Easy Analysis of Traffic Bottlenecks

Michael Dannehy

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Congestion is a global problem.

**Top 3 - Increasing congestion**
- Riverside: 15% (3) Current 18%
- Vancouver: 32% (3) Current 33%
- Boston: 18% (3) Current 21%

**Top 3 - Decreasing congestion**
- Mexico City: 60% (6) Current 54%
- New Orleans: 24% (2) Current 22%
The worst 25 cities in 2013

<table>
<thead>
<tr>
<th>Rank</th>
<th>CI change</th>
<th>City</th>
<th>Country</th>
<th>Congestion</th>
<th>Morning peak</th>
<th>Evening peak</th>
<th>Highways</th>
<th>Non-Highways</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>▲</td>
<td>Rio de Janeiro</td>
<td>Brazil</td>
<td>55%</td>
<td>84%</td>
<td>115%</td>
<td>45%</td>
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<td>2</td>
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<td>Mexico City</td>
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<td>89%</td>
<td>43%</td>
<td>60%</td>
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<td>3</td>
<td>...</td>
<td>São Paulo</td>
<td>Brazil</td>
<td>46%</td>
<td>66%</td>
<td>95%</td>
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<td>52%</td>
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<td>36%</td>
<td>55%</td>
<td>75%</td>
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<td>Vancouver</td>
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How to collect data at an urban level?

The options were:
- Roadside equipment like loops, radar, ANPR, camera, bluetooth)
- Roadside interviews & measurements (moving observer)
- Phone interviews

However,
- These methods are expensive and time consuming
- Collection of data and data processing is time consuming
- Information is sparse and fragmented over time and space
- Information not available for the full network

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Problems with before and after comparisons

Not all studies are alike. You need to have the same:

- Date range (impact of seasons)
- Time period's
- Start and end points
- Granularity
- Sample Size
Floating Car Data provides new opportunities
Analysis Example: Amsterdam
Example analysis for Amsterdam

Where: Amsterdam

When: Q1 2014

What: Analyze speeds in the Morning Rushhour (06:00 – 09:00) and compare these to the speeds driven during the night (00:00 – 05:00)

Purpose: identify the worst bottlenecks in the Amsterdam road network
Example Speed Analysis for Amsterdam

Roadname: Ij-tunnel
Length: 265 Meters
Average travel time: 15.8 Seconds
Medium travel time: 14.9 Seconds
Average Speed: 63.6 Km/h
Median Speed: 64.0 Km/h
Standard Deviation Speed: 10.7
Sample Size: 16082 vehicles

Average speeds for morning rush hour (km/h)
Example Congestion Analysis for Amsterdam

Roadname: A10
Length: 42 Meters
Travel Time Ratio: 4.95
Example Congestion Analysis for Amsterdam
Analysis Example Italy
Case Study Citilabs - SPEA

Where: A14 Bologna S.Lazzaro – Castel S.Pietro
       Castel S.Pietro – Imola
       Imola – Dir.Ravenna

When:  2012, October       #1
       2012, August, 15   #2

What:  SPEA – vehicular data of vehicle types: cars, motorcycles, over the road truck, trucks under 3,5 tons, collected by Tutor portals
       TomTom – vehicular data collected by millions of TomTom navigation devices, mainly from *In car Dash Navigation*

Purpose: compare data provided by SPEA and data derived from TomTom Floating car Data. This in order check the validity of Floating Car Data
The data are compared for a specific segment. Speed data from the Ground Loops (Vel. Cl. A) are compared with Floating Car Data (TomTom).

The middle portion of the day is highlighted in yellow: from 06:00 to 21:00
Non-Loop analysis number 1
Approach to the Bologna San Lazzaro toll booth (dir. Bologna)
The segments of interest from TomTom shapefile
Analysis of TomTom average speed data in the approach, the transit and in the way out from of the toll booth
Non-Loop analysis number 2
Approach to the Ravenna Barrier toll booth (dir. Ravenna)

Analysis of a situation on interest #2
**Approach to the Ravenna barrier (dir. Ravenna, 2012 August 15)**

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Selection of segments of interest from TomTom shapefile
Analysis of TomTom average speed data in the approach, the transit and in the way out from of the toll booth.

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Questions?