

VERIFICATION
VALIDATION
METHODS

Final Event 21 / 22 November 2023

Infrastructurally collected traffic data for scenario extraction and analysis

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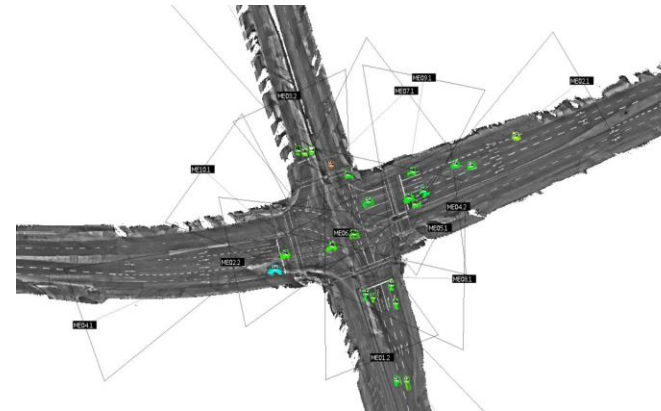
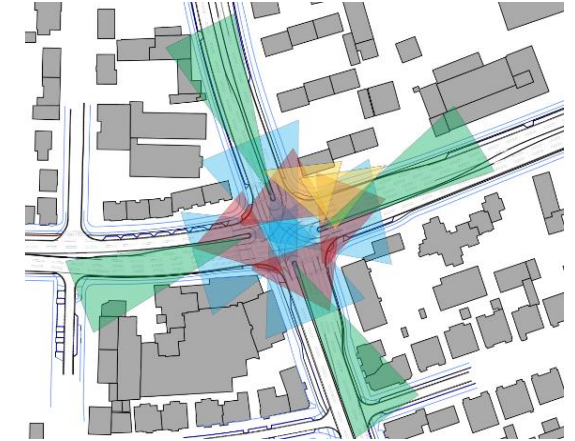
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AIM Research Intersection

- Part of the *Anwendungsplattform Intelligente Mobilität (AIM)* as a real traffic laboratory in Braunschweig operational since 2014
- 14 vertical Stereo-Sensor-Systems
- Weather station
- Detection and classification of motorized and non-motorized traffic participants
- Provision of augmented scene videos and numerical trajectory data







Overview

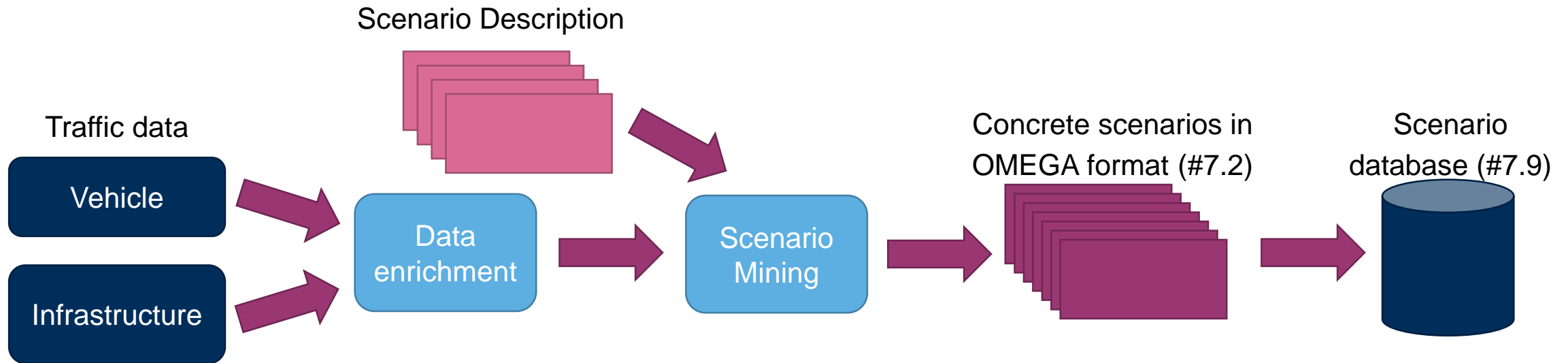
- Exploitation of individual measuring locations such as country roads
- Stand-alone operation or combination of several stations
- Transport height: 4m
- Maximum height in measuring mode: 8m
- Weight: 2.3 tons
- Power requirement: 2.5 kW
- Local data processing
- Uninterruptible power supply (UPS)
- Air conditioning
- Remote access via LTE router

