

AI - Assignment 5

Patrick Nagel: `patrick.nagel@h-brs.de`

Iswariya Manivannan: `iswariya.manivannan@smail.inf.h-brs.de`

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1. Programming Assignment: The Traveling Salesman Problem

- Inside `src/data/LEA` you will find two input files (cities throughout the world along with their locations) for this weeks programming assignment.
- Solve the Traveling-Salesperson problem by implementing random-restart hill-climbing. You can assume kartesian distances between the cities.
- You can use the `49_cities.txt` to test your program. Submit the final results on all cities (`cities_full.txt`).
- Russel and Norvig describe the steepest-ascent/descent version of hill climbing: Given a state, all possible sucessors are being evaluated and the one with the highest/lowest objective function is chosen as the new state. The simple hill climbing variant is: Start evaluating the sucessors of your current state and as soon as any better one is found, take is as the new state and repeat. (For more information see variants here: https://en.wikipedia.org/wiki/Hill_climbing).
- The goal of your agent is to find a cycle (a roundtrip) which visits every city once, while traveling the minimal possible distance. For more information see: https://en.wikipedia.org/wiki/Travelling_salesman_problem.
- Do random-restart hill-climbing atleast 5 times in both your implementations and for every 2000 iterations. This means that you restart each hill-climbing algorithm after every 2000 iterations and run until 10000 iteration to report the best result.
- Generate plots of results for with iterations from 1 to 10000. (Hint: Use matplotlib for plotting) Look at the sample plot in `results/plots` to get an idea of how the plot should look like.