The Data Smart Cities Need: Using “Big” Mobile Device Data to Understand Travel Behavior in Oakland

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Overview

I. Introduction

II. Types of Big Data

III. Case Study: Travel Patterns and Parking in Oakland

IV. Q&A
Introduction
Downtown Oakland is growing and looking to better manage curb space
New Department of Transportation is looking for smart transportation solutions

- The Oakland DOT adopted a Strategic Plan in 2016
- One of the goals of the City is to establish in the with curb management:

  “Manage on-street parking supply as part of a comprehensive curb management program”
Big Data Background
Mobile Device Data Can Reveal Travel Patterns

Mobile device data from ~23% of US and Canadian adults and ~12% of commercial truck trips
Video shows a subset from Oct 8th, 2017 in San Bernardino, California
Data is Just a Cost UnTill Put it to Work

StreetLight InSight®: The Only On-Demand Platform For Running Actionable Transportation Analytics

1300+ Transportation Analyses Supported Each Month
**Location-Based Services Data Is Created By Mobile Applications (Think “Apps”)**

<table>
<thead>
<tr>
<th>Technical Characteristics</th>
<th>LBS Data Creation</th>
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<tbody>
<tr>
<td><strong>Spatial Precision</strong></td>
<td>![Mobile Devices]</td>
</tr>
<tr>
<td>~5 meters – 25 meters</td>
<td></td>
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<tr>
<td><strong>Frequency of Data Pings</strong></td>
<td>Variable; usually triggered by location change</td>
</tr>
<tr>
<td><strong>Type of Trip</strong></td>
<td>![Icons]</td>
</tr>
<tr>
<td>Personal</td>
<td></td>
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<tr>
<td><strong>Sample Size</strong></td>
<td></td>
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<tr>
<td>~23% of US adult population (62M+ US devices in our database)</td>
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The Wheel of Putting Big Data to Work for Transportation

1. Travel Demand Models
2. Freight Patterns
3. Measure “Cut Through” Traffic
4. Transport Equity
5. Transit + Last Mile Planning
6. Before / After Studies
7. Causes of Congestion
8. New Modes TNCs, Flying Cars, Etc.
9. Infrastructure Investment Priorities
Case Study: Oakland

Understanding Personal Travel Behavior with Location-Based Services Data
Trips that end in Downtown Oakland are concentrated in two areas in the AM Peak Period.

What are the travel behavior patterns of downtown Oakland?

**Need:** Evaluate parking demand and potential solutions for downtown Oakland.

**Challenge:** The city has some curb parking turnover data, but they don’t provide much information on overall parking demand for area.

**Solution:** Streetlight Data team worked with the City of Oakland to develop analytics for travel behavior in downtown Oakland.
Trips with destinations in downtown are traveling long distances and are mostly work-related

<table>
<thead>
<tr>
<th>Trip Purpose</th>
<th>AM Peak Period</th>
<th>Evening Period</th>
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<tbody>
<tr>
<td>Home to Work</td>
<td>68%</td>
<td>18%</td>
</tr>
<tr>
<td>Home Based Other</td>
<td>13%</td>
<td>37%</td>
</tr>
<tr>
<td>Non-Home Based</td>
<td>19%</td>
<td>45%</td>
</tr>
</tbody>
</table>

**Description:** The zone activity analysis indicates that trips ending in downtown in the AM Peak period are mostly employees traveling long distances (9-19 miles) to get to work; particularly, in the Civic Center and Uptown/Lakeside areas of downtown.
Policy Implications:
Oakland Can More Effectively Assess the Potential of Its Downtown Area as a Commercial and Entertainment Activity Generator

1. Understand characteristics of trips ending in downtown provides direction about parking demand

2. Evaluate the share of travel related to work vs. leisure indicates that there is a higher demand for curbside parking in the evenings

3. Determine where they should anticipate higher parking revenues or consider parking management
Understanding Commercial Truck Behavior with Navigation-GPS Data

Case Study: Oakland
Truck activity in the AM Period mostly focused in Chinatown and Civic Center (Medium-duty trucks)
Truck Activity in the midday period changes from the AM peak period

Heavy Duty Trucks

Medium Duty Trucks
Policy Implications:
Oakland Can Pursue More Effective Strategy for Managing Commercial Trucks

1. Ability to identify best locations for yellow curb loading zones; can anticipate sizes of trucks using them

2. Allows Oakland to accommodate waiting trucks while preventing them from clogging roads

3. Helps Oakland encourage growth of commerce without negative impact on local travel
Conclusion: Big Data Can Be a Valuable Resource – And That Value Depends on Your Specific Question

I have a VERY specific question and no flexibility on output.

I have a specific question Big Data is suited to.

I have a broad question I want to explore.

I like pretty maps.
Thank You
Q&A

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