BMWi Funded Project Ko-PER: Compendium and Digest

BMWi Förderprojekt Ko-PER: Leitfaden und Übersicht

Dr. Reiner Wertheimer
Management & Consulting
• Existing driver assistance and active safety systems (e.g. ECC/ESP, ACC and EBA), already significantly reduce the frequency of accident types in comparatively simple traffic scenarios (e.g. single vehicle driving accidents, rear-end collisions, etc.).

• Hence, the relative incidence of accidents in complex traffic situations increases continuously.

• Complex situations often require a virtually complete representation of the local driving environment and thus tend to overburden drivers as well as “self-sufficient” on-board vehicle perception systems.

• Because of occlusions and unexpected behavior of fellow road users, human drivers (and purely intra-vehicle perception systems as well) are often caught by surprise.

• Temporary inattentiveness is an added factor in case of humans.
Accidents with personal injuries: total (100% = 206,696)

- Highways (16%)
- In town/village (24%)
- Rural roads w/o highways (23%)
- Other accident (6%)
- Stationary vehicles (14%)

Type of accident
- Turning off the road (Abbiegeunfall)
- Turning into the road/crossing (Einbiegen/Kreuzen)
- Vehicles moving along in carriageway (Längsverkehr)
- Crossing the road (Überschreitungenfall)
- Driving accident (Fahrunfall)
- Other accident (Sonstiger)

In town/village (68.9%)

- Turning off the road (13%)
- Entering into the road/crossing (16%)
- Moving vehicles along (4%)
- Other accident (4%)

Rural roads w/o highways (25.1%)

- Turning off the road (26%)
- Entering into the road/crossing (26%)
- Moving vehicles along (10%)
- Other accident (10%)

Highways (6.0%)

- Turning off the road (28%)
- Entering into the road/crossing (59%)
- Moving vehicles along (2%)
- Other accident (<1%)

One Major Result of Ko-PER
Vast Reduction of Safety-Critical Situations

Accidents with personal injuries in town/village (Germany, 2012)
Source: German Federal Statistical Office

Type of accident
- Turning off the road (Abbiegeunfall) 11%
- Turning into the road/crossing (Einbiegen/Kreuzen) 13%
- Vehicles moving along in carriageway (Längsverkehr) 4%
- Crossing the road (Überschreitungenfall) 16%
- Driving accident (Fahrzeugunfall) 8%
- Other accident (Sonstiger) 21%
- Stationary vehicles (Ruhender Verkehr) 26%

Assessment of potential benefit
Result of extensive driving simulator studies (IZVW)

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<th>Relative frequency of safety-critical situations [%]</th>
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- no assistance
- with assistance

September 18, 2013
Ko-PER: Compendium and Digest
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The Ko-PER Pyramid
Layers of Information Processing

Use Cases

Safety Functions

- MMI
- Driver Intention
- Risk Analysis
- Scene Interpretation
- Inter-Vehicle (Cooperative) Perception
- I2V- and V2V-Communication

Intersection-based
Local Perception

Intra-Vehicle Perception
& Self-Localization
Ko-PER Building Blocks: From Sensor Data to Situation Awareness

- Perception Network Intersection
- In-Vehicle Perception
- High Precision Self-Localization

- Wireless I2V and V2V Communication
- Inter-Vehicle Sensor Data Fusion / Cooperative Perception

- Situation Analysis
- HMI Composition / Effectiveness
- Preventive Safety Functions
Ko-PER Will Contribute 16 Talks Grouped in the Following 4 Sessions

<table>
<thead>
<tr>
<th>Bezeichnung der Session</th>
<th>Session Moderator</th>
<th>Corporation / Institution</th>
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<tbody>
<tr>
<td>Eigenlokalisierung und Kommunikation</td>
<td>Dr.-Ing. Felix Klanner</td>
<td>BMW Group Forschung und Technik</td>
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<tr>
<td>Infrastrukturbasierte Perzeption und Informationskarten</td>
<td>Prof. Dr.-Ing. Klaus Dietmayer</td>
<td>Universität Ulm</td>
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<tr>
<td>Kooperative Perzeption und Situationsanalyse</td>
<td>Dr. rer. nat. Andreas Wedel</td>
<td>Daimler Aktiengesellschaft</td>
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<tr>
<td>Situationsinterpretation und aktive Sicherheit / neuartige Fahrerinformationskonzepte</td>
<td>Dipl.-Psych. Alexandra Neukum</td>
<td>Interdisziplinäres Zentrum für Verkehrswissenschaften IZVW</td>
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Now Enjoy

Selected Presentations

provided by the three funded projects

Ko-TAG, Ko-KOMP and Ko-PER

affiliated in

Research Initiative Ko-FAS