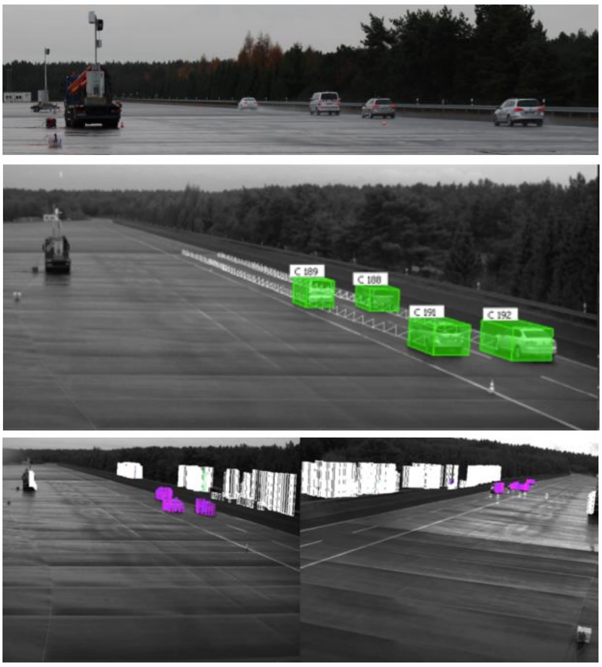
TESTING AND SAFEGUARDING – Booth No. 26

PROVING GROUND & FIELD TESTS - MOBILE TRAFFIC ACQUISITION

PEGASUS

Technical data

- System consists of mobile sensor poles with a fused field of vision
- Sensor head with stereo camera system and infrared flash for 24/7 operation
- Communication unit: V2X-RSU for information exchange with vehicles and LTE-connection for remote access
- Power supply via external link to national grid or power unit
- Outdoor control box for processing computers
- Output data: trajectories (position, speed, acceleration, heading) and corresponding scene videos with augmented bounding boxes



Scene video with augmented bounding boxes (top). 3D particles with coded direction of movement by color (bottom).

Measurement campaign for data validation at test site in Ehra-Lessien.

Closer view on sensor head of one of the poles with vertical stereo camera system and infrared flash .

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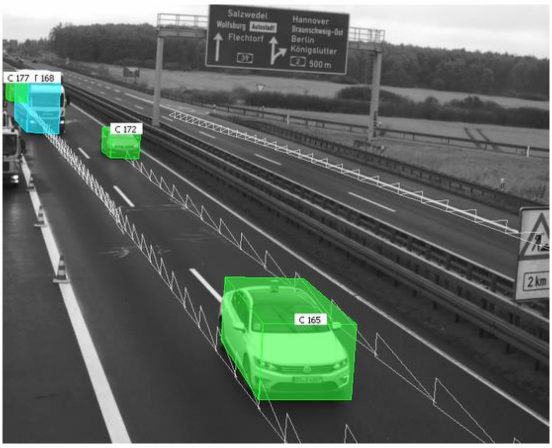
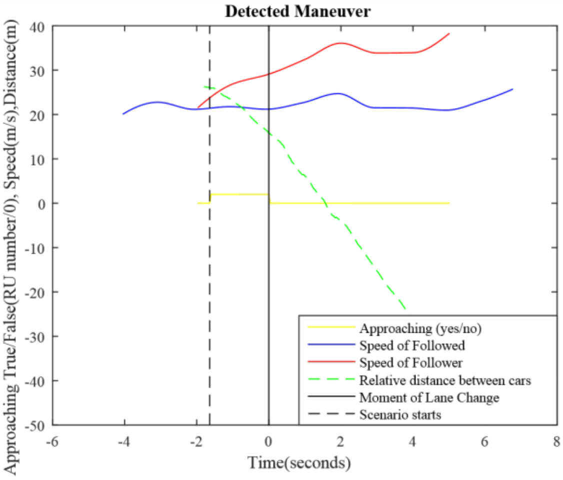
Application

- Detection, tracking and classification of motorized (and non-motorized) traffic in freeways
- Delivery of ground truth traffic data to enrich vehicle perspective
- Observation of driving behavior and interaction of automated and non-automated vehicles in the field
- Analysis of traffic behavior in freeways
- Maneuver and parameter extraction for testing ADFs in simulation environment
- Storage of data for offline-applications in local database
- Ability to be integrated in cooperative system approaches via V2X (using messages like CPM or DENM)



Augmented scene video from A39

Measurement campaign at Autobahn A39



Maneuver detection and extraction based on the dynamic tracked data in a freeway environment (current use-case: approaching maneuver followed by a lane change)

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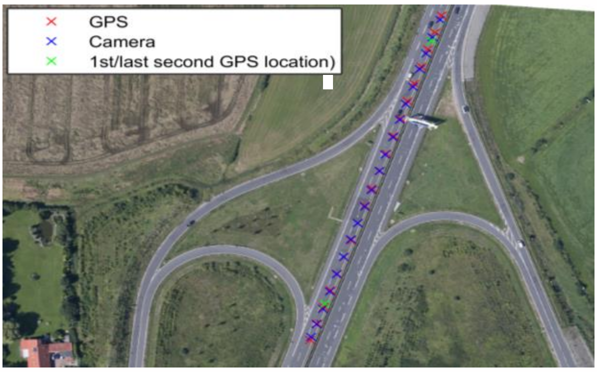
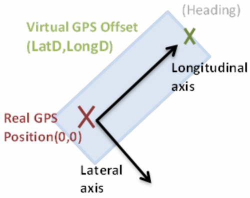
Evaluation of accuracy

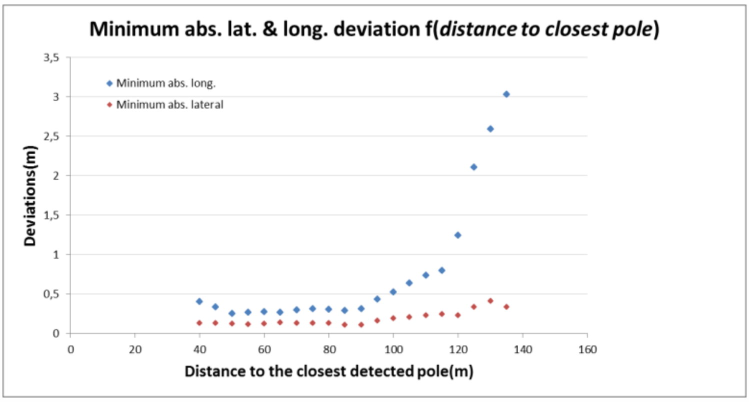
- Ground truth data obtained via vehicles with dGPS for evaluation of lateral and longitudinal average positioning deviation with respect to the distance of the detected object to the closest pole
- Analytical error quantification indicates that object detection can be carried out for distances greater than 100 m with an average positioning accuracy of 0.25 m (max. long 0.55m, max. lat 0.35m dev.)
- Validation of enriched hardware stereo-setup on proving ground and field test successfully done. Accuracy is sufficient for microscopic behavior analysis.
- Experience is integrated in creation of “Testfeld Niedersachsen”, which is currently build at the A39



Satellite image of A 39 with visualization of the accuracy analysis made on one of the detected vehicles. The trajectory is represented by both data sources (poles and dGPS).



vehicle coordinate system



Average deviation of the lateral and longitudinal position estimation with respect to the closest distance of the object to the pole.

Satellite image of proving ground in Ehra. Plotted is the estimated position of one vehicle according to cameras and dGPS data.

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