

Prediction and Scenario-based Traffic Management 2 (POST2)

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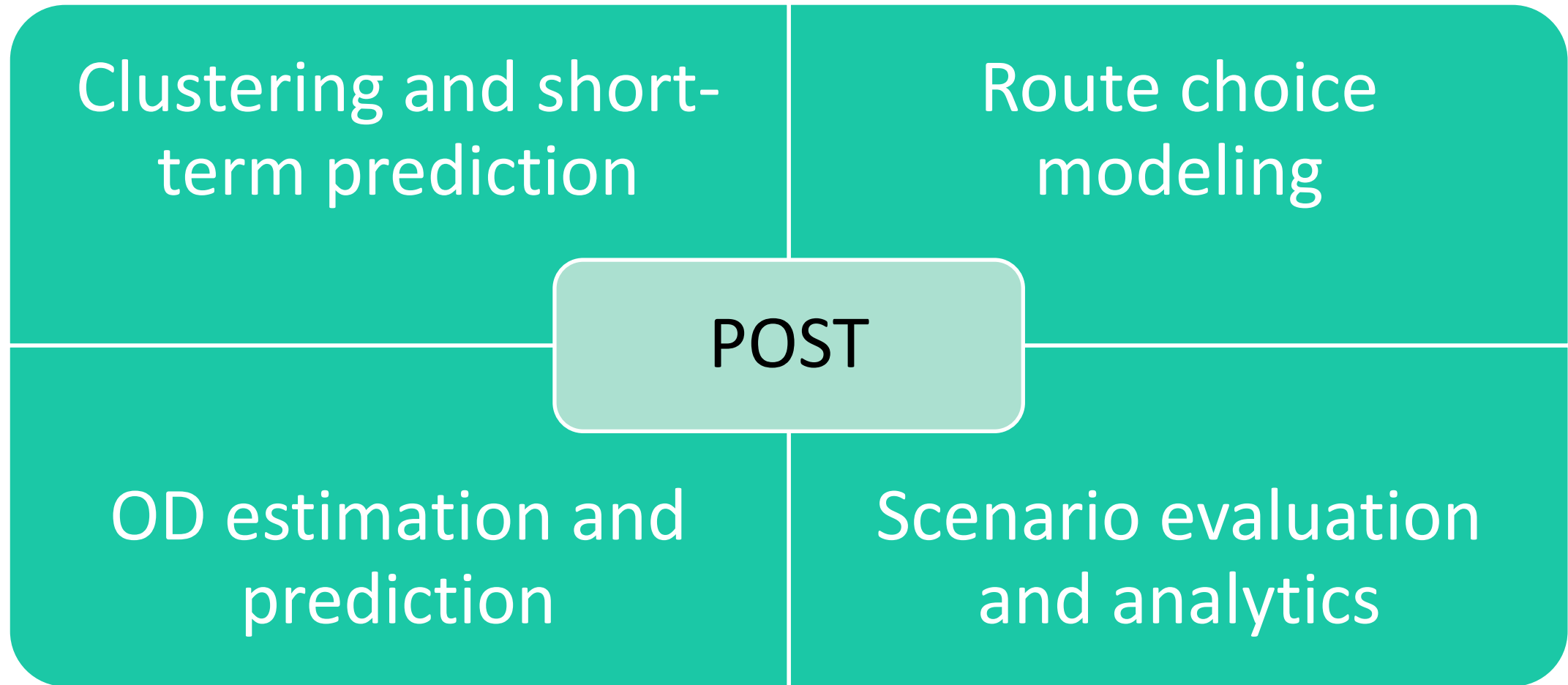
Trafik Stockholm, TrV STRESS, UC Berkeley

