

GPUtech Europe 2018 Munich

highD and ADI - Naturalistic Trajectory Datasets of German Highways and Intersections from Aerial Perspective

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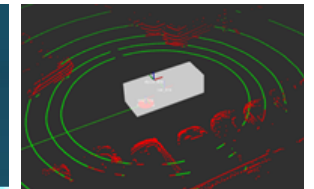
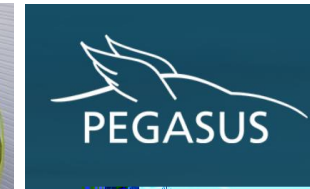
Institute for Automotive Engineering

About us

Institute for Automotive Engineering of RWTH Aachen University

The Automated Driving Department has expertise on

- Safety Validation of Highly Automated Driving
- Applications of Machine Learning
- Driving Simulators
- Driving Simulations
- Automated Driving Functions, such as Valet Parking



Robert Krajewski



Research Scientist since 2016
Automated Driving Department

Expert on

- Computer Vision
- Generative Models
- Safety Validation of Highly Automated Driving

Julian Bock



Research Scientist since 2014
Automated Driving Department

Expert on

- Computer Vision
- Predictive Modelling of Road Users
- Safety Validation of Highly Automated Driving

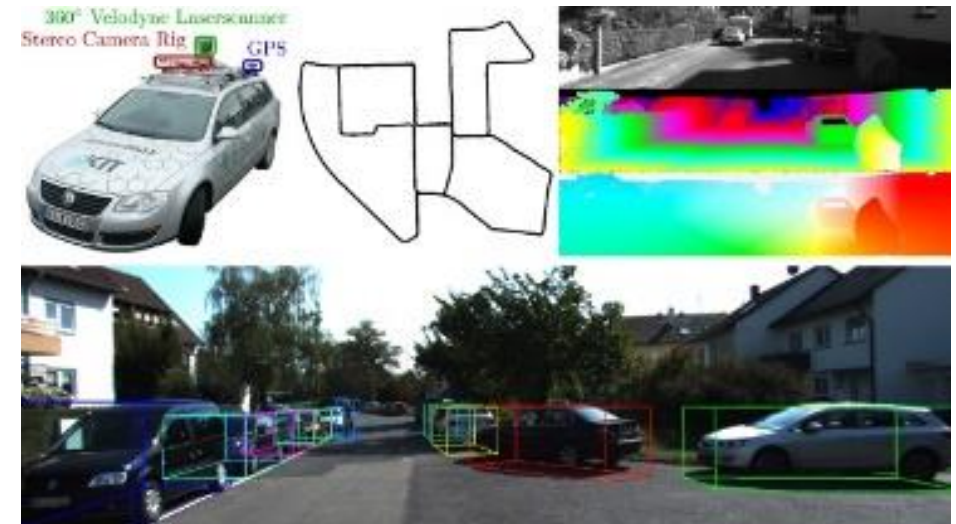
Motivation: Relevance of Datasets

Vehicle sensor datasets such as Cityscapes and KITTI are heavily used in industry and research

Cityscapes



KITTI

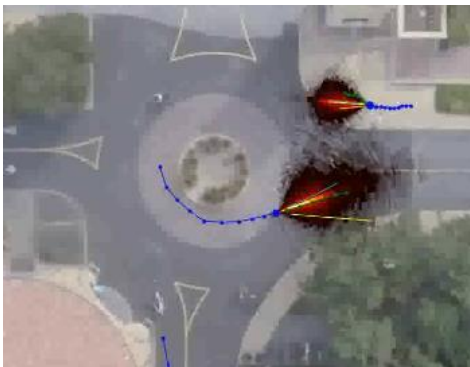


But what about other fields of automated driving?

Data are relevant for many fields in automated driving and road traffic!

