Business Innovation in the Development of Big Data Toolboxes for the Management of Professional Vehicle Fleets

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Fleet Management and Digital Transformation

- Modern fleet management systems go beyond simple location tracking.
- Fleet operators require a more in-depth knowledge of the current fleet status.
- Historical data need to be analyzed in order to assess past fleet operation.
- Accurate predictions are needed for better future fleet utilization.
- Tools should be able to give answers to various fleet management business cases.
The role of Big Data in Fleet Management and in the Supply Chain

- Fleet Management systems rely on continuous real time monitoring of vehicles updates
- A fleet of 10k vehicles generates more than 250M records per month
- Online and offline data processing offers:
  - Detailed status of each vehicle
  - Possible future position
  - Better utilization of the fleet which leads to reduced cost and quality if supply chains
Business opportunities

• Clean data to minimize erroneous sensor readings
• Insights due to correlations with the operational environment of the vehicles (e.g. weather, traffic etc.),
• Advanced management of large amounts of data on demand,
• Provide fleet managers with robust solutions for: driver behaviour; fuel efficiency; and, predictive maintenance.
Leading the user for actions

- Fleet operators don’t always have time to make a good decision

But

- A single picture can be enough to guide a user for action
Track & Know Big Data Toolboxes

- Big Data Processing (BDP)
- Big Data Analytics (BDA)
- Complex Event Recognition (CER)
- Visual Analytics (VA)
Big Data Processing (BDP)

• The BDP Toolbox specifically considers the needs of researchers, scientists, practitioners, and developers that work with big mobility data.

• It supports
  • Scalable storage and indexing
  • Efficient query processing.
Big Data Analytics (BDA)

• Cluster analysis
• Find and identify hot spots is specific area and time
• Find patterns “hidden” inside the data; where current business cases are unaware off
• Match raw or resampled GPS trajectories to the underlying road network
• Prediction of the future location of trajectories
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<thead>
<tr>
<th>Track &amp; Know Capabilities</th>
<th>Related Fleet Management Business Requirements</th>
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<tbody>
<tr>
<td>BDP: Reliable data collection modes</td>
<td>- Increase the number of external sources integrated in by the Big Data Platform (e.g. weather, holidays and geographic points identification, etc.)</td>
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<td>BDP: Track&amp;Know Big Data Operators</td>
<td>- Reduce invalid coordinates introduced due to errors in the fleet monitoring system</td>
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<td>- Reduce cases of invalid speed calculations due to errors in the fleet monitoring system</td>
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<td>BDA: Support for computing intensive, analytic processing, and machine learning techniques</td>
<td>- Identify driving behavior excess per driver</td>
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<td>- Provide recommendations for fuel consumption reduction based on driver behavior</td>
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<td>- Identify patterns leading to improved fleet maintenance costs</td>
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<td>- Support preventive maintenance recommendations based on tracked parameters (service downtime, tire life, etc.)</td>
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<td>BDA: Future Location Prediction</td>
<td>- Proactive identification of traffic hot spots per day</td>
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<td>- Alternative routes per identified hot spot</td>
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<tr>
<td>BDA: Trajectory Prediction</td>
<td>- Provide recommendations for fuel consumption reduction based on the overall fleet performance optimization</td>
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<td>- Provide accurate estimations of future travel distances</td>
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<td>- Increase the recommendations for alternative routes based on fuel economy and road conditions</td>
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Thank You