Aim and purpose

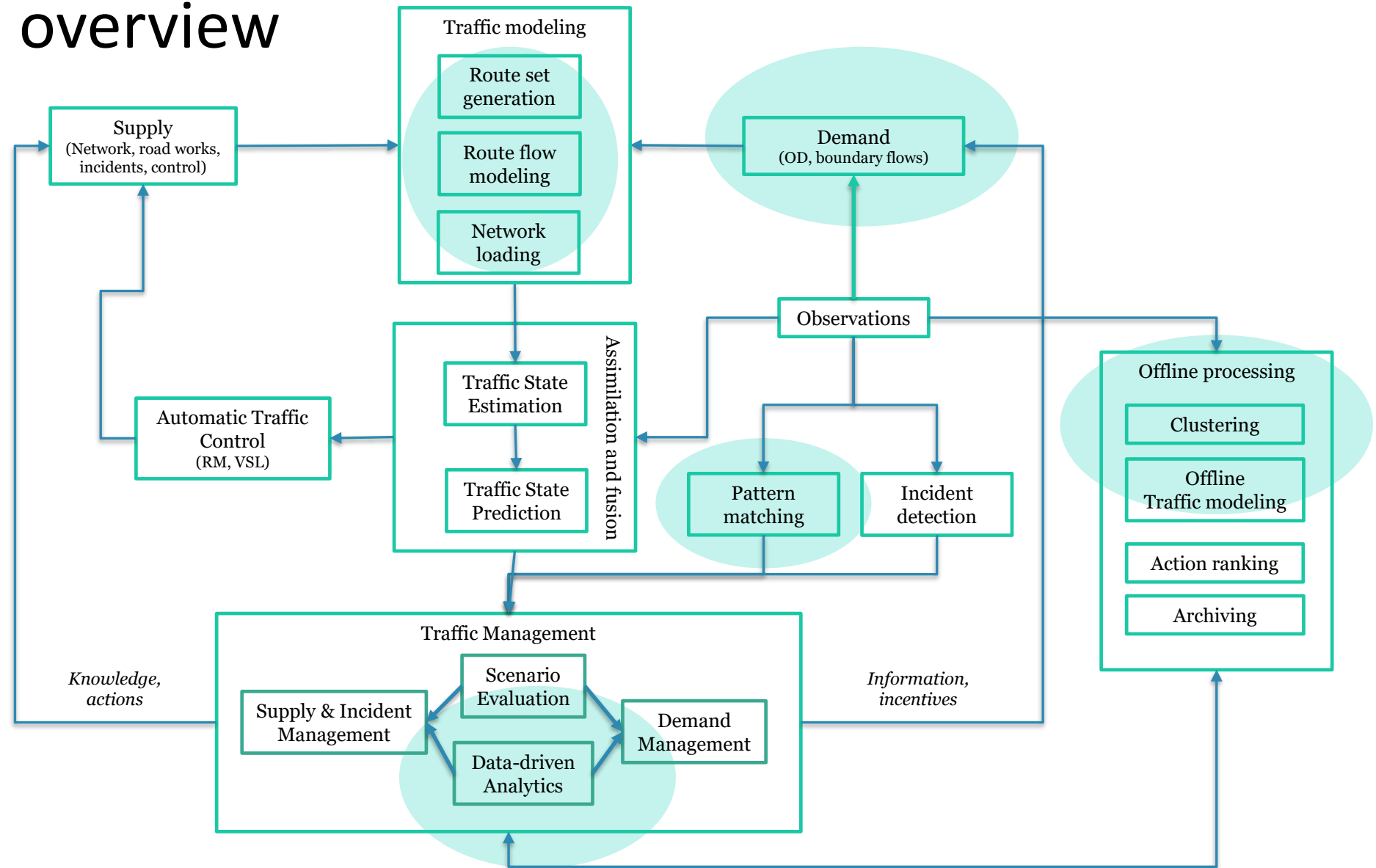
- **Means for evaluating traffic management measures**
 - Results of towing directly or from waiting to after peak hour traffic
 - Effects of early information to travelers of severe incidents (i.e. do not use car)
- **Predict demand and route choice for scenario evaluation and action ranking**
 - Offline processes for demand prediction and scenario evaluation
 - Online processes for classification of traffic situation and choice of control measure