Sensors

- 2x stereo camera systems
- 2x infrared flashes
- 1x RSU for C2X communication



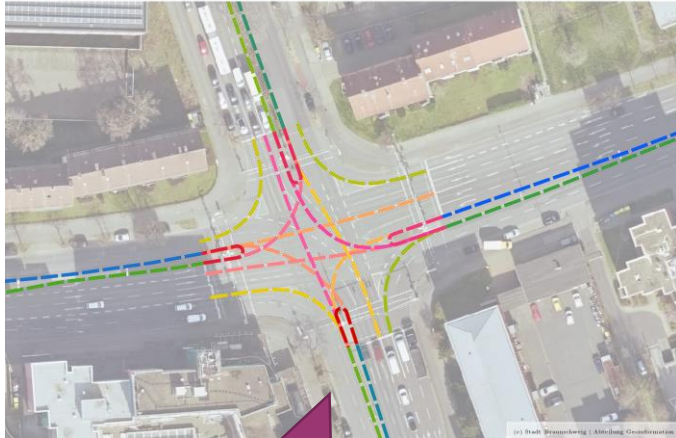
Scenario extraction from real-world traffic data



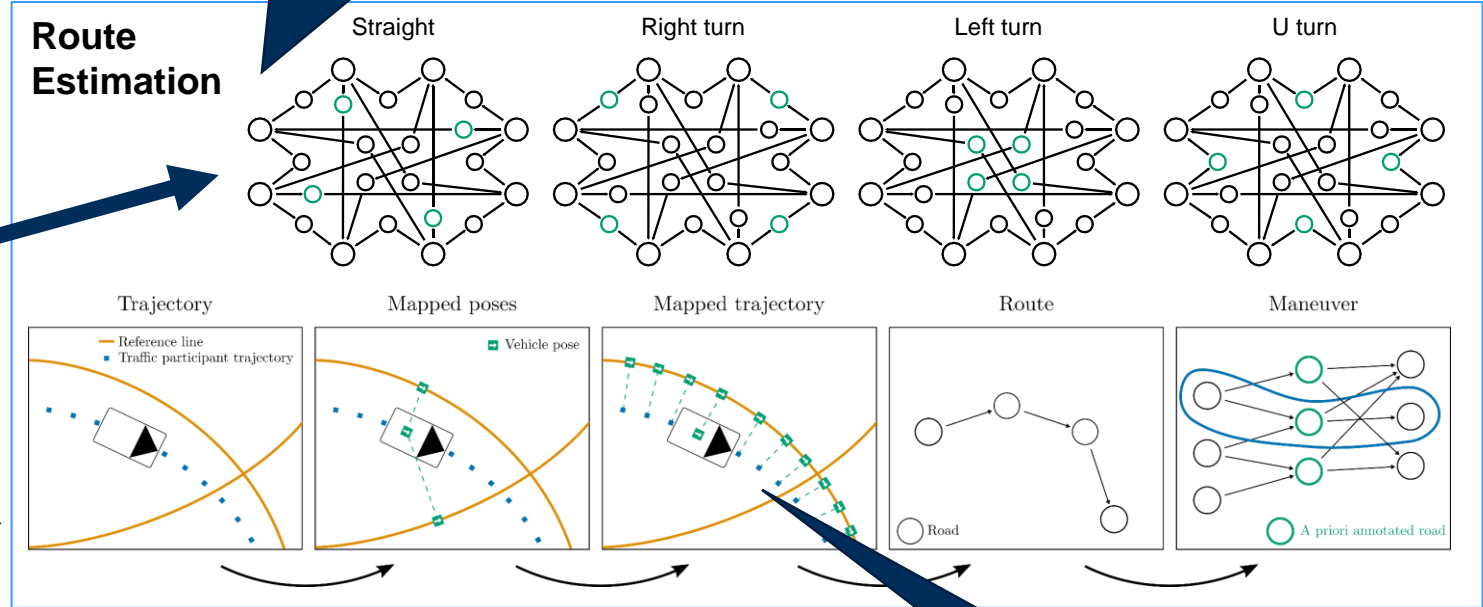
- ▶ The scenario descriptions are used to design a problem-tailored processing pipeline
- ▶ The scenario mining component hosts and manages the pipelines for extracting concrete scenarios

