Automated contingency planning for infrastructure disruptions

Problem description

Infrastructure disruptions are typically unplanned closures of open tracks, station tracks, or complete stations, during a certain time period. The reduced available capacity often makes the original timetable impossible to operate, therefore to anticipate rescheduling traffic measures and better respond to disruptions before they happen, so called contingency plans need to be developed. Currently, ProRail develops over 1000 contingency plans. The current capacity and resources of the planning team has been reached; however, there is an urgent need for its expansion. In order to be able to produce more contingency plans in the long term, further development of decision-support and automation systems is indispensable.

This project has the objective of further developing models and tools to automatically design contingency plans. In particular, the project will generate contingency plans by adapting basic timetables for a given set of disruptions. The contingency plans provide feasible and robust timetables that minimize the inconvenience to passenger and freight operators.

Assignment

- Literature study of existing articles
- Data preparation
- Develop a new approach for generating contingency plans
- Deriving the best rescheduling measures to preserve a high level of service during disruptions
- Write a report and a scientific paper

Background

A student is expected to have knowledge and interest in mathematical optimization, data analysis and programming. The project builds on recent developments of the Digital Rail Traffic Lab with NS and ProRail. It can be conducted as final thesis project or research project. The research can be preformed within T&P and/or in collaboration with a relevant railway company.

Information

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