CyclePhilly:
Development, Deployment, Data, and (future) Directions

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Smarter Phones

SENSOR GROWTH IN SMARTPHONES

- **GALAXY 1**: Ambient Light, Accelerometer, Magnetometer
- **GALAXY S2**: Gyroscope, Proximity
- **GALAXY S3**: Pressure RGB, Gyroscope, Proximity
- **GALAXY S4**: Temperature Humidity, Hall Effect, Gyroscope, Proximity
- **GALAXY S5**: Heart Rate, Fingerprint, Temperature Humidity, Hall Effect, Pressure RGB, Gyroscope, Proximity

Timeline:
- 2010: GALAXY 1
- 2011: GALAXY S2
- 2012: GALAXY S3
- 2013: GALAXY S4
- 2014: GALAXY S5
- 2015+:
- Austin
- Raleigh
- Minneapolis/St. Paul
- Seattle
- Salt Lake City
- Toronto
- Los Angeles

2009-2013
- Understand needs and prioritize infrastructure
- Use to create a bicycle route choice model
- Information about plan implementation
Improvements: better anonymization, bike to transit, interest in the entire region
User Demographics

• User Characteristics
  – Age
  – Ethnicity
  – Gender
  – Income (Household)

• Cycling Frequency

• Cyclist Classification

• Cycling History
### Weather Alert:
Clear throughout the day.

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**41 saved trips:**

<table>
<thead>
<tr>
<th>Exercise</th>
<th>7/12/14 1:36 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.9 miles, 42 minutes.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Errand</th>
<th>7/12/14 1:26 PM</th>
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<tr>
<td>0.9 miles, 7 minutes.</td>
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<table>
<thead>
<tr>
<th>Exercise</th>
<th>7/6/14 10:38 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 miles, 14 minutes.</td>
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<table>
<thead>
<tr>
<th>Exercise</th>
<th>7/6/14 10:02 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8 miles, 33 minutes.</td>
<td></td>
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</tbody>
</table>
Data Collection Flow

Cycle Philly
User starts recording their trip

GPS Tracking
App records time-stamped geographic coordinates

Data Upload
Once the trip is completed, recorded data is uploaded
Data Processing Flow

GPS Traces → Data Processing → GPS traces related to street network → DVRPC → Public Database

Open Street Map
Handling Raw Data

• GPS accuracy variability
  – Urban (Street) Canyon
  – Obscured line of sight
• Anonymization concerns
• Accidental multi-modal trips
• ... other unspecified strangeness
Cleaning & Anonymization

RAW

Polygon Generated
Cleaning & Anonymization

Polygon Generated

Trip Clipped
Trip Snapping
Trip Snapping

Raw Trace – Snapped Trace

Snapped Trace
Link Selection

ROAD SEGMENT
SPRUCE
TOTAL TRIPS ON THIS ROAD SEGMENT:
545
WORK COMMUTE
387
SOCIAL
56
ERRAND
30
EXERCISE
8
OTHER WORK RELATED (NOT COMMUTE)
18

Total CyclePhillyTrips per Segment:
- 1 - 10
- 11 - 50
- 51 - 150
- 151 - 250
- 251 - 500
- 501 - 866
Purpose: Errand
Purpose: Exercise
Purpose: Shopping
Purpose: Social
Rider Characteristics

![Rider Characteristics Graph](image)

- Refused/No Data
- 4 Strong & Fearless
- 3 Enthused & Confident
- 2 Comfortable, but cautious
- 1 Interested, but concerned

**Rider History**

- 1 Just trying it out/Just started
- 2 One year or less
- 3 Several years
- 4 Since childhood
- Refused/No Data

**Count**

- 60
- 40
- 20
Trips by Purpose

![Graph showing trips by purpose with two peaks, one in the morning (AM) and one in the afternoon (PM).]
Trips by Purpose
Travel Time by Purpose
Travel Time by Purpose
App development

Improvements for 2015:
• New user types
• Fix bugs
• Ability to share trips
• Question about bike share

Long-term work:
• Total rebuild
• Create white label version
Data generation and usage

**Improvements for 2015:**
- Improved and expanded publicity
- Giveaways!!
- User and trip goals
- Analysis of 2014 data

**Long-term work:**
- Analysis pre- and post-bike share
- Analysis using CyclePhilly and regional bike counts
- Development of a regional bike plan
- On-going improvements to processing
Data:
http://www.dvrpc.org/webmaps/cyclephilly

Questions:
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