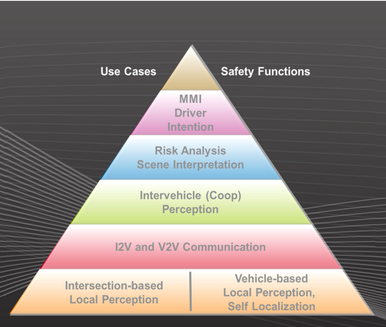

Cooperative Perception & Apps
Key Story, Digest, Outlook

Project Ko-PER

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K O - F A S

Existing driver assistance and active safety systems like ECC/ESP, ACC and EBA (electronic brake assist), already significantly reduce the frequency of accident types in comparatively simple traffic scenarios (*e.g.* single vehicle driving accidents and rear-end collisions).

As a result, the relative incidence of accident types that occur in more complex situations increases continuously.

Such complex scenarios often require a virtually complete representation of the local driving environment and thus 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 self-sufficient intra-vehicle perception systems as well) are often caught by surprise. Temporary inattentiveness is an added factor in case of humans.

One major outcome of Ko-PER is the evidence that the criticality of such situations is decisively reduced if said surprise effects are avoided by deploying timely advisory warnings (1-2s before the latest instant to induce necessary emergency measures that prevent an imminent collision).
► Visit Live demos but also MMI investigations / driving simulator (@ Foyer)

The crucial pre-requisite for such timely advisory warnings to be appropriate is an least basic understanding (by the *technical* system, that is) of the relevant traffic situation (including the driver's and fellow road users' intentions) and its inherent risks.
► Situation analysis / risk assessment (Visit Live demos & Foyer)

In order to achieve any meaningful situation analysis in complex situations, Ko-PER has systematically adopted the paradigm: ***Distributed sensor networks accomplish a vitally more complete prospect of the local traffic environment as an only individual one is capable to accomplish.***

Accordingly, Ko-PER vehicles as well as the sensor network of the local Ko-PER test intersection wirelessly broadcast what they observe to all other road-bound traffic partners in the vicinity, taking advantage of a type of messaging which has been specifically designed and implemented to accomplish the task of *Cooperative Perception.* ► Ko-PER communication group (Visit Foyer)

The messages received by a vehicle are associated and integrated there with its own findings (inter-vehicle sensor data fusion) to achieve the afore mentioned virtually complete information about the current driving environment – which is in turn used to feed the situation analysis modules. ► cf. intra- and inter-vehicle sensor data fusion (Visit Live demos & Foyer)

Inter-vehicle sensor data fusion requires an overall consensus about the spatial and temporal relations coming along with any local and/or communicated observation; therefore, sufficiently precise self-localization and temporal synchronization are crucial system-related issues.
► cf. methods & approaches for self-localization (Visit Foyer)

Last not least, the intersections sensor network and perception system is particularly eligible to detect all nearby road users, hence predestinated not only to resolve occlusions, but also to timely predict imminent pedestrians behavior. ► cf. Live demo / Intersection pavilion

Outlook: Research focusing on computer-based situation comprehension and the development of methods suitable for vehicle-based driver-in-the-loop investigations covering arbitrary critical (hence dangerous) situations constitute the most consistent next development cycle.

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