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Piloting map service for navigating in punctuality analysis for trains

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1 Introduction

This thesis will discuss analysis of train delays and visualization of these delays. It will involve making a prototype map visualization of delays based on train routes in Norway. This prototype will involve features such as being able to play through a certain time period, which will be selectable, both backwards and forwards. It will also make it possible to study each train delay to make it possible to track the delays through the Norwegian rail network, and hopefully make it possible to spot why a train is delayed.

As will be discussed in Chapter 2 on the following page, some plotting examples exists already, however none of them covers what this thesis will research.

2 Background

A train network is a complex system. Almost every running train have the possibility to affect almost every other train running in the system. When you look at a busy area, such as a major city and it's closest area, a great deal of material can be on the move at any given time on a rail network with limited capacity. This leads to limited time slots for each train and every problem can lead to major problems, not just for the train experiencing the problem, but can spread to other trains.

To minimize delays it may be necessary to improve both infrastructure and/or time table on railway routes or parts of routes. However, to understand what needs to be improved and optionally where, you need a good tool to analyze the rail network capacity, and if necessary, visualize each individual train (see figure 2.1 on the next page) in the rail network to follow delays to the source.

Here they have plotted each train on it's course between each station on it's route, with a colored circle around the train which varies depending on if the train is on schedule or delayed. It is also possible to play through the selected day or drag through time manually.

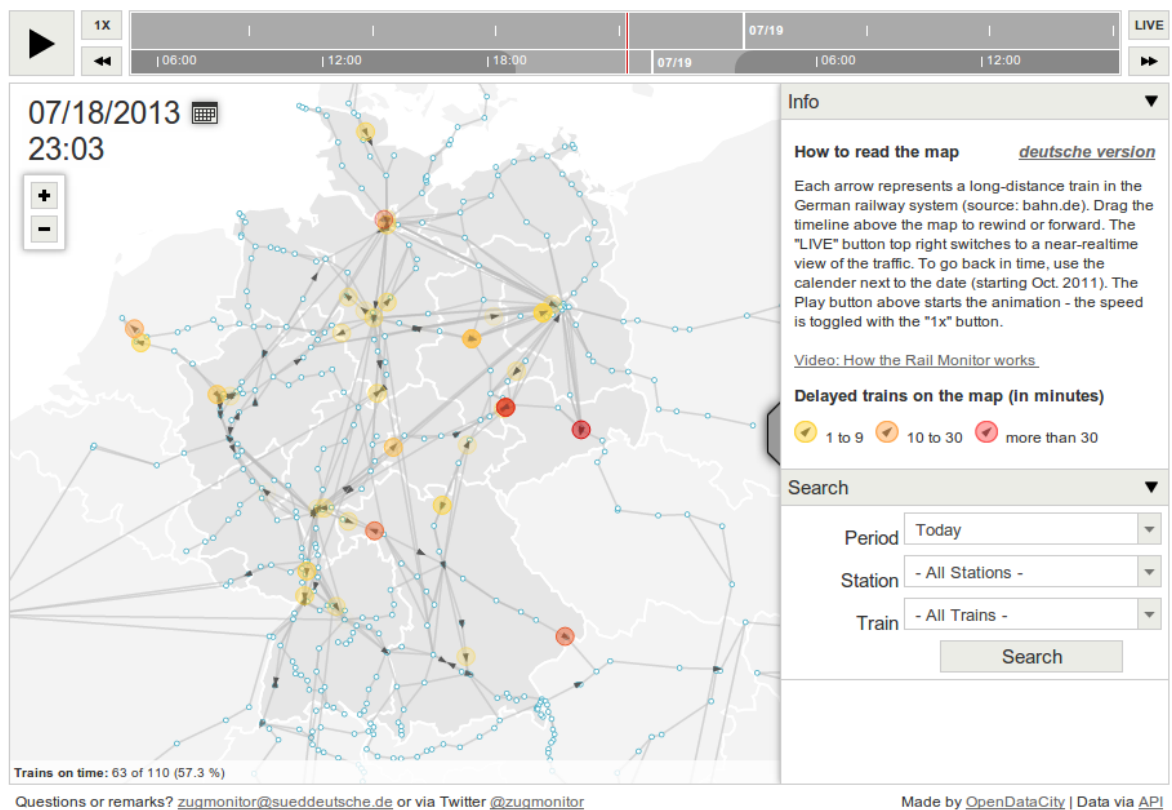


Figure 2.1: Zugmonitor [1]

In the next example (figure 2.2) a live map for the train routes in the United Kingdom have been developed, where it plots the relative location of trains in the UK based on live departure data fetched from the National Rail website. This example does not however, display whether or not the trains are delayed. The routes are only drawn as straight lines between each station.

