

# Public transport service optimisation



## Problem description

Optimisation problems arising in public transport design, planning, and operation require algorithms that demand large computational resources. The development of machine learning offers an opportunity to incorporate learning into optimisation algorithms to efficiently solve large and complex problems.

This project aims at studying optimisation problems in public transport networks. Computational intelligence methods will be used to address these problems including heuristics, metaheuristics (e.g., evolutionary algorithms), and optimisation approaches based on machine learning.

## Assignment

There are ample examples of optimisation problems in public transport service design. This includes among others service synchronization and the design of stopping patterns. For any graduation project within this realm, the outline of the project consists of a review of the state-of-the-art on solving this public transport optimisation problem, the definition of a set of problem instances to use as benchmark, the development of efficient algorithms to solve the benchmark, and their evaluation in terms of the quality of the solutions found and their computational performance.

## Candidate

- Should be familiar with fundamentals of mathematical modelling
- Should have coding skills in Python and/or Java
- Should have a background or interest in developing his/her knowledge in high-performance computing

## Research group

Smart Public Transport Lab, Department of Transport & Planning

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