DLR Institute of Transportation Systems

DLR Urban Traffic dataset (DLR UT)

Version 1.1.0
Dataset Documentation

DLR

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1. Introduction

One of DLR's strategic positions is to foster innovation and transfer by embedding parts of DLR tooling frameworks into external value chains (process-driven) and by linking innovative data and models to R&D and V&V procedures (data-driven). Among other pillars, DLR operates research infrastructures that provide such tooling and data frameworks for potentially embedding them into external tooling frameworks.

One strategic main development corridor is the thematic area of virtualized verification and validation processes e.g. as performed in research projects like VVM or SET Level. In both projects methodological aspects of a generic safety case - leading to a process view on the safety case - and a data- and model-driven tooling approach - leading to an open source V&V toolchain called Open Source Toolchain for Automotive Reserach (OSTAR) has been established by DLR to support the realization of safety cases by providing data, models and simulation services.

Consequently, following the above strategy, it is pursued to link examples according to data, models, and services to external technical ecosystems to generate win-win situations like professional exchange and initiation of cooperation and common research projects.

The real-world trajectory dataset offered here serves as an example for potential partners from Industry and Science to integrate DLR-generated data into their analysis and R&D toolchain procedures. The dataset was generated at the AIM Research Intersection in Braunschweig, Germany, which is one part of DLR's acquisition technology. The dataset is intended to be used in research and development only. Neither the completeness nor the correctness of the dataset can be guaranteed in any way. The dataset author does not take legal responsibility for the use of this dataset for any purposes or endangerment that occurs during usage.

2. Quick Facts

Topic	**Content**
Dataset name	DLR Urban Traffic dataset
Dataset acronym	DLR UT
Dataset version	1.1.0
Date of emission	November 2024, 1st
Emitting entity	DLR Institute of Transportation Systems
Download from	https://doi.org/10.5281/zenodo.14025010
Filename	DLR-Urban-Traffic-dataset_v1-1-0.zip
Size (uncompressed)	2.6 GB
Duration	1 day of data
Collection Period	24.09.2023 00:00:00 - 25.09.2023 00:00:00 UTC+0
License	CC BY-NC-SA 4.0
Contact	Mr. Clemens Schicktanz, clemens.schicktanz@dlr.de

3. General Description

3.1. Brief Description

The dataset comprises trajectory data of traffic participants, along with traffic light data, current local weather data, and air quality data from the Application Platform Intelligent Mobility (AIM) Research Intersection. The trajectory data is indexed by object ID and timestamps, including detailed information about the position, speed, acceleration, dimensions, and classification of each object. The dataset contains 31,405 trajectories, covering both motorized and vulnerable road user (MRU and VRU). The traffic light data captures the current state of all 30 traffic lights at the intersection. The weather data provide information on wind, sunlight, precipitation, visibility, and more. The air quality data represent concentrations of five different gases and fine particle concentrations in the atmosphere.

3.2. Data Source

The trajectory data is extracted from video recordings from 14 Multi-Sensor Systems that are mounted around the AIM Research Intersection at 10 different installations. See the detailed explanation below.

Further details:

- S. Knake-Langhorst and K. Gimm, "AIM Research Intersection: Instrument for traffic detection and behavior assessment for a complex urban intersection" *JLSRF*, vol. 2, A65, 2016, doi: 10.17815/jlsrf-2-122.
- S. Knake-Langhorst, "Generische Systemarchitektur für die Erhebung mikroskopischer Verkehrsdaten", Technische Universität Berlin (Germany), 2022.

The traffic light data is sourced directly from the traffic light control system. Weather and air quality data are collected from a station with 6 sensors mounted on a streetlight pole.

3.3. Geographical Coverage

Description of the area where the data was captured:

- Google Maps
- DLR: AIM Research Intersection
- Intersection: Hans-Sommer-Str. / Brucknerstr. / Rebenring / Hagenring, 38106 Braunschweig, Germany
- UTM Zone 32 N, Easting: 604625-604900, Northing: 5792650-5792875

Figure 1: Geographical Coverage. © The City of Braunschweig, Department Geographic Information

3.4. Versioning

We use Semantic Versioning in the MAJOR.MINOR.PATCH format (e.g. v1.0.0) to differentiate potential future modifications to the dataset.

- The MAJOR version is incremented when data from a different time range is published.
- The MINOR version is incremented when new raw data is added to the dataset (e.g., V2X data).
- The PATCH version is incremented when errors in the data are corrected (e.g., merging two trajectories that belong to the same object) or when changes are made to the documentation.

3.5. Change Log

1.1.0

- Edit data:
    - Merge some trajectories → New total number of trajectories: 31,405
    - Split weather data into weather and road condition data → Add new folder road_condition
- Edit documentation
    - Add sections about "Road Condition Data"
    - Minor fixes

1.0.1

- Edit documentation and rename ZIP file of dataset

1.0.0

- Initial publication

4. Data Structure and Content

4.1. General

4.1.1. Format and File Type

- File format: CSV
- Structure: The data is organized in a tabular format, with a unique index combining the timestamp and object ID to ensure each entry is distinct.

