Traffic Bottleneck Analysis and Real-Time Traffic Services

ESRI European Congress 2014

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Congestion is a global problem

<table>
<thead>
<tr>
<th>Top 3 - Increasing congestion</th>
<th>Top 3 - Decreasing congestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Istanbul</td>
<td>Previous: 59%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Previous: 22%</td>
</tr>
<tr>
<td>London</td>
<td>Previous: 32%</td>
</tr>
<tr>
<td>Bern</td>
<td>Previous: 20%</td>
</tr>
<tr>
<td>Gothenburg</td>
<td>Previous: 21%</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Previous: 33%</td>
</tr>
</tbody>
</table>
The worst 20 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>Moscow</td>
<td>Russia</td>
<td>74%</td>
<td>111%</td>
<td>141%</td>
<td>79%</td>
<td>72%</td>
</tr>
<tr>
<td>2</td>
<td>▲</td>
<td>Istanbul</td>
<td>Turkey</td>
<td>62%</td>
<td>87%</td>
<td>129%</td>
<td>73%</td>
<td>54%</td>
</tr>
<tr>
<td>3</td>
<td>▼</td>
<td>Palermo</td>
<td>Italy</td>
<td>39%</td>
<td>60%</td>
<td>64%</td>
<td>29%</td>
<td>45%</td>
</tr>
<tr>
<td>4</td>
<td>▼</td>
<td>Warsaw</td>
<td>Poland</td>
<td>39%</td>
<td>71%</td>
<td>75%</td>
<td>37%</td>
<td>41%</td>
</tr>
<tr>
<td>5</td>
<td>▼</td>
<td>Rome</td>
<td>Italy</td>
<td>37%</td>
<td>71%</td>
<td>64%</td>
<td>26%</td>
<td>41%</td>
</tr>
<tr>
<td>6</td>
<td>▼</td>
<td>Dublin</td>
<td>Ireland</td>
<td>35%</td>
<td>74%</td>
<td>71%</td>
<td>27%</td>
<td>42%</td>
</tr>
<tr>
<td>7</td>
<td>▼</td>
<td>Marseille</td>
<td>France</td>
<td>35%</td>
<td>60%</td>
<td>70%</td>
<td>20%</td>
<td>41%</td>
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<tr>
<td>8</td>
<td>▼</td>
<td>Paris</td>
<td>France</td>
<td>35%</td>
<td>65%</td>
<td>65%</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>9</td>
<td>▲</td>
<td>London</td>
<td>United Kingdom</td>
<td>34%</td>
<td>60%</td>
<td>63%</td>
<td>22%</td>
<td>40%</td>
</tr>
<tr>
<td>10</td>
<td>▼</td>
<td>Athens</td>
<td>Greece</td>
<td>34%</td>
<td>54%</td>
<td>49%</td>
<td>14%</td>
<td>40%</td>
</tr>
<tr>
<td>11</td>
<td>▲</td>
<td>Brussels</td>
<td>Belgium</td>
<td>34%</td>
<td>73%</td>
<td>77%</td>
<td>31%</td>
<td>36%</td>
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<tr>
<td>12</td>
<td>▼</td>
<td>Stockholm</td>
<td>Sweden</td>
<td>30%</td>
<td>59%</td>
<td>66%</td>
<td>27%</td>
<td>33%</td>
</tr>
<tr>
<td>13</td>
<td>▼</td>
<td>Stuttgart</td>
<td>Germany</td>
<td>29%</td>
<td>49%</td>
<td>60%</td>
<td>28%</td>
<td>31%</td>
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<tr>
<td>14</td>
<td>▼</td>
<td>Naples</td>
<td>Italy</td>
<td>28%</td>
<td>43%</td>
<td>50%</td>
<td>13%</td>
<td>40%</td>
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<tr>
<td>15</td>
<td>▼</td>
<td>Hamburg</td>
<td>Germany</td>
<td>28%</td>
<td>45%</td>
<td>49%</td>
<td>22%</td>
<td>32%</td>
</tr>
<tr>
<td>16</td>
<td>▼</td>
<td>Vienna</td>
<td>Austria</td>
<td>28%</td>
<td>44%</td>
<td>50%</td>
<td>18%</td>
<td>33%</td>
</tr>
<tr>
<td>17</td>
<td>▲</td>
<td>Prague</td>
<td>Czech Republic</td>
<td>28%</td>
<td>57%</td>
<td>48%</td>
<td>22%</td>
<td>31%</td>
</tr>
<tr>
<td>18</td>
<td>▼</td>
<td>Berlin</td>
<td>Germany</td>
<td>27%</td>
<td>42%</td>
<td>49%</td>
<td>24%</td>
<td>30%</td>
</tr>
<tr>
<td>19</td>
<td>▼</td>
<td>Milan</td>
<td>Italy</td>
<td>27%</td>
<td>62%</td>
<td>52%</td>
<td>17%</td>
<td>33%</td>
</tr>
<tr>
<td>20</td>
<td>▲</td>
<td>Lyon</td>
<td>France</td>
<td>27%</td>
<td>55%</td>
<td>53%</td>
<td>22%</td>
<td>31%</td>
</tr>
</tbody>
</table>
Traffic Bottleneck Analysis
Floating Car Data provides new opportunities
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

Travel time ratio: morning peak vs. night
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, caravan, trucks under 3,5 tons, collected by Tutor portals
       TomTom – vehicular data collected by millions of TomTom navigation device, 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 is compared for a specific segment. Speed data from the Ground Loops (Vel. Cl. A) are compared with Floating Car Data (TomTom).

Central time zone 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)
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
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)
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.
Real-Time Traffic Services
Real Time Probe Data
Traffic Incidents and Traffic Flow

- File contains information ONLY for the road stretches affected by incident/congestion
- Accurate delay, start and end location
- Current speed information on all relevant roads – both congested and freeflow
- Easy GIS integration

STOCKHOLM
The 4 steps in accurate routing

1. Base maps
2. Map Share
3. Speed Profiles
4. TomTom Traffic
Example: Driving to Frankfurt at 9AM Friday
Example: Driving to Frankfurt at 5PM Friday
Smart Planning

Travel Time: 62 minutes
Distance: 50.0 km
Smart Planning

Travel Time: 58 minutes
Distance: 51.1 km
Travel Time Isochrones (Service Areas)
Congestion Impact

Normal accessibility
Area Accessible within 10 minutes of Origin Point

Exceptional accessibility
17:00 on a Friday
Area Accessible within 10 minutes of Origin Point
Questions?