



## Master Thesis

# Propagation of Disturbances in Public Transit Networks

To reach sustainable mobility, the mobility behaviour of all travellers needs to adapt. A common idea is that the usage of Public Transport is the most efficient solution. One issue in Germany is that the reliability of the urban public transport systems is oftentimes perceived to be very low. The reason for this is a multitude of different disturbances, ranging from personnel issues to infrastructure problems. High usage also results in delays which can be sufficient to cause problems in the whole network. This idea also is the basis for this thesis. Using the data from two public transport areas, you are tasked to analyse how delays in schedule affect the public transport network. Based on a systematic analysis, the propagation of disturbances through the network is a major concern for operating the public transport system. This serves to improve the public transport operation and to propose policies for operating the transport system.

## Key tasks and objectives of the thesis

- Prepare and visualize the public transport data
- Analyse propagation of delays based on time and kind of delay
- Deduce implications for operational policy and PT planning (schedule etc.)

### Topics



- Smart Urban Mobility
- Public Transport Analysis

### Methods



- Data Analytics
- Empirical Analysis

## Sources (selection)

- Yap, M., Cats, O., Törnquist Krasemann, J., van Oort, N., & Hoogendoorn, S. (2022). Quantification and control of disruption propagation in multi-level public transport networks. *International Journal of Transportation Science and Technology*, 11(1), 83–106. <https://doi.org/10.1016/j.ijtst.2021.02.002>
- Malandri, C., Fonzone, A., & Cats, O. (2018). Recovery time and propagation effects of passenger transport disruptions. *Physica A: Statistical Mechanics and Its Applications*, 505, 7–17. <https://doi.org/10.1016/j.physa.2018.03.028>

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