STATISTICS AUSTRIA
The Information Manager

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Use of Mobile Positioning Data for Tourism Statistics

Austrian views

Overview

1. Big data – general thoughts
2. Background – Austria
3. Expectations – Statistics Austria
4. Austrian experiences – A1 Traffic Data Stream
5. General challenges
6. Expected Pros and Cons
7. Future plans
8. Conclusions

Big data - general thoughts

"Big data: are we making a big mistake? – Big data is a vague term for a massive phenomenon that has rapidly become an obsession with entrepreneurs, scientists, governments and the media"

Financial Times, 28/3/2014, Tim Harford

Some **considerations** and **questions**:

- Promising research results - but how good are the results (bias)?
- Methodological challenges (data scientist vs learning by doing)?
- What are the risks (data confidentiality, public opinion, trust in data)?
- Cost-efficient (access to data, continuity of access)?

Background - Austria

2009: News report that main mobile provider in Austria (**A1**) sells **mobile data for marketing and research purposes** (http://derstandard.at/1259282147270/Mobilkom-gibt-Bewegungsdaten-fuer-Geo-Marketing-frei)

2010 - 2013:

- ✓ Statistics Austria (STAT) takes **first steps** by exploring technical and legislative possibilities
- ✓ Literature research and **discussion** with experienced countries, in particular Estonia and Ireland about use of mobile data for official tourism statistics
- ✓ STAT in **negotiation** with A1 (sample data, specification) – with help of LBS Positium

2014: Mobile data are **not in use for official statistics yet**

Expectations – Statistics Austria (1)

Tourism and travel statistics:

- **Better analysis** of tourism flows (e.g. concerning same-day trips)
- Improvement of **quality** of tourism statistics (e.g. better coverage, less recall bias, less errors when collecting and processing data)
- More **consistency** - definition of **usual environment**
- Plausibility check of national tourism statistics and **mirror data**
- Additional source for TSA and TBoP estimations with **new information** (e.g. identification of transborder flows, transit tourists, sub-regional data)
- **Increased timeliness** of tourism data
  - Short term tourism data (e.g. tourism events, weather)
  - Improved analysis of seasonal dependencies and shift in holidays
- **Reduction of respondent burden**

Expectations – Statistics Austria (2)

Requirements (statistical units)	Availability
Incoming-traveler	
Country of residence	ok
Type of traveler	
• tourism/travel	ok
• same-day trip/trip with overnight stay	ok
• personal/business	X
Incoming-trip	
Number of trips to Austria for this traveler	ok
Duration of trip in number of nights	ok
Duration of trip in number of hours	ok
Main destination (NUTS 2)	ok
Month of arrival	ok
Type of trip	
• tourism/travel	ok
• same-day trip/trip with overnight stay	ok
• personal/business	X
• repeating trip	ok
Outgoing-traveler	
Austrian federal province of residence (Austrian federal province = NUTS 2)	ok
Type of traveler	
• tourism/travel	ok
• same-day trip/trip with overnight stay	ok
• personal/business	X
Outgoing trip	
Number of outgoing trip for this traveler	ok
Duration of trip in number of nights	ok
Duration of trip in number of hours	ok
Main country of destination	ok
Other countries visited on this trip	ok
Month of departure	ok
Type of trip	
• tourism/travel	ok
• same-day trip/trip with overnight stay	ok
• personal/business	X
• repeating trip	ok
Domestic-traveler	
Austrian federal province of residence (Austrian federal province = NUTS 2)	ok
Type of traveler	
• tourism/travel	ok
• same-day trip/trip with overnight stay	ok
• personal/business	X
Domestic trip	
Number of domestic trip for this traveler	ok
Duration of trip in number of nights	ok
Duration of trip in number of hours	ok
Main destination (Austrian federal provinces = NUTS 2)	ok
Month of departure	ok
Type of trip	
• tourism/travel	ok
• same-day trip/trip with overnight stay	ok
• personal/business	X
• repeating trip	ok

Information to be generated

- ✓ Number of travelers
- ✓ Number of trips
- ✓ Sum of nights and hours
- ✓ Average duration of stay in nights and hours
- ✓ Aggregated by destination/residence and type of trip