Overview of computational modules

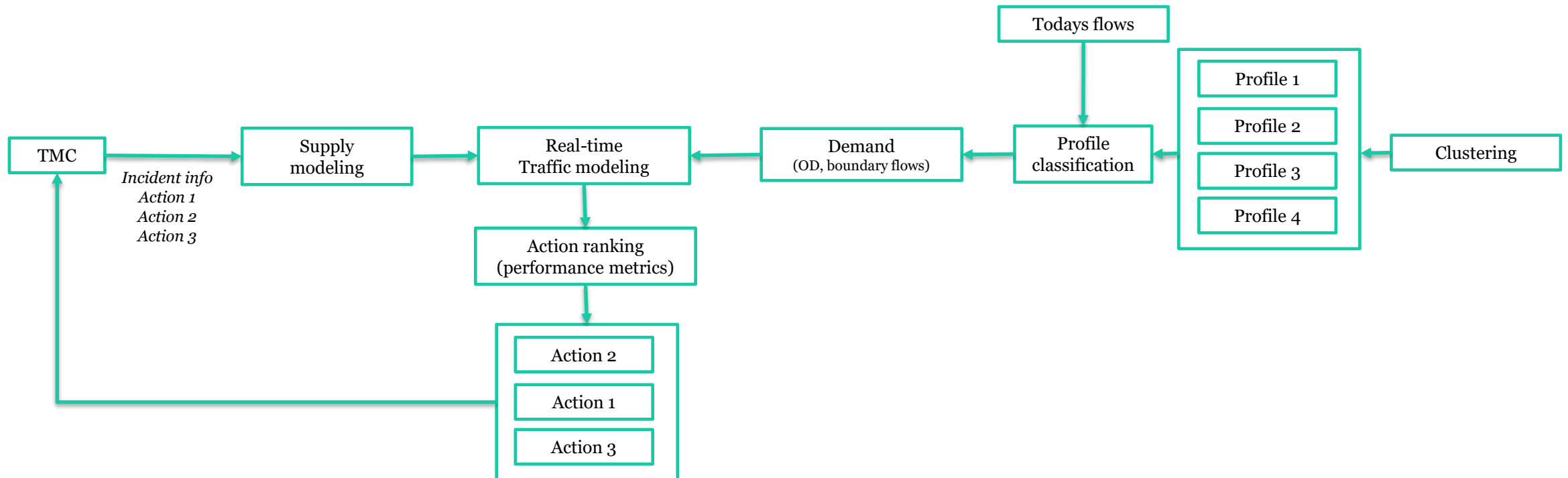


Module overview



Research Target

1. Scenario evaluation for historical events
2. Scenario evaluation using real-time data



POST2 Publications

- **Papers (5)**

- Data-driven network loading (published, Nikolaos et al)
- Revealing day-types in transport networks using traffic data clustering with external validation criteria (submitted, Matej et al)
- Similarity and interchangeability of flow and speed data for transport network day-type clustering and prediction (to be submitted, Matej et al)
- OD estimation based on data-driven network assignment (submitted, Nikolaos et al)
- GPS probe data for calibration of route choice set (summer/autumn 2021, Anna et al)

- **Doctoral thesis (2)**

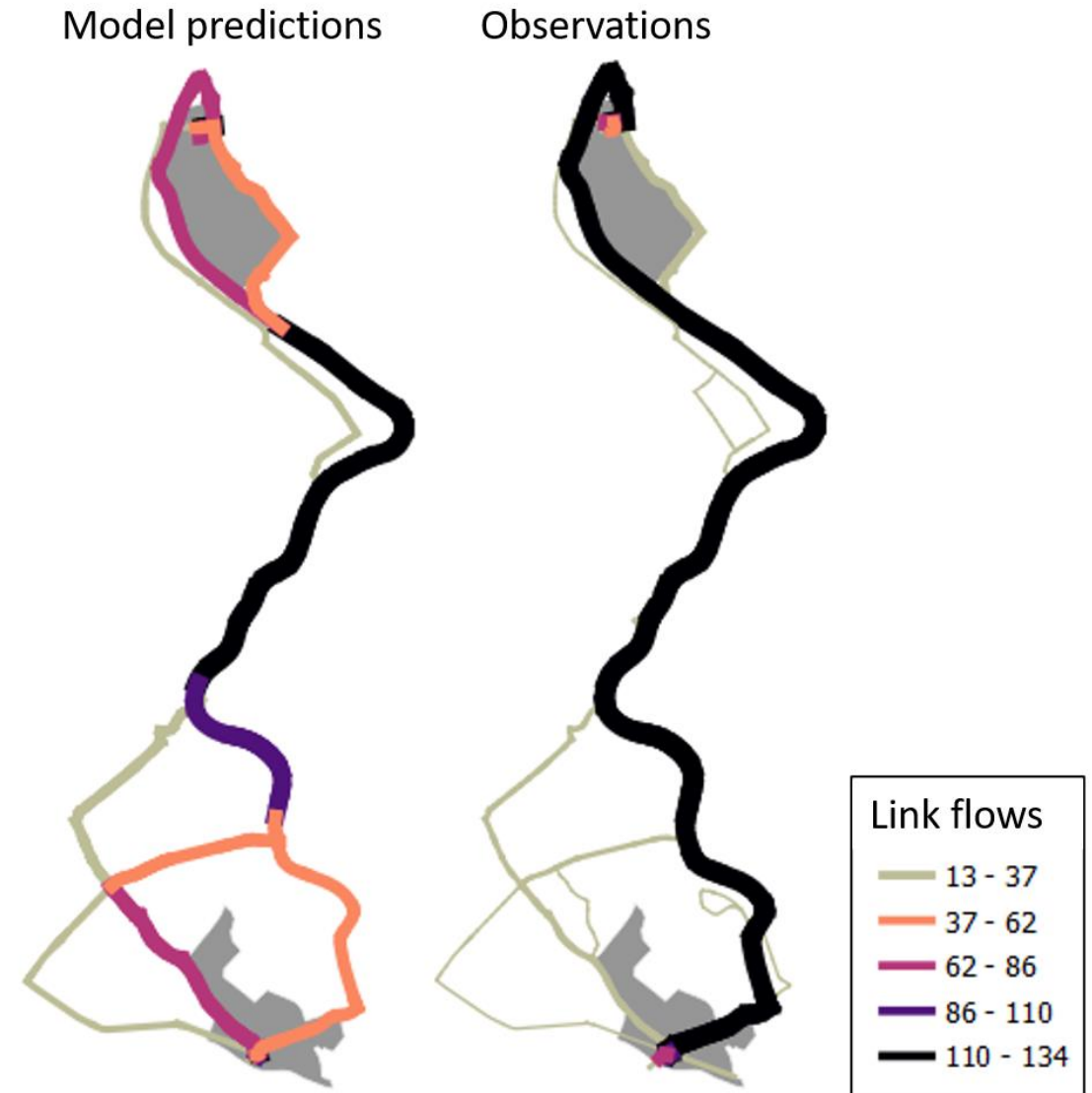
- Data-Driven Approaches for Traffic State and Emission Estimation (Nikolaos, June 17)
- Data-driven pattern recognition in large-scale transport networks: revealing the most typical days, days clustering, spatio-temporal neighborhoods, and short-term prediction. (Matej, autumn 2021)