Motivation: Fields with need for appropriate datasets

Prediction of Road Users



Scenario-based Validation and Verification of HAV



Source: PEGASUS Project

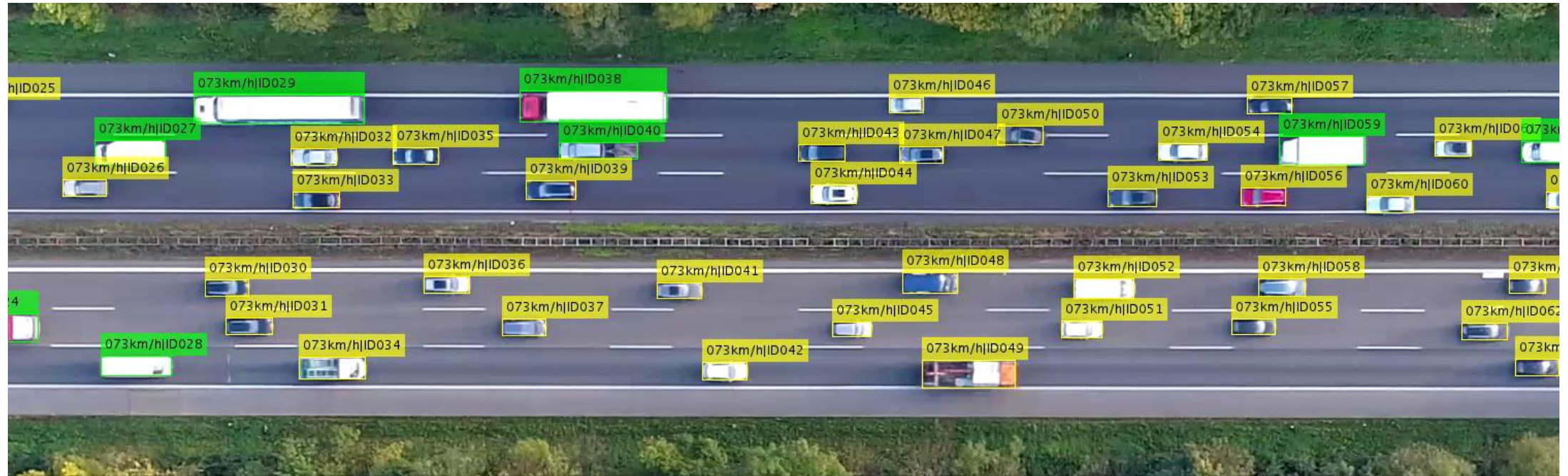
Driver Modelling



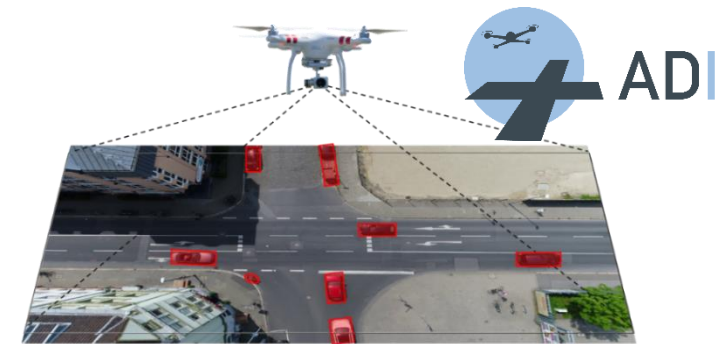
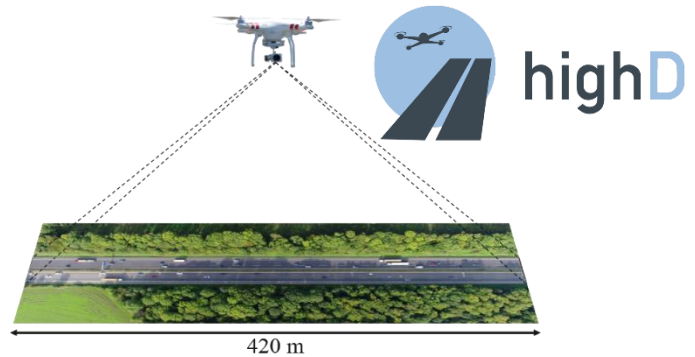
Source: Handelslatt