Scenario mining

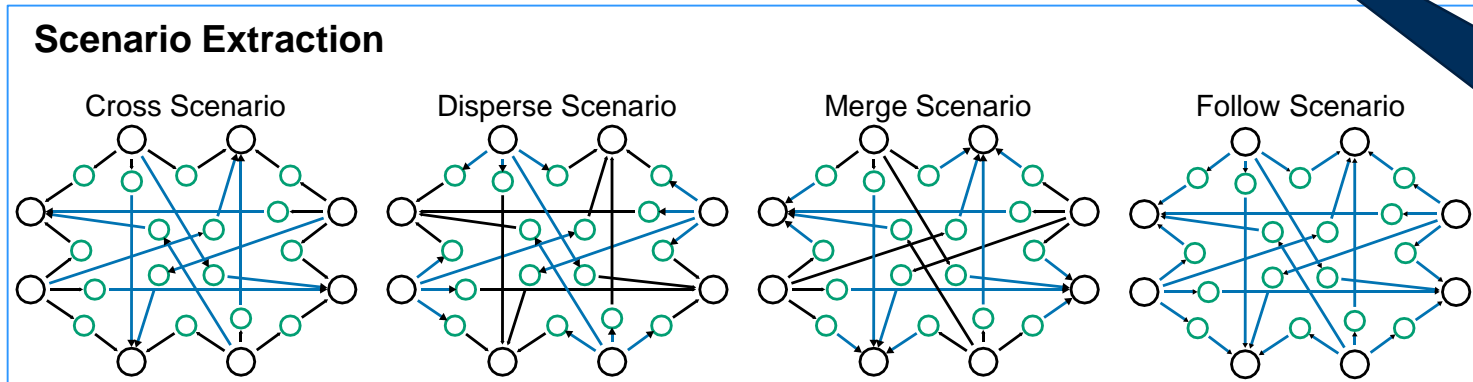
| Roads | | | | | |
|--------|--------|--------|--------|--------|--------|
| 100000 | 200000 | 300010 | 300014 | 300018 | 300022 |
| 101000 | 201000 | 300011 | 300015 | 300019 | 300023 |
| 179000 | 279000 | 300012 | 300016 | 300020 | 300024 |
| 180000 | 280000 | 300013 | 300017 | 300021 | 300025 |



Annotate roads with primitive routing maneuver



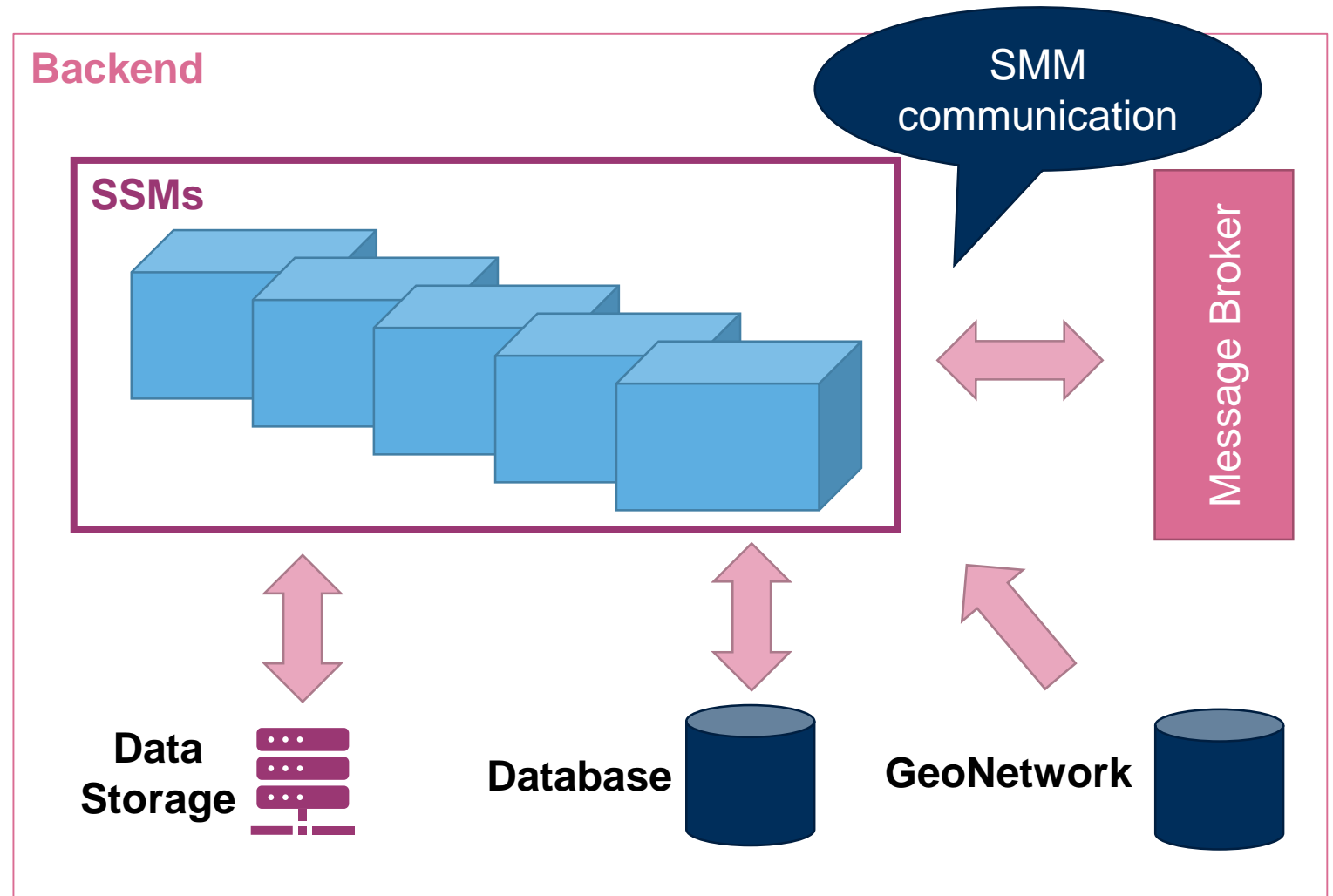
OpenDRIVE representation of road network



