



## Unravelling Passenger Demand Patterns using Smart Card Data

### General description

In the last decade, smart card data became one of the most important sources of information in the public transport industry. The systematic analysis of smartcard data offers unprecedented information on observed passenger behaviour. Current research efforts strive going beyond the construction of origin-destination matrices to unravelling demand patterns by means of data clustering and mining techniques. This includes for example identifying patterns in the data in relation to spatial characteristics of passenger demand, weekly travel habits and investigating how the latter evolve over time. Furthermore, smart card data allow estimating behavioural models such as route choice models using revealed preferences data.

### Assignment description

Smart card data from the Stockholm region is available for this project. Passengers tap-in on buses or at station gates in the case of metro and commuter train. No tap-outs are available but they have been inferred in a previous project, making it possible to estimate OD matrices and travel patterns. The master graduation project will involve the following one or more of the following activities, all in relation to the case of the smart card data in the Stockholm region:

- Analysing origin-destination demand patterns including spatial clustering
- Segmenting passenger demand based on travel patterns
- Test the tap-out inference technique by calibrating it against counts
- Investigate the impacts of a major network change – new commuter train stations and frequencies - on passenger travel patterns

### Candidate background

T&P or TIL students who have knowledge and interest in public transport planning and have very good programming skills, in particular with Python and have affinity with managing large databases and large-scale computational requirements.

### Research group

Transport & Planning Department, Dr. Oded Cats, o.cats@tudelft.nl

### External support

The project will be performed in cooperation with Region Stockholm, the public transport authority of Stockholm County and KTH Royal Institute of Technology in Stockholm.