Lecture 3 - Local Optimization Algorithms

Local search algorithm

Different Neighbourhoods

- For permutations we can swap two elements to create a neighbourhood
- For a vector of numbers, we can add or subtract some small number from a set of values (but exclude the case where no values are changed)

Local search

1. Select a solution in solution space, evaluate it, define it as current
2. Generate new solutions as neighbours of the current one and evaluate them
3. If a new solution if better consider it the current one, otherwise ignore it
4. Repeat steps 2 and 3 as long as there is improvement

Two variants of Local Search

- Greedy

Chooses the first neighbour better than the current solution, doesn't evaluate all the neighbours.

- Steepest

Evaluates all the neighbours and chooses the best one.

Moore and Von Neumann

Moore neighbourhood is square and Von Neumann neighbourhood is diamond shaped.