Short term ridership prediction in public transport by processing smart card data

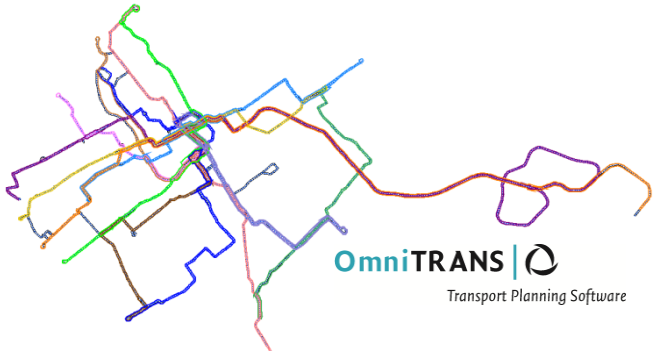
Niels van Oort, Ties Brands, Erik de Romph

N.vanOort@TUDelft.nl http://nielsvanoort.weblog.tudelft.nl/

Introduction

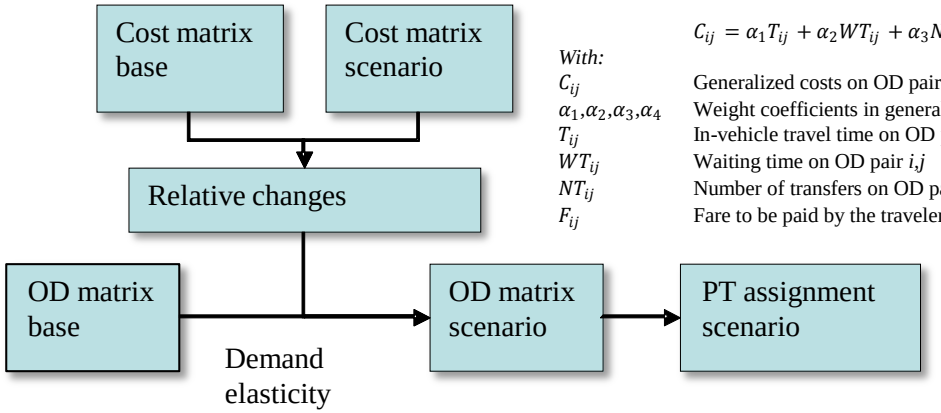
- Challenges PT: more quality and higher efficiency
- Current approach predictions: spreadsheat analyses; no network impacts; existing models too complex
- Availability smart card data enables new approach
- Combination of demand modeling software and simple elasticity calculations

Step 1: Importing network and timetable into modeling software



Step 2: Importing current OD-pairs from actual smartcard data

Step 3: Calculating new generalized costs per OD; assessing future demand per OD using elasticity method

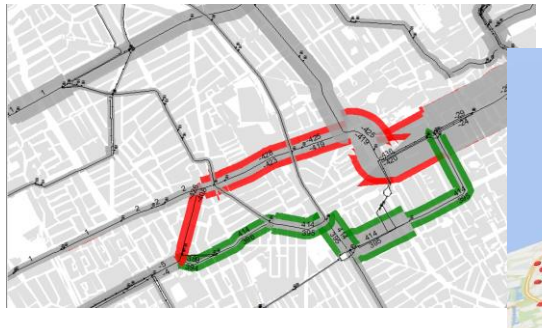


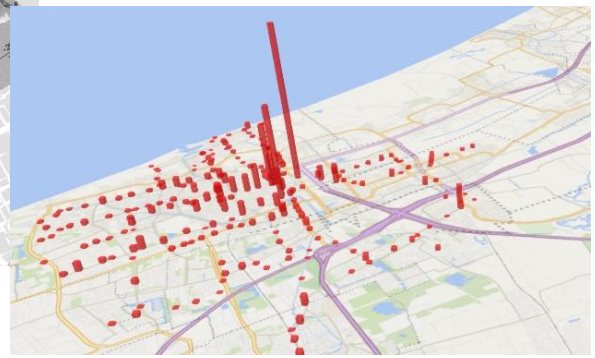
$$C_{ij} = \alpha_1 T_{ij} + \alpha_2 WT_{ij} + \alpha_3 NT_{ij} + \alpha_4 F_{ij}$$

With:

C_{ij}	Generalized costs on OD pair i,j
$\alpha_1,\alpha_2,\alpha_3,\alpha_4$	Weight coefficients in generalized costs calculation
T_{ij}	In-vehicle travel time on OD pair i,j
WT_{ij}	Waiting time on OD pair i,j
NT_{ij}	Number of transfers on OD pair i,j
F_{ij}	Fare to be paid by the traveler on OD pair i,j

Step 4: Results: expected ridership and link loads





Conclusions

- Case: Valid approach for complete bus and tram network; calculation time about 15 min.
- Valuable insights into network impacts
- Further research: Update of elasticity values by RP research (smart card data)

TU Delft Delft University of Technology
Challenge the future

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