- **Master thesis (5)**

- Data-driven incident effects based on estimation of route sets (published)
- Public transport origin-destination pattern recognition and short-term prediction (published)
- Link flow destination distribution estimation based on observed travel times for traffic prediction during incidents (published)
- Unsupervised learning for real-time estimation of OD matrices (published)
- OD estimation based on road tolls (september 2021)

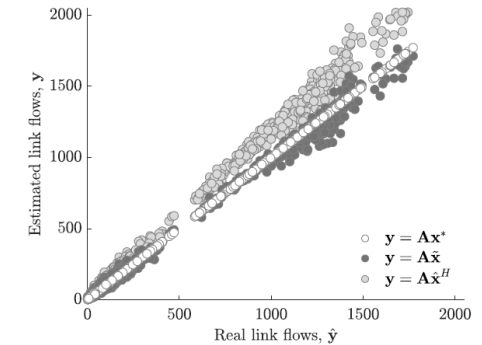
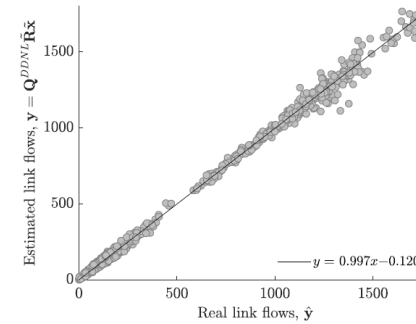
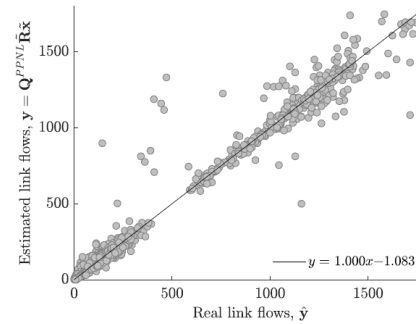
Route choice modeling

- Simulation experiments indicate major challenges in calibrating simpler choice models using only travel time data
- Observing route choice using raw large-scale GPS observations
 - How handle route similarity?
- Route choice calibration
 - Key features?
- Route set generation
 - Severe effect on model calibration
- Input to data-driven network assignment or incident analysis



