ACTIONABLE TRANSPORTATION ANALYSIS BY TURNING ALL OUR GSM-PHONES INTO SENSORS.

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Mozart learned to code at the age of four, we do too!
Population: 1.3 Million
Size: 45 227 km²
Capital: Tallinn
Language: Estonian
Member of EU
Currency: Euro
GDP: 17 BEUR
REACH-U, WHO ARE WE?

- European leader in Location-Based Services (LBS) and GIS
  - Public Security and Safety (Monitor Security, CivilWarning System)
  - Earth Observation
  - Location Based Analytics and Services
  - Intelligent Transport Systems

- Established 1990

- Strong cooperation with research institutions (Fraunhofer, MIT, University of Tartu …)

- Partner of Smart City Lab, Tartu
AGGREGATED AND ANONYMOUS LOCATION UPDATES

» Everybody leaves a footprint in digital world, specially with smartphones. (Google, Apple, Microsoft Facebook etc.)

» All cell phones register their location with cell phone networks several times a minute, and this function cannot be turned off while the phone is getting a wireless signal.

» Public sector uses the info mostly in Law Enforcement and not in Citizen Experience.

» Anonymous and aggregated info does not jeopardize persons security and privacy
EXAMPLES: HOW MANY AND WHEN?

Traffic density estimations
- For allocating maintenance budget
- For planning new infrastructure
- For population density and variation
- Difference between local people and foreigners
EXAMPLES: HOW MANY AND WHEN?
EXAMPLES 2: HOW?

- Estimation of proportions people who use different means of transportation, e.g. metro vs. road traffic.

- Origin-destination (O/D) matrix estimation – the whole territory is divided into n smaller areas, and one estimates the number of people moving between any pair of these areas.

- Combining available additional info with positioning-based info. E.g. compare behavior of different age groups or genders.
EXAMPLES 2: HOW?
EXAMPLES 3 (MORE IMPORTANT): WHY?

- Traffic – Where they came from and where they are going to.

- Estimation of travel speed between areas, depending on time of the day, day of the week, season; depending transportation means.

- Estimation of location semantics within trajectories of individual home, work, child’s kindergarten locations, etc. to be used in aggregated statistics.
Risks and Lessons Learned

- The passive positioning data has spatial uncertainty levels significantly higher compared to GPS measurements and it is not trivial to get reliable estimates of interested variables.

- The amount of mobile data is very large – typical volume is several billion events per day. Specific software solutions are needed to handle this data volume in reasonable time, on some use-cases in real-time.

- It’s easy to lost in all the possibilities. The “actionable” check is good tool for validating different options and analyses.
ADDITIONAL OPTIONS FOR USING LOCATION DATA IN PUBLIC SECTOR

Location Based Messaging – Civil Warning

- Re-route traffic quickly in case of accidents
- Send evacuation routes in case of landslides, wildfires and tsunamis
- Send weather warnings
Monitor Large Scale Events

- Social manifestations, massive pilgrims, elections, rock concerts and football games
- Identify hooligans and criminals
- Filter these gatherings where number of suspicious people is above threshold value
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