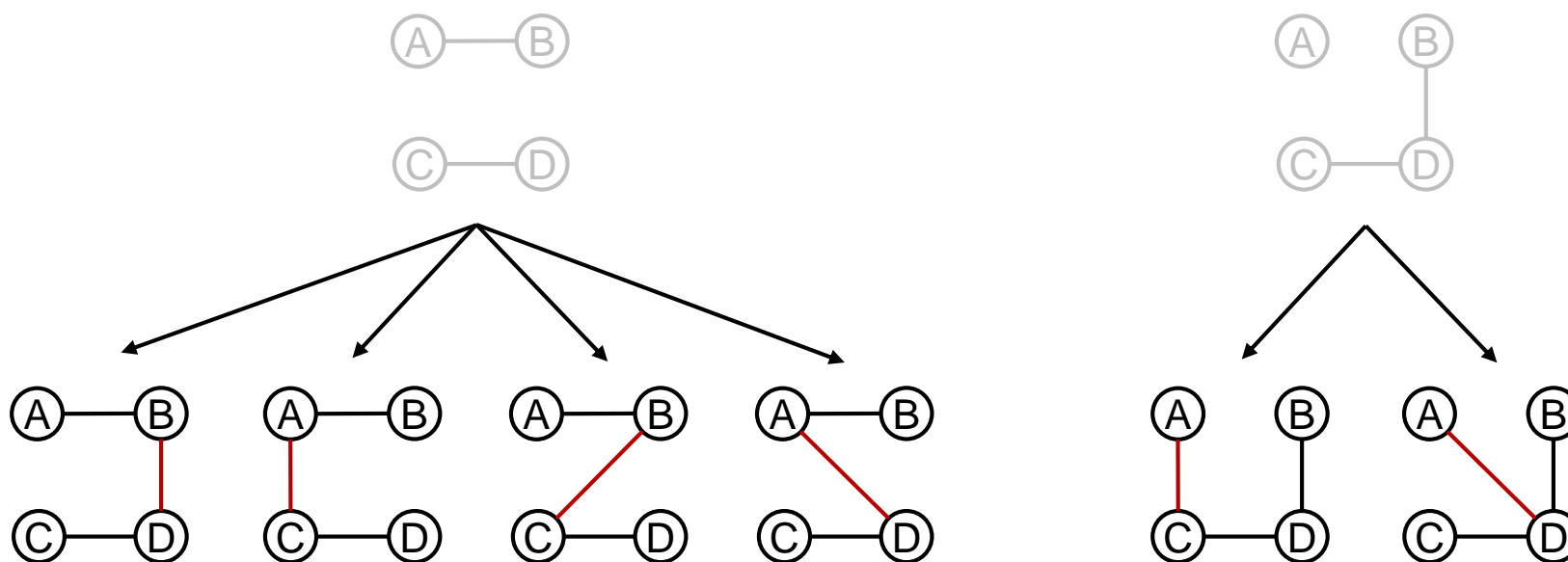
保持 k 个状态而不仅仅为1。从 k 个随机生成的状态开始。本例中 $k=2$ 。



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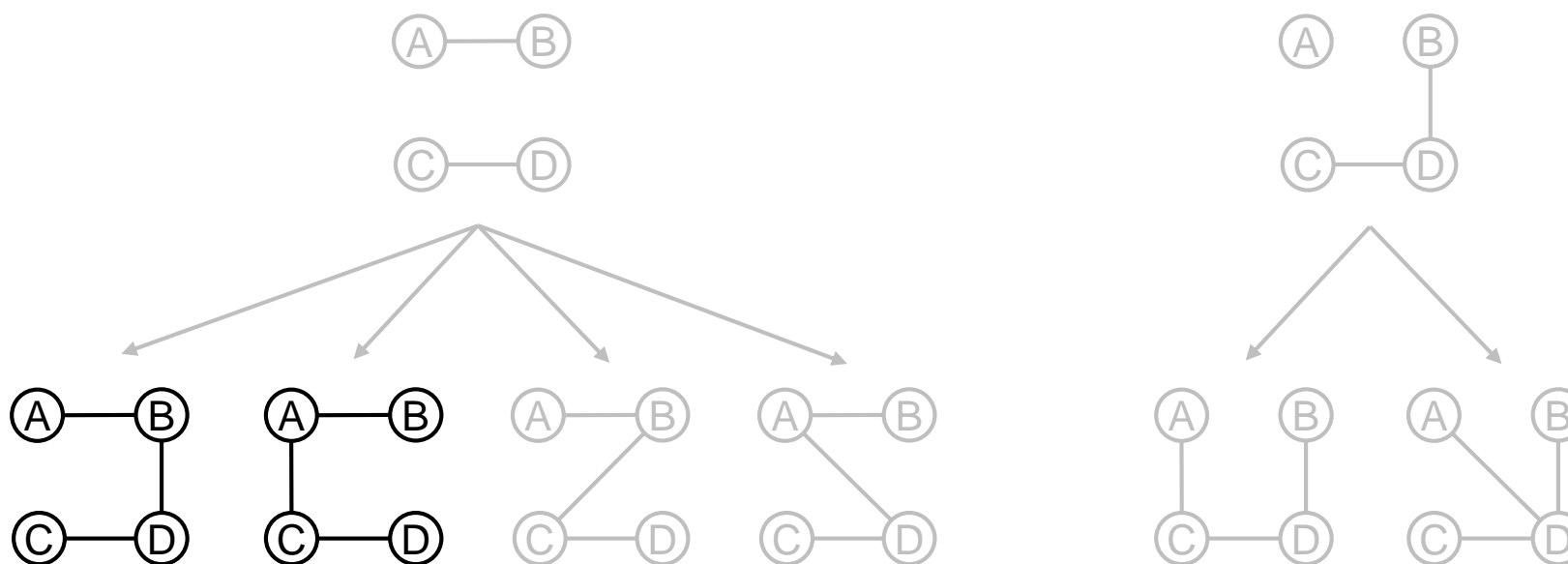


Generate all successors of all the k states. None of these is a goal state so we continue.

生成所有 k 个状态的全部后继节点。这些后继节点中没有目标状态，故继续下一步。

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 生成所有 k 个状态的全部后继节点。这些后继节点中没有目标状态，故继续下一步。

Select the best k successors from the complete list. Repeat the process until goal found.

从完成表中选择最佳 k 个后继节点。重复上述过程，直到找到目标。

Variant of Local Beam Search 局部束搜索的变型

□ Stochastic Beam Search 随机束搜索

- Local beam search may quickly become concentrated in a small region of state space, making the search little more than an expensive version of *hill climbing*.
局部束搜索会很快地集中在状态空间的某个小区域内，使得搜索代价比爬山法还要昂贵。
- It analogous to *stochastic hill climbing*, helps alleviate this problem.
它模仿随机爬山法，有助于缓解这个问题。

Variant of Local Beam Search 局部束搜索的变型

□ Stochastic Beam Search 随机束搜索

- Instead of choosing best k successors, it chooses k successors randomly, with the probability of choosing a successor being an increasing function of its value.
它不是选择 k 个最佳后继节点，而是以选择后继节点的概率是其值的递增函数，来随机地选择 k 个后继节点。
- Stochastic beam search bears some similarity to the process of natural selection.
随机束搜索有些类似于自然选择的过程。

Thank you for your attention!

