

Master/Bachelor/Semester Thesis

Schedule Generation for Train Classification

The railway sector has recently become a wide application field of computer science. Today, computer science methods are extensively used for planning, operating, and optimizing many operational processes in railways. One such process, called train classification, is assembling single railway cars into trains. Freight train services must operate fast, and the classification process often constitutes the capacity bottleneck, which motivates developing fast classification methods. Finding an optimal schedule is an NP-complete problem in the most general setting. However, an algorithm deriving optimal schedules is desirable for handling inputs of moderate size, but its exponential running time requires a careful implementation.



What we offer:

In this Master project, you would first examine the practical problem and understand its theoretical modeling. You would then analyze the existing basic implementation to optimize and (optionally) extend it to handle further problem variants. Finally, you would run extensive experiments on synthetic input instances to test the algorithm, in order to develop reasonable measuring objectives and to elaborate their correlation with the input parameters. The project is finished by a written report, which particularly highlights the experimental results. The project task can be customized if you do a Bachelor or Semester thesis.

Who we are looking for:

You are a motivated student who is interested both in problems of practical and theoretical flavour. You have successfully done some programming in C++ before, and you bring some interest and general knowledge in data structures and algorithms. Basic English skills are recommended (for reading and the report). Additionally, some basic knowledge of gnuplot, R, STL, other C++-libraries, and \LaTeX would be beneficial though not mandatory, but you are ready to learn some of them and willing to read the relevant manuals. If you are interested in this project or want some further information, do not hesitate to ask.

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