4.1.2. Data Segmentation

- The data is divided into 15-minute batches to manage file size.

4.1.3. Sampling Rate

- Trajectory data: 20 Hz
- Traffic light data: 1 Hz
- Weather data: every 10, 30, or 60 seconds
- Road condition data: every 30 seconds
- Air quality data: every 60 seconds

4.2. Trajectory Data

Table 1: Trajectory data format

Name	Unit	Data type	Description
timestamp	-	ISO timestamp	The timestamp indicating when the data was recorded.
id	-	int	The traffic participant's ID is derived from the timestamp in microseconds of their first detection.
center_easting	m	float	The x-coordinate of the object's center in UTM zone 32N.
center_northing	m	float	The y-coordinate of the object's center in UTM zone 32N
velocity_easting	m/s	float	The velocity vector's component along the east direction.
velocity_northing	m/s	float	The velocity vector's component along the north direction.

velocity_magnitude	m/s	float	The speed of the object, calculated as the absolute value of the velocity vector.
acceleration_easting	m/s^2	float	The acceleration vector's component along the east direction.
acceleration_northing	m/s^2	float	The acceleration vector's component along the north direction.
acceleration_magnitude	m/s^2	float	The magnitude of the acceleration, calculated as the absolute value of the acceleration vector.
yaw	°	float	The heading of the bounding box in degrees, where 0° is east, increasing counterclockwise up to 360°.
dimension_length	m	float	The length of the object's bounding box.
dimension_width	m	float	The width of the object's bounding box.
dimension_height	m	float	The height of the object's bounding box.
classifications_pedestrian	-	float	The probability that the object is a pedestrian.
classifications_bicycle	-	float	The probability that the object is a bicycle.
classifications_motorbike	-	float	The probability that the object is a motorbike.
classifications_car	-	float	The probability that the object is a car.
classifications_van	-	float	The probability that the object is a van.
classifications_truck	-	float	The probability that the object is a truck.

4.3. Traffic Light Data

Table 2: Traffic light data format

Name	Unit	Data type	Description
id	-	int	The unique identifier assigned to each traffic light (see Figure 2).
timestamp	-	ISO timestamp	The timestamp indicating when the data was recorded.
state	-	int	The current operational state of the traffic light (see Table 3).

4.3.1. Explanation of Traffic Light IDs

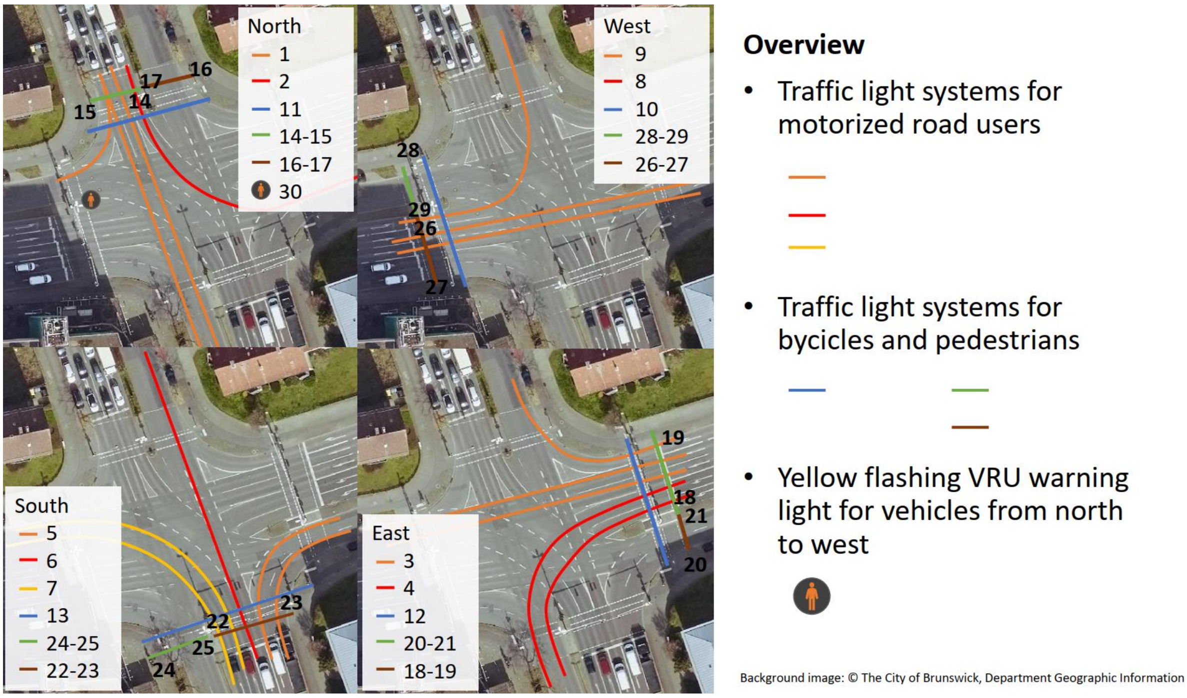

Figure 2: Traffic light ID overview

4.3.2. Explanation of Traffic Light States

Table 3: Traffic light states

State	Description
0	Traffic light status is unavailable.
1	Traffic light is off.
2	Stop required before proceeding.
3	Red light, stop and wait.
4	Red light and yellow light.
5	Green light.
6	Green light, protected movement allowed.
7	Yellow light.
8	Yellow light, protected movement allowed.
9	Yellow light flashing.

4.4. Weather Data

Table 4: Weather data

Name	Unit	Data type	Data collection interval in seconds	Description
timestamp	-	ISO timestamp	10	The exact time when the measurement was taken.
air_temperature	°C	float	10	The temperature of the surrounding air, measured in degrees Celsius.
relative_humidity	%	float	10	The percentage of moisture in the air relative to the maximum amount the air can hold at the current temperature.
dew_point_temperature	°C	float	10	The temperature at which the air becomes saturated, and dew begins to form, measured in degrees Celsius.
wet_bulb_temperature	°C	float	10	The lowest temperature that can be achieved by evaporating water into the air, measured in degrees Celsius.
air_pressure_msl	hPa	float	10	The atmospheric pressure at mean sea level, given in hectopascals (hPa).
wind_direction	°	int	10	The direction from which the wind is blowing, measured in degrees (0° = North, 90° = East, etc.).
wind_speed	m/s	float	10	The speed of the wind, measured in meters per second (m/s).
wind_gust_direction	°	int	10	The direction from which the strongest wind gusts during a measurement period originated, measured in degrees.

hail_intensity	hits/cm^2	int	10	The intensity of hail falling, based on the size and number of hailstones.
visibility	m	float	30	The horizontal visibility distance, measured in meters, indicating how far one can see clearly.
present_weather	-	str	30	The current weather conditions according to World Meteorological Organization (WMO) standards, based on standardized codes (Codes).
rain_intensity	mm/h	float	30	The intensity of rainfall, measured in millimeters per hour (mm/h).
rain_accumulation	mm	float	30	The total amount of rainfall accumulated over a specified period, measured in millimeters.
snow_accumulation	mm/h	float	30	The total amount of snow that has accumulated over a specified period, measured in millimeters.
solar_radiation	W/m^2	float	60	The intensity of solar radiation reaching the Earth's surface, measured in watts per square meter (W/m^2).

4.5. Road Condition Data

Table 5: Road condition data

Name	**Unit**	**Data type**	**Data collection interval in seconds**	**Description**
timestamp	-	ISO timestamp	30	The exact time when the measurement was taken.
surface_temperature	°C	float	30	This measurement reflects the thermal state of the road surface.

surface_state	-	int	30	The condition of the road surface.
surface_grip	-	float	30	The traction of the road surface. (0: lowest grip, 0.82: highest grip)
water_layer_thickness	mm	float	30	The thickness of the water layer on the road surface, measured in millimeters.
ice_layer_thickness	mm	float	30	The thickness of the ice layer on the road surface, measured in millimeters.
snow_layer_thickness	mm	float	30	The thickness of the snow layer on the road surface, measured in millimeters.

4.5.1. Explanation of Surface States

Table 6: Surface states

State	Description
0	Error
1	Dry
2	Moist
3	Wet
5	Forsty
6	Snowy
7	Icy
9	Slushy

4.6. Air Quality Data

Table 7: Air quality data

Name	Unit	Data type	Data collection interval in seconds	Description
timestamp	-	ISO timestamp	60	The exact time when the measurement was taken.
no2_gas_concentration	µg/m³	float	60	The concentration of nitrogen dioxide (NO_2) in the air, measured in micrograms per cubic meter (µg/m³).
no_gas_concentration	µg/m³	float	60	The concentration of nitrogen monoxide (NO) in the air, measured in micrograms per cubic meter (µg/m³).
so2_gas_concentration	µg/m³	float	60	The concentration of sulfur dioxide (SO_2) in the air, measured in micrograms per cubic meter (µg/m³).
o3_gas_concentration	µg/m³	float	60	The concentration of ozone (O_3) in the air, measured in micrograms per cubic meter (µg/m³).
co_gas_concentration	µg/m³	float	60	The concentration of carbon monoxide (CO) in the air, measured in micrograms per cubic meter (µg/m³).

fine_particle_mass_concentration	µg/m³	float	60	The concentration of fine particulate matter (PM2.5) in the air, measured in micrograms per cubic meter (µg/m³), which includes particles with a diameter of 2.5 micrometers or smaller.
coarse_particle_mass