Data-Driven Cycling Analytics:
Tools & Experience

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CYCLERS
About Cyclers (by Umotional)

Cyclers App

Cyclers for Cities platform

- Information & Navigation
- Motivation & Incentivization
- Data Collection & Analytics
Cycling Analytics: Prague Example
Prague on Bike

- **Prague’s official cycling app**
- **The city’s best rated mobile app**
- **Over 20,000 users**
- **Over 200 thousand rides recorded**
Prague Cycling Volume Map

100K GPS cycling tracks

Prague cycling network

# recorded trips per segment
Prague Cycling Volume Map

Rides per segment

Data from 25 static bike counters

Estimated average daily number of rides
Cycling Contraflow Analysis

Additional analysis and data

Segments with recorded contraflows

Infrastructure upgrades proposed and implemented

Over 70 suitable segments identified
Cycling Data Analytics: Key Ingredients

Cycling Data

Cycling Analytics Tools
### User data
- High-resolution GPS traces
  - Full network coverage
  - Limited sample
  - Limited access (unless own app)

### Fleet data
- Variable-resolution GPS traces
  - Full network coverage
  - Limited sample
  - Additional quantities
  - Access can be enforced

### Infrastructure
- Traffic counts
  - Complete sample
  - Point coverage only
  - High accuracy
  - Accessible with extra investment
Cycling Analytics: Basic
Heatmaps

Traces

Geovisualization tools
Trip Origin-Destination Analysis

Trips

Geovisualization tools
Cycling Analytics: Intermediate
Intermediate Analytics: Networks

Prague cycling network
(209k nodes, 564k edges)

Maps
Elevation profiles
Cycling infrastructure
...
Cycling Volume Maps

Average daily number of rides per segment in collaboration with Traces Counts Maps Network building Network-matching Geovisualization tools
For 100 thousand recorded rides, 26% of segments has more than 50 recorded rides in Prague.

250 rides per sq km → reasonable accuracy.
Cycling Speed Maps

- Traces
- Maps

- Network building
- Network-matching
- Geovisualization tools
Data Analytics: Advanced
Advanced Analytics: Route-Choice Models

- Many-to-Many
- One-to-Many
- One-to-One
- Many-to-Many
Street Attraction Index

- Traces
- Counts
- Maps

- Network building
- Network matching
- Cycling routing
- Geovisualization tools
Travel Time Maps

Traces
Counts
Maps

Network building
Network matching
Cycling routing
Geovisualization tools
Analysis of B+R Potential (with train / metro / tram)

- Traces
- Counts
- Maps
- Timetables
- Census

Intermodal network building
Network matching
B+R routing
Geovisualization tools
## Analytics: Summary

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<th>Tools</th>
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<td>Route choice modes</td>
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Key Take-Aways

1. Cycling analytics is reality and can deliver real changes on the ground.

2. Various levels of tools and know-how required for different outputs.

3. Less complex analytics can be carried in-house; advanced analytics might require external help.
Thank you!
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Meet us:
Stand G5
cyclers.city
Intermediate Cycling Analytics

Various cycling data + Cycling Networks + Network building
Network matching
Intermediate Analytics: Summary

- **Data**
  - Multiple data sets
  - Integration required

- **Tools**
  - Advanced, but still off-the-shelf GIS tools
  - Some customization needed
Travel Times to the City Center

- **Traces (10K+)**
- **Network (med detail)**
- **Network matching**
- **Bicycle routing**

In collaboration with Traces (10K+)
Street Attraction Index

- Traces (100K+)
- Cycling Network
- Network matching
- Routing