


Using data traces to improve transport systems: Introduction and initial considerations

Presentation

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Publication date:

2017-06

Permanent link:

<https://doi.org/10.3929/ethz-b-000166705>

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Using data traces to improve transport systems

Introduction and initial considerations

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June 2017

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Why use data traces for transport modeling?

Limitations of Travel diaries and methods

- Data collection is time consuming and expensive
- Small sample sizes
- Short term, infrequent – Mikrozensus every 5 years
- Challenges in recall (trips, routes, ...)
- Evaluating real world infrastructure changes is difficult

Data traces – an alternative?

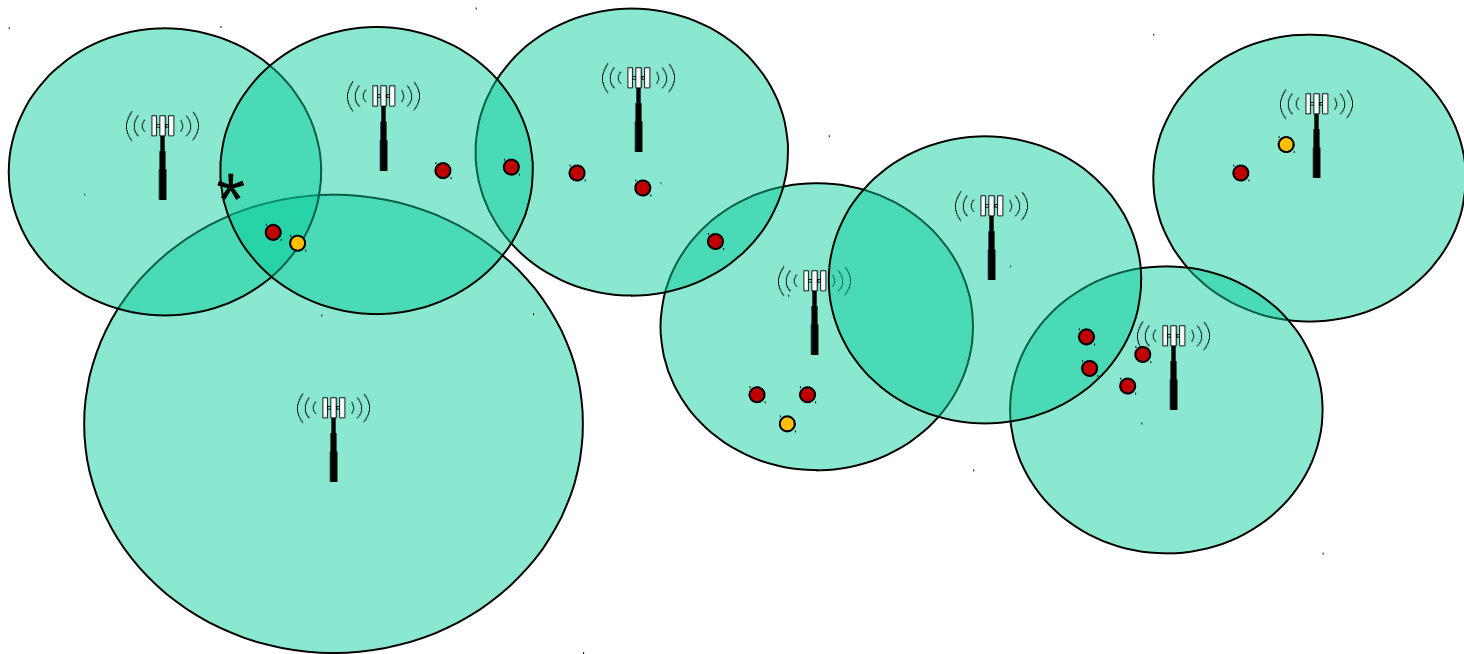
Data Trace Technologies: GPS v. GSM

Trace data are generated anyway, they just needs to be captured

	GPS	GSM - CDR
Nature	Active	Passive
Spatial Resolution	High	Low
Temporal Resolution	High	Low, very variable
Sample size	Small	High
Doesn't work:	In urban canyons, tunnels, buildings	Out of network range
Social demographic data	Sometimes , when linked to travel diary	No, by law (some exceptions)

The Swisscom Dataset

- Much more detailed than standard CDR (yellow vs red points)
- Includes roaming users
- Triangulation possible (*)
- Signal timing and delay propagation information also available



Sample Data Point

```
{ NetworkEvent : {  
  "id": { "string": "228017219732835" },  
  "startTime": 1455524318434,  
  "endTime": null,  
  "cells": {  
    { "cellid": 23902, "lac": 606 }  
    { "cellid": 23868, "lac": 606 }  
    { "cellid": 40465, "lac": 606 }  
  },  
  "eventId": 128,  
  "source": { "GPEH" },  
  "auxiliary": {  
    "map": {  
      "propDelay": "7.0",  
      "frameoffset": "112.0",  
      "chipoffset": "33366.0"  
    }  
  }  
}
```

(ID, time)

(Cell towers)

(Distance from Antenna)

Pros & Cons of High Resolution CDR

- ✓ Negates some of the disadvantages of CDR datasets
 - ✓ Resolution, triangulation
- ✓ Can track same travellers over multiple days

- Cleaning instead of collection
- Very large datasets
 - 1 Week
 - 10,000 persons
 - ~14,000 samples per person/day

- × Biases remain - i.e. Market share
- × No social demographic information
- × Operational Obstacles – Privacy, governance considerations

Our Objectives

Overarching questions:

- Can the added resolution can help understand travel behavior?
- How limiting is the lack of personal information?

Paradigm shift

- Finding questions for data to answer, not data to answer questions
- Geographic information observatories – Miller H.J. (in press)

Avenues of investigation:

1. Before/after assessment of a significant network change
2. Calibrate MATSim using mobile data
3. End goal of investigating road pricing schemes

Stage 1: Route Choice - Transjurane

Using Swisscom data to analyze the impact of the finished Transjurane

- Is traveler ● on the:
 - a) Autobahn
 - b) Old route
 - c) Train
- Route/Mode Choice
- Traces from before & after opening of final section
- No test data to validate any algorithms



<http://www.a16.ch>

Discussion
