JOHANNES KEPLER
UNIVERSITY LINZ

Master Thesis

Playground Environment for Solving Traveling Salesman Problems

Short Title: TSP Playground

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The Traveling Salesman Problem (TSP) is a classic optimization problem, where large problem instances can be solved only approximately with heuristic algorithms.

The aim of this master thesis is to develop a “playground environment” for experiments with TSP instances in Euclidian space (where a “tour” consists of straight lines between locations). The system shall enable students to experiment with algorithms for constructing tours from scratch and for improving existing tours. The environment should have the following features:

- Graphical representation of problems and solutions (locations and tours).
- Interactive experiments by drawing lines between locations.
- Creating and editing problem instances by defining locations and their coordinates.
- Loading predefined TSP problems of various sizes.
- Interactive development of simple algorithms for creating and improving tours, with the ability to run the algorithms and immediately see the results.
- Library to support the development (access locations, distances, manipulate tours, etc.)
- “Contest mode”, where students compete to find the best possible solution for a given problem. In a workshop, a teacher would finally collect the solutions of the contestants and present the achieved results.

Ideally, the system should be platform-independent (such as a web-based application that runs in a web browser). Programming the algorithms should be done in a simple language that is easy to learn. This could be JavaScript or a simple custom language with specific TSP functions.

The design of the user interface, the graphical representation of tours, and the programming language must be coordinated with the advisor.

The progress of the project should be regularly discussed with the advisor. A time schedule and a milestone plan must be set up within the first 3 weeks. It should be continuously refined and monitored to make sure that the thesis will be completed in time. The final version of the thesis must be submitted not later than September 31, 2018.

Advisor: a.Univ.-Prof. Dr. Günther Blaschek

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