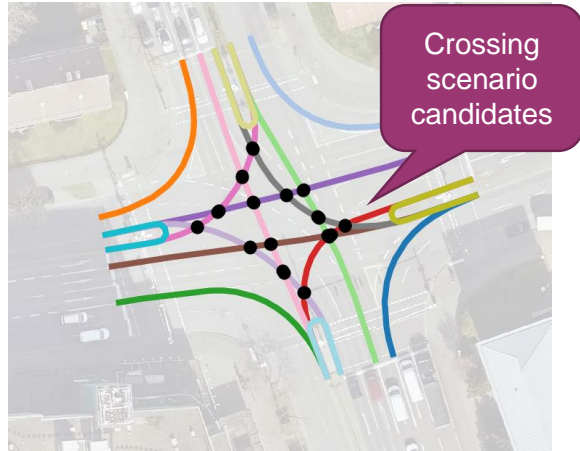
Associate traffic participants with maneuver annotated roads via their trajectory

Scenario mining | Architecture overview

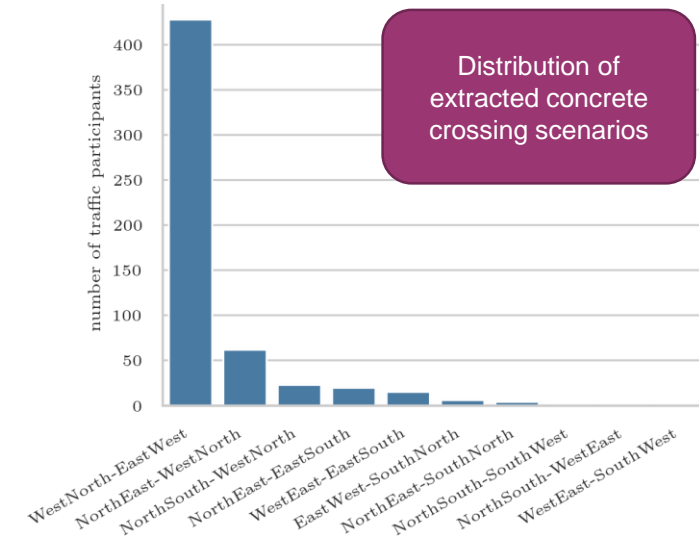
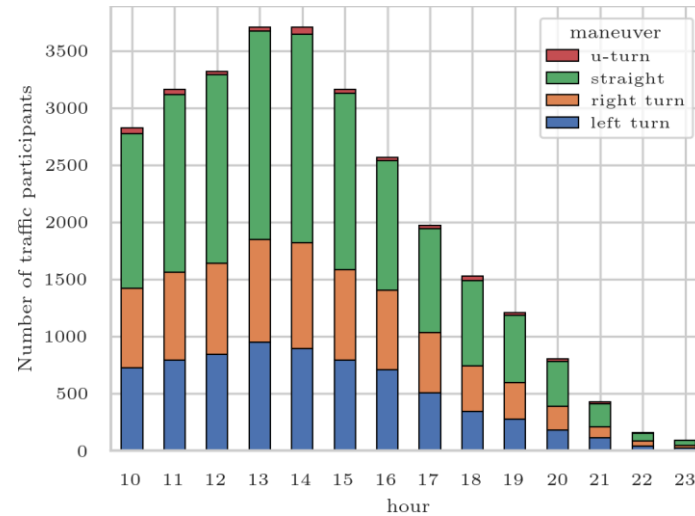
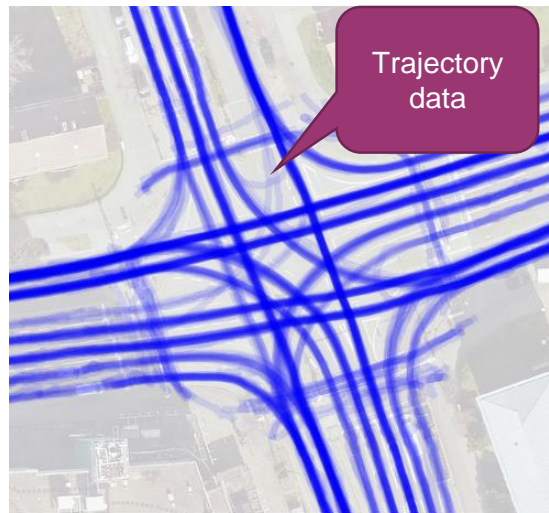
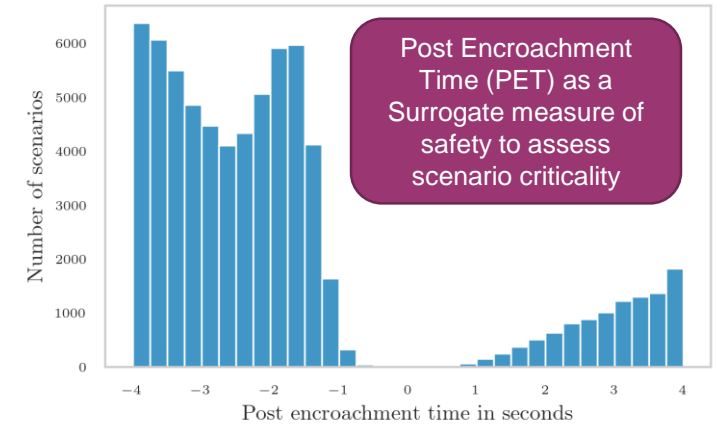
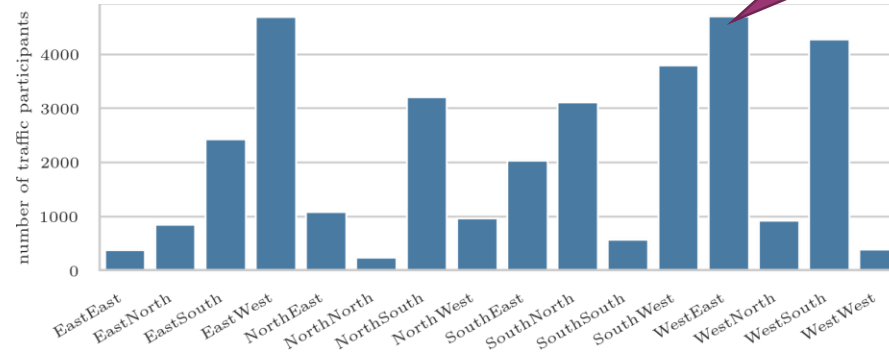
- ▶ Microscopic traffic data from measurement infrastructure is send to Backend
- ▶ Scenario Mining Modules (SMMs) are deployed for scenario extraction in Kubernetes
- ▶ A SSM has a dedicated task, e.g. map matching, route estimation, PET estimation, ...



Crossing Scenarios on Research Intersection



Distribution of traffic participant's route usage



(c) Stadt Braunschweig | Abteilung Geoinformation

Thank you!

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A project developed by the VDA Leitinitiative
autonomous and connected driving

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