Scientific head:	Prof. Dr. F. Corman
Project title:	Statistical Analysis of Disruptive Events and their Effect on Railway Operation
Supervision:	Jan Lordieck

Background

Planned railway operation which is represented as a timetable is usually conflict-free and executable. They include a timeframe for every process happening in the system to account for variations e.g. in dwelling time. Deviations from schedule only happen if an initial disruptive event causes the timetable to be infeasible without changes. Hence, understanding and reducing initial disruptive events support improving the performance of railway system.

Foto: Kantonspolizei Zürich

Problem description

It is often hard to analyse how disruptions in a railway system develop, as delays cascade through the network triggered by some disruptive event. The IVT has a detailed dataset on the operation of the Sihltal-Zürich-Uetliberg Bahn (SZU) available in which these cascades are already worked out. Further available is a detailed disruptive event logbook. SZU is interested in finding out which disruptive events cause severe disruptions and if there is a recognisable pattern to target future development measures.

Research question

This proposal intends a descriptive study on disruptive events at SZU. The questions are "What disruptive events occur in the SZU operation?", "Where and when do disruptive events occur?" and "Is there a pattern of disruptive events causing network disruptions of different severities?"

Expected results

The student taking this challenge is expected to clean and categorise the SZU disruptive event logbook and link the events to the already identified disruptions in operation data. From there a statistical analysis should aim on allowing to recognise patterns between location, point in time and category of the disruptive events and its following disruption.

Credits:	10-20 (Bachelor or Project thesis)
Requirements:	• Motivation to work with real world data which allows partially manual cleaning and categorisation • Some experience in python to link disruptive events with operation data • Some experience with data analysis in python or R