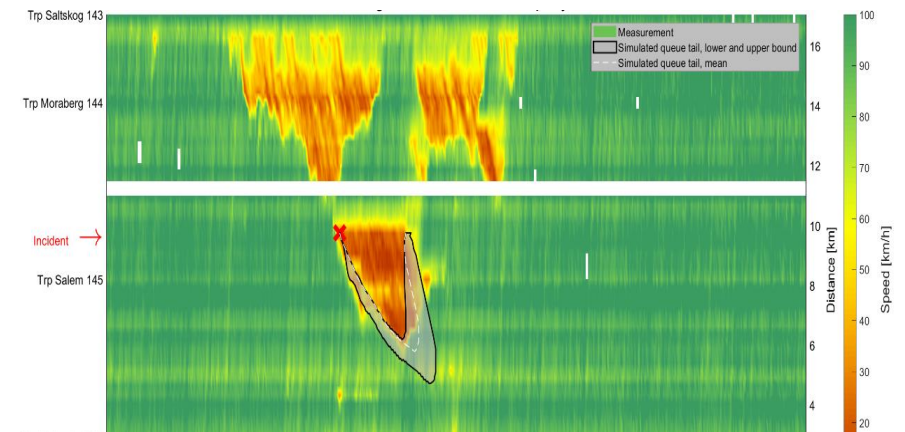
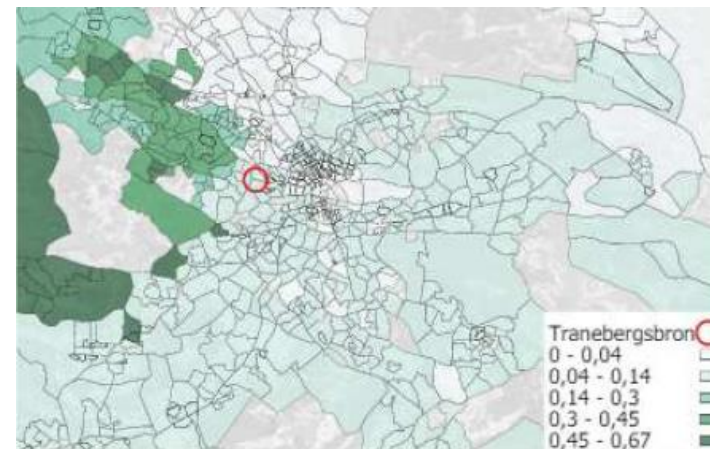
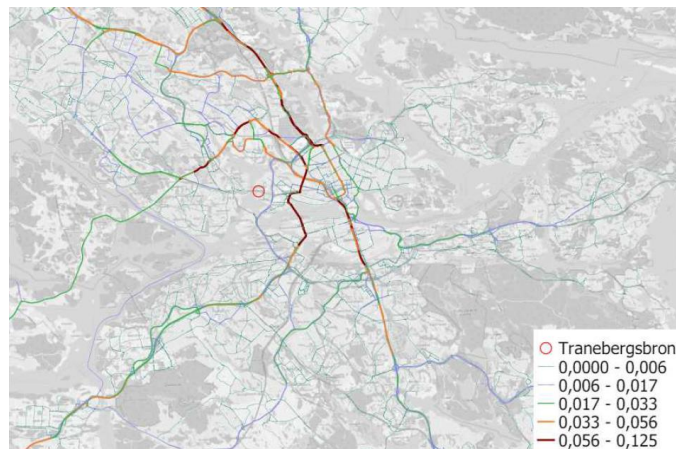
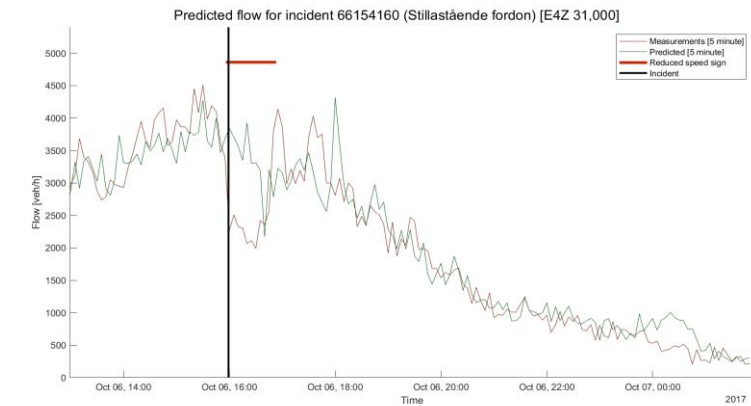
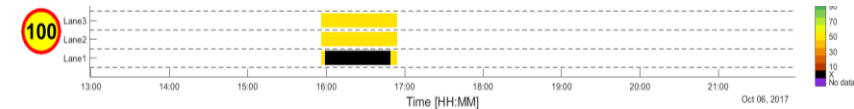
OD estimation

- Data-driven network assignment for efficient fusion in real-time applications
 - Promising results from Los Angeles case study
- Direct observations from probe data or mobile network data useful for matrix structure
- Dimensionality reduction efficient for handling sparse probe data



Scenario evaluation and analytics

- Model-based evaluation
 - Framework for running CTM-v model with lane blocking
- Data-driven approach
 - Decision support based on route-set generation



Next: Clustering and prediction