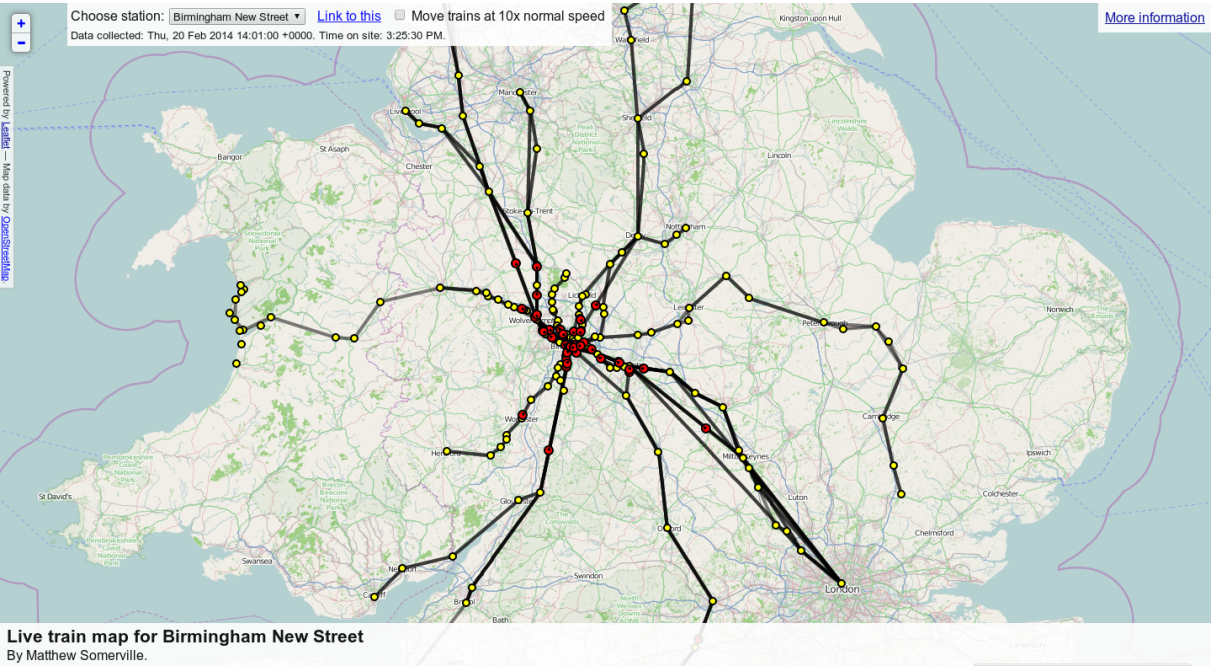
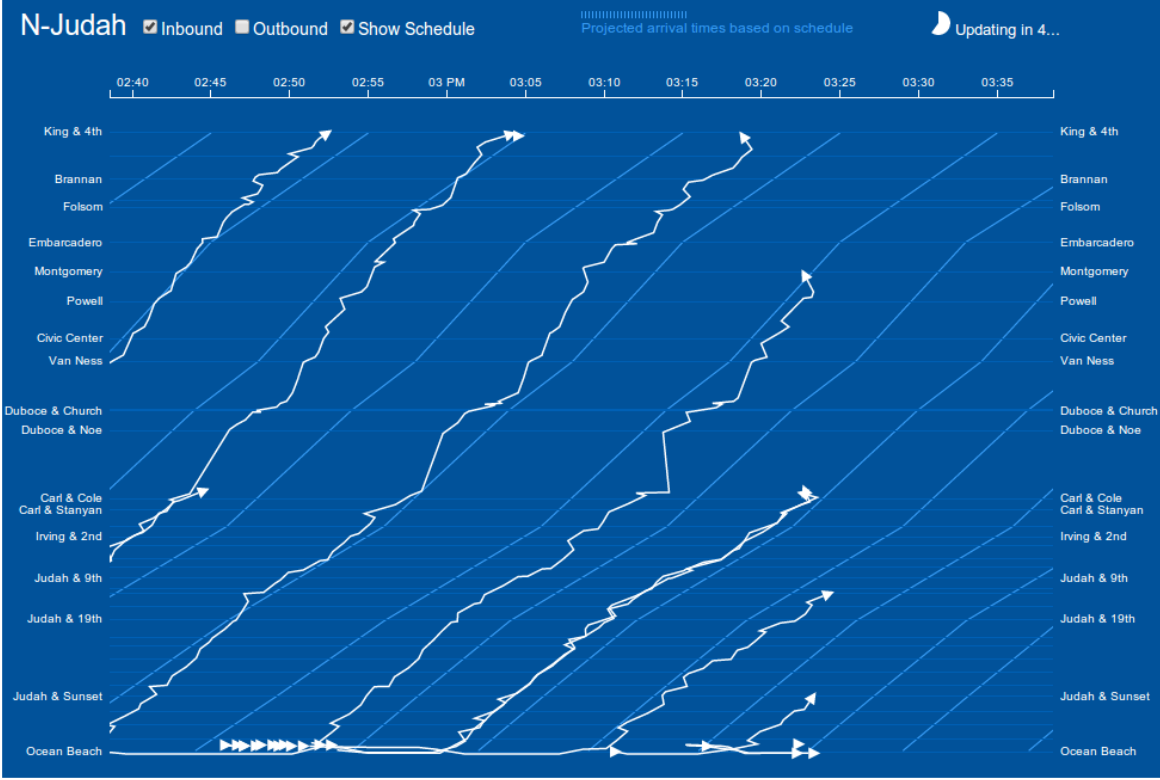


