Re-use of FOT Data to Assess the Frequency and Impact of Distracted Driving

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NDS = NDS?!
• EU-project „euroFOT“ to evaluate driver assistance systems
  • Data from 115 drivers provided with a well-equipped car for three months
  • Three variants of navigation (without navigation system/build in/mobile)
  • Statement of the drivers if a trip is familiar or not at the beginning of a trip

• No other restrictions => Field operational test (FOT) => Naturalistic driving study (NDS) for analysis of distracted driving
### Results after preprocessing steps

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Participants</td>
<td>115</td>
</tr>
<tr>
<td>Number of Participants with complete data set</td>
<td>104</td>
</tr>
<tr>
<td>Number of Trips</td>
<td>39,703</td>
</tr>
<tr>
<td>Observed Kilometers</td>
<td>1,013,262</td>
</tr>
<tr>
<td>Observed Hours</td>
<td>15,129</td>
</tr>
</tbody>
</table>
• A few hundred variables with objective data (speed, THW, use of systems, driver-vehicle-interaction,...)

• Video data from nearly all trips (4 cameras)

• Coding of 348 trips with 20000 km and 256 hours overall for analyzing distracted driving.
Objective Data

Frequency of distracted driving for each driver

Analysis of distracted driving for each driver

Results showing the benefit of NDS

Video coded data

Frequency of distracted driving for each driver
Frequency of distracted driving

- **Objective data**: Talking to a hands-free telephone is the most frequent task.
- **Video-coded data**: Vehicle and mobile-interaction are the most frequent tasks.
Frequency of distracted driving

Where?

- Distracting activities are mostly located in the area of the middle console and directly in front of the driver.
- Drivers mostly either use no hand or the right hand for the secondary task.

How?
• Choosing an appropriate analysis method to find reliable effects of distracted driving.
  => Ensure comparability
  • Different type of secondary tasks (navigation vs. radio)
  • Secondary tasks have different length (telephone vs. pressing a button).

### Impact of distracted driving

<table>
<thead>
<tr>
<th>Secondary Task</th>
<th>Before</th>
<th>Beginning</th>
<th>End</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>A trip</td>
<td>No</td>
<td>Telephoning</td>
<td>Telephoning</td>
<td>Telephoning</td>
</tr>
<tr>
<td>Time-based approach</td>
<td>Secondary task</td>
<td>Before</td>
<td>During</td>
<td>After</td>
</tr>
<tr>
<td>Sequence-based-approach</td>
<td>Telephoning</td>
<td>No Telephoning</td>
<td>Telephoning</td>
<td></td>
</tr>
</tbody>
</table>
A significant increase of the distance for all road classes can be found.

The results for incoming calls are similar.
Time-based-approach for handling turn-and-press-controller

- Significant increasing of THW during handling.
- For speed similar results can be found in rural and urban areas.
Impact of distracted driving – turn-and-press-controller

- Significant less lane changes during handling.
- During handling significant less time on crossings.
Conclusion

- Objective data (> 100 drivers, ~1 000 000 kilometers) and video-coded data (>100 drivers, ~ 20000 kilometers) were analyzed.

- Phoning and vehicle interaction are the most frequent tasks.

- Two approaches were used for analyzing impact of distracted driving.

- Adaptation of driving parameters during secondary tasks as well as hints for a situation-aware behavior can be found.

- The benefit of NDS depends on variety of influences and the choice and development of appropriate analysis methods.
Thank you!

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