→ There is an urgent need for large naturalistic trajectory datasets

Our proposed solution



Datasets at a Glance

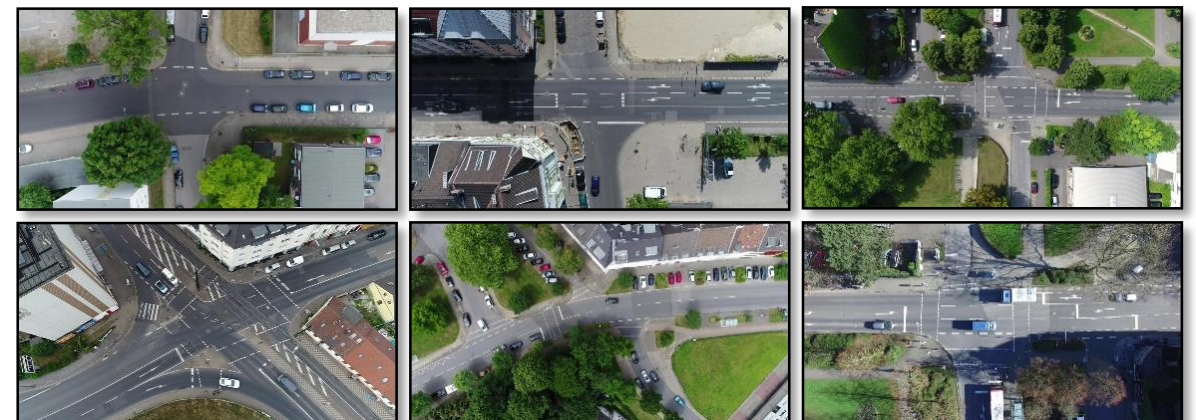


Highways

- Measurements from 6 locations
- Number of vehicles: 110 000
- Driven distance: 45 000 km
- Pixel-level accuracy = 0.1-0.2 m

Intersections

- Measurements from 6 different intersections in 2 cities
- Number of pedestrians: > 3000
- Number of Vehicles: > 10 000
- Accuracy: <0.1m

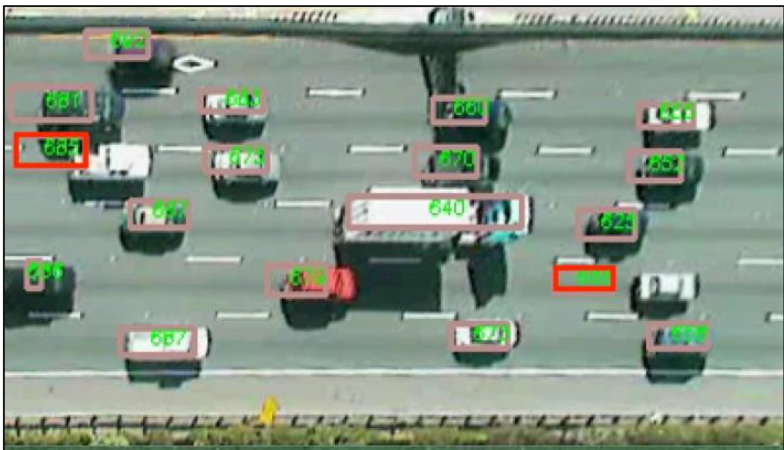


Comparing the highD Dataset to the NGSIM Dataset

- **NGSIM** is the current state-of-the-art trajectory dataset on naturalistic highway driving
- **highD** exceeds NGSIM in accuracy and size:

Accuracy

NGSIM



Source: Coifman et al.



Size

Attribute	Dataset		
	NGSIM	highD	
Recording Duration [hours]	1.5	16.5	11x
Vehicles	9 206	110 000	12x
Cars	8 860	90 000	10x
Trucks	278	20 000	71x
Driven distance [km]	5071	45 000	9x
Driven time [hours]	174	447	2.5x

highD Dataset: Available Now!

highD-dataset.com

highD

Home About Explore Download Commercial Team

C|118km/h|ID124 C|120km/h|ID128 C|136km/h|ID137 C|114km/h|ID132

T|075km/h|ID135 T|074km/h|ID131 T|084km/h|ID123 T|075km/h|ID114

The Highway Drone Dataset

Naturalistic Trajectories of 110 000 Vehicles Recorded at German Highways

New Request access to the dataset upon release!

About the Dataset

The highD dataset is a new dataset of naturalistic vehicle trajectories recorded at German highways. Using a drone, typical limitations of established traffic data collection methods like occlusions are overcome. Traffic was recorded at five different locations and includes more than 110 000 vehicles. The trajectory for each vehicle, which includes type, size and driven maneuvers, is automatically extracted. Using state-of-the-art computer vision algorithms, the positional error is typically less than 10 centimetres. While the dataset has been created for safety validation of highly automated vehicles, it is also useful for tasks such as analyzing traffic patterns or deriving driver models.

420 m

Large-scale Dataset

The dataset includes:

- 110 000 vehicles (90 000 cars, 20 000 trucks)
- 45000 driven kilometres
- 147 driven hours

High Quality and Variety

The dataset includes:

- Five different recording locations
- Different traffic states (free flow, traffic jams)

Enriched Data

Pre-extracted information:

- Surrounding vehicles
- Metrics like THW or TTC
- Driven maneuvers (e.g. lane changes)

Easy Start

Provided scripts for Matlab:

- Visualization of recorded trajectories
- Scripts for manoeuvre classification
- Scripts for calculating statistics

Contact

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