KI DATA TOOLING
The Data Kit for Automotive AI

Benefits of the “AIM Research Intersection“ for KI Data Tooling

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Acquisition, Curation & Refinement of Real Data

Data Recording

At the “AIM Research Intersection” of the DLR a dataset was recorded together with recording vehicles from project partners (see Figure 1). In addition to the trajectory data, the sensors mounted at the intersection also provide weather data on visibility, water layer thickness and road grip.

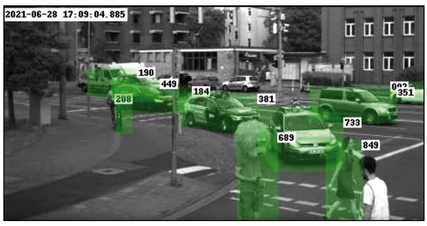

Figure 1: Camera image with augmented bounding boxes (green) and recording vehicles from Bosch (object 733) and Valeo (object 981). A corner case was recorded: Object 689 is wearing the headpiece of a costume.

Data Post-Processing

The trajectory data (see Figure 2) was compared with the CAN data from the recording vehicles to identify the vehicles in the infrastructure dataset. This information was annotated in the trajectory data to facilitate the easy utilization of the shared datasets.

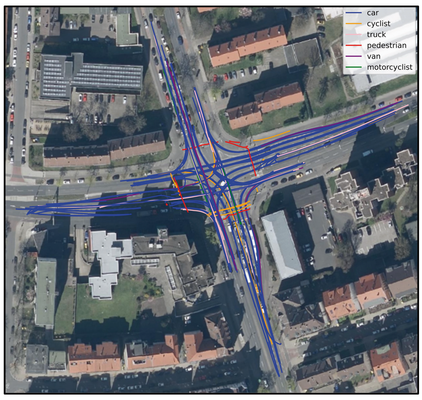

Figure 2: Trajectories of traffic participants from sequence 2599. Copyright: State Office for Geoinformation and Land Surveying Lower Saxony

Context Generation

Three types of context data were extracted from the trajectory data: traffic volume, traffic speed, and criticality.
Traffic volume: The infrastructure-based monitoring enables the determination of the traffic volume per route (see Figure 3). This context serves to identify heavily traveled lanes and cannot be generated by a single vehicle since the entire route cannot be observed from an individual vehicle's perspective.

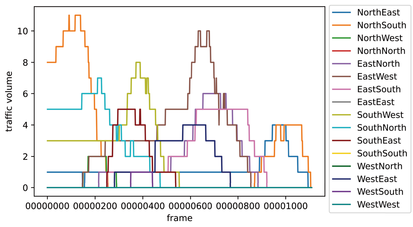

Figure 3: Traffic volume per route for sequence 2599

Traffic speed: The average speed of road users per route was computed to discern whether vehicles on a route are moving or waiting.
Criticality: The criticality of the situation was assessed based on time-to-collision, allowing for the identification of critical situations.

Trajectory Auto-Labeling

A methodology for the automated extraction of critical and atypical traffic scenarios (see Figure 4) from trajectory data was developed. The data can now be utilized for testing automated driving functions.

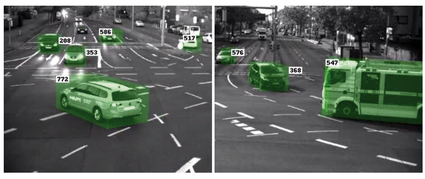

Figure 4: Two augmented images from the AIM Research Intersection illustrate critical situations involving objects 353 and 772 in the left image and objects 368 and 547 in the right image.

Conclusion

The research intersection provides information about the traffic situation at the entire intersection, including areas and road users that may be obscured from the vehicle's view but are on a collision course with the vehicle. Furthermore, it enables the differentiation of traffic situations into normal and atypical scenarios and provides valuable insights into real-world traffic behavior.

Partners

BMW GROUP · BOSCH · Continental · Valeo · ZF · Ansys · AVL · dSPACE · DLR · FKFS · FZI · Bergische Universität Wuppertal · Universität Stuttgart · Technische Universität München · UNIKASSEL VERSITÄT · Universität Passau

External partners

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