Figure 2.2: Vaguely live map of trains in the United Kingdom [2]

The third example (figure 2.3) displays a XY-chart based on the N-Judah line on the Muni Metro light rail line in San Francisco, with stations on the Y-line and time on the X-line. This chart plots the schedule of the each train and the actual time each train uses.



A live chart of vehicle locations on the N-Judah light rail line in the past 12 hours.

Figure 2.3: Visualizing transit delays [3]

The next example (figure 2.4) shows how much different airports and the routes between them are delayed. It also have a playback function to see how the delays are throughout the day. This plot also shows some weather so it may be possible to spot if the delays to be blamed on uncontrollable conditions.

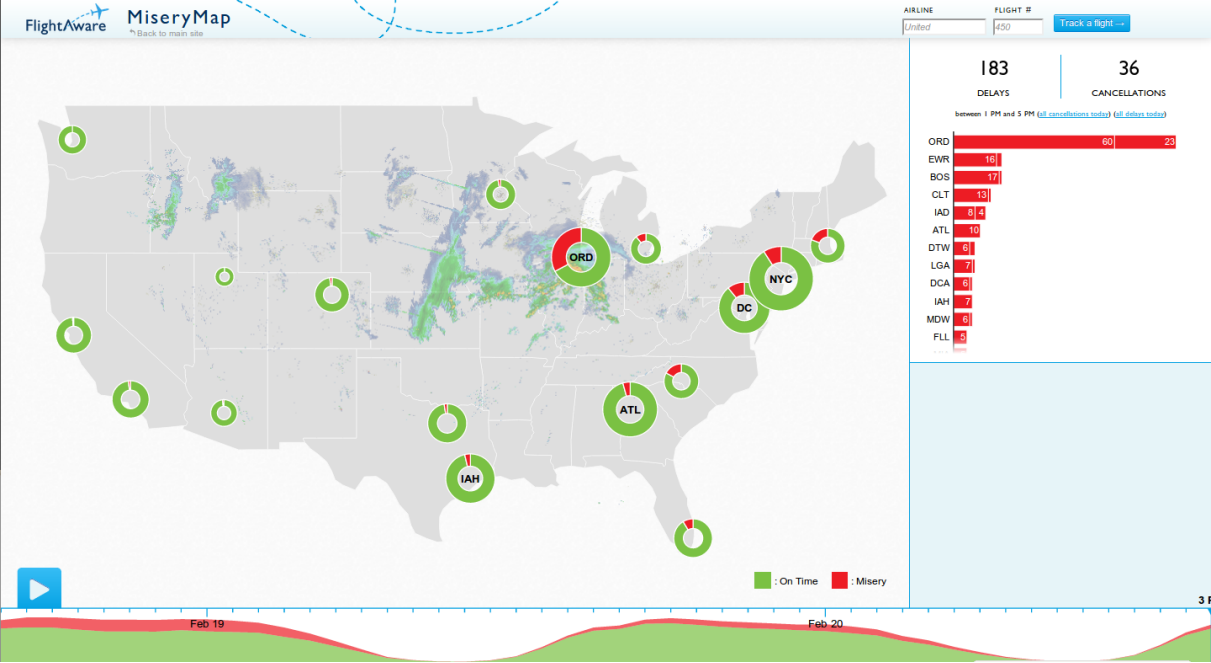


Figure 2.4: MiseryMap [4]

Bibliography

- [1] OpenDataCity, “Zugmonitor – leider außer betrieb.” <http://zugmonitor.sueddeutsche.de/>. [Online; accessed 15. February 2013].
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- [3] bdon.org, “Visualizing transit delays in real time: Muni light rail.” <http://bdon.org/2013/08/28/visualizing-transit-delays/>. [Online; accessed 15. February 2013].
- [4] FlightAware, “Miserymap.” <http://uk.flightaware.com/miserymap/>. [Online; accessed 15. February 2013].