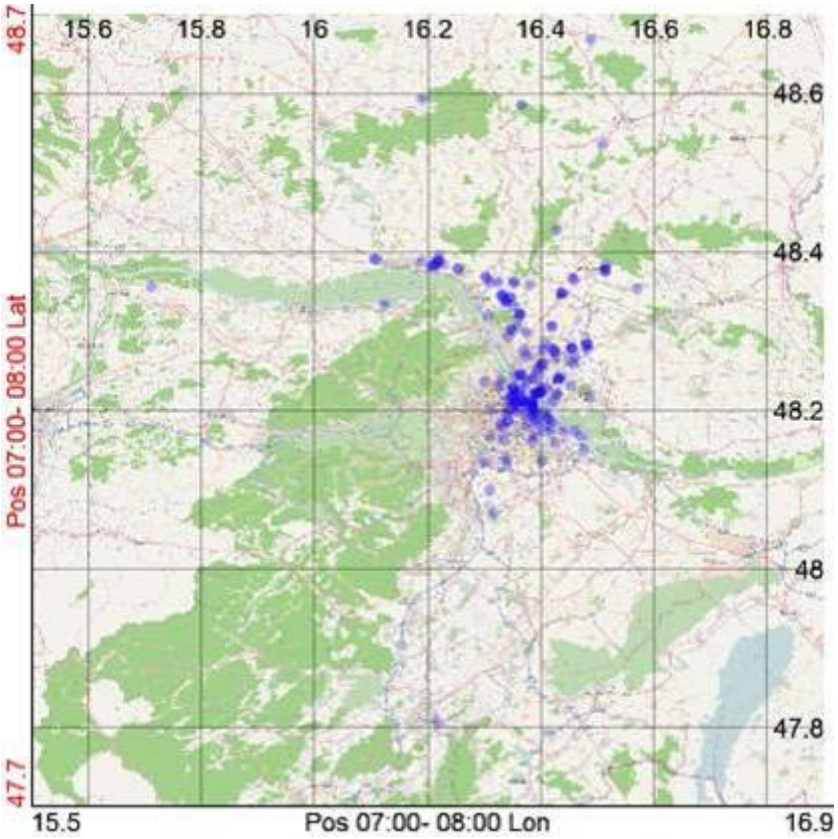
Austrian experiences – A1 Traffic Data Stream (1)

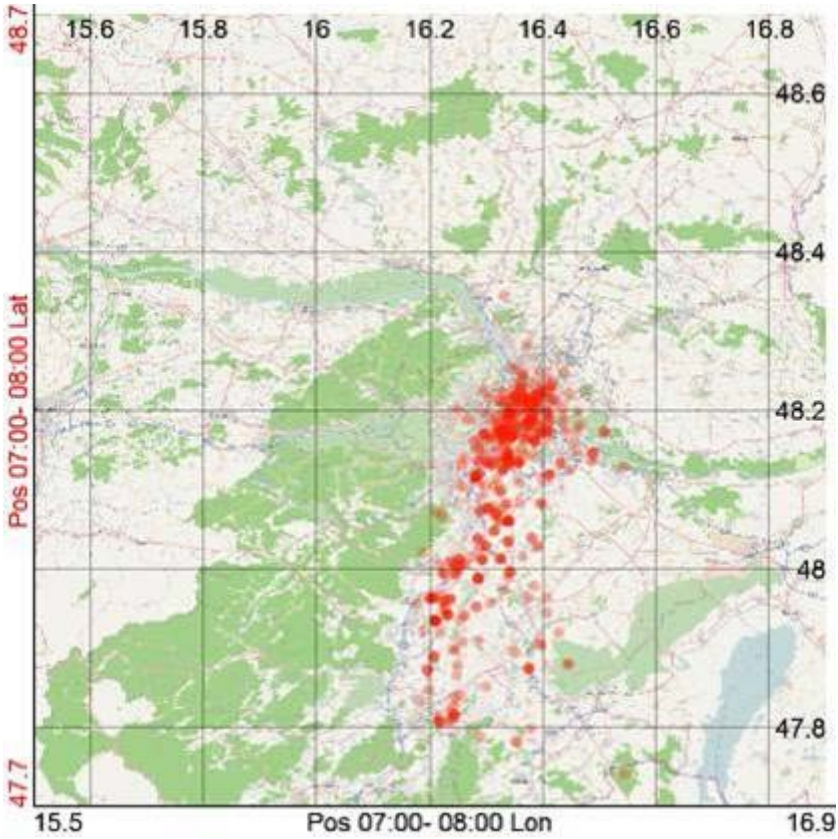
In 2009 the most important mobile provider in Austria (A1) sells mobile data for marketing and research purposes (Project: **A1 Traffic Data Stream**):

- Movements from approximately 4.7 mn phones (real time information)
- Data already in use for the analysis of traffic flows, zones of attraction and movement of commuters
- Local determination of the phones (SIM cards) established via the respective cell via which the mobile subscribers were connected to the network
- GPS data from individual phones could be added to the data pool, if users agree to this (e.g. those users would get such a GPS phone for a certain period of time)
- Data is encoded, therefore no data security issues (according to the mobile provider)
- "Standard" data stream could not be used for tourism statistics purposes, mobile provider planned to implement changes

Austrian experiences – A1 Traffic Data Stream (2)

Commuter flows in the north and south of Vienna





Source: Press Conference, A1 mobilkom austria, 17.12.2009

General challenges

- **Coverage and representativeness** of data (e.g. bias due to penetration of mobile providers/mobile phones, switch off of mobile phones – especially abroad, use of one or more mobile phones, border noise)
- **Methodological and technical issues** related to dealing with huge databases
- **Privacy issues** (i.e. concerns about data confidentiality/data protection)
- **Public opinion** related to the handling of private data, great reservation concerning the (mis)use of private data
- Changes related to **data access** (i.e. due to new mobile technology, characteristics of data change, administrative changes)
- Setting **legal requirements** (e.g. how and where the data might be processed)
- **Coordination of data collection** (i.e. from different mobile providers)
- Mobile providers and their reservation against the "publication" of their **business secrets**
- In-depth discussions with the **national data protection authority**

Expected Pros and Cons

Pros

Public/users:
- ✓ More/additional data concerning tourism flows
- ✓ Reduction of respondent burden
- ✓ Increase of frequency and timeliness
- ✓ Data visualization

Data:
- ✓ Additional source of tourism related data/information
- ✓ Fast data collection (real-time) and data processing
- ✓ High potential for in-depth research e.g. data on sub-regional level
- ✓ More consistency
- ✓ Less recall bias

Financing/technology:
- ✓ Cost-efficient in long-term
- ✓ Cheap compared to primary surveyed data
- ✓ Sophisticated technology already available (app, CDR)

Cons

Public/users:
- ✓ Trust in official data (robustness of data)
- ✓ Negative effect of public opinion related to using mobile data (data confidentiality and protection)

Data:
- ✓ Systematic and sampling bias
- ✓ Representativeness and reliability of data
- ✓ Methodological and technical issues due to high amounts of data
- ✓ Comparability over time not guaranteed

Financing/technology:
- ✓ Implementation cost intensive
- ✓ Legal basis unclear (data access and continuity of access, rights)

Future plans

- **Internal relationships** (Statistics Austria):
  - ✓ Management, methodology section, IT
  - ✓ Data protection officer, including the assessment of the legal prerequisites (data protection act 2000, federal statistics act 2000), including data confidentiality
- Brainstorming with **possible internal users**:
  - ✓ Statistics Austria (Tourism Statistics, Transport Statistics, Population Statistics, Labor Statistics, Social Statistics, Information Society Statistics)
- Building relationships with **legal/external stakeholders**:
  - ✓ Meetings with "Austrian Data Protection Authority" (http://www.dsb.gv.at/DesktopDefault.aspx?alias=dsken)
  - ✓ Contacts with the "Austrian Regulatory Authority for Broadcasting and Telecommunications" (RTR; https://www.rtr.at/en)
- Warm up communications with main data provider and building **relationships** with other **mobile providers**
- **Public relations** concerning **confidentiality** and future **users** (e.g. tourism industry)

Conclusions

Remaining issues to be considered:

- Question of **resources**:
  - ✓ Financing of project (balance of implementation/maintenance costs and benefit)
  - ✓ Human resources & skills (tourism statisticians vs data scientist vs learning by doing)
- **Methodological** issues:
  - ✓ Usual environment
  - ✓ Quality and reliability of data (systematic and sampling bias)
  - ✓ Analytical tools and methods
- Consideration of data **users´ and legal requirements** (i.e. Regulation on Tourism Statistics 2011):
  - ✓ Information that cannot be covered (e.g. private/business, means of transport)
  - ✓ Longitudinal data (observations over time)?

… therefore:

- Financial, methodological, technical and legislative possibilities need to be further explored
- Public relations important to limit negative effect on public (and internal) opinion towards NSIs and big data (official statistics vs the use of big data, trust in data confidentiality and quality of results)

Statistical methods are essential, but they have to be built on
"*old statistical lessons, and not by ignoring them*" (Financial Times, 28/3/2014)!

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