

Parallel Heuristic Algorithms for TSP

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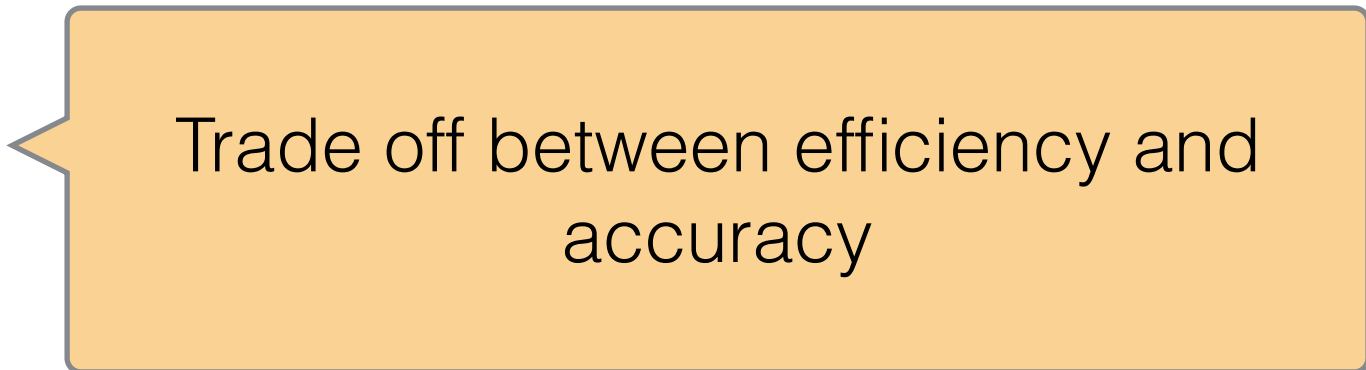
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TSP Problem

- The traveling salesman problem (TSP) asks the following question:
 - Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city exactly once and returns to the origin city?
- NPC problem: nondeterministic polynomial time

Heuristic Algorithms

- Random path
- Greedy search
- **Genetic algorithms**
- **Simulated annealing**
- Tabu search
- Ant colony optimization
- River formation dynamics
- Cross entropy method
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Trade off between efficiency and accuracy

Difficulties

- Parallel search: on distributed machines and on GPUs. Combine MPI and CUDA.
- Dynamic scheduling mechanism and workload balance -> how?
- Asynchronous computing and synchronization points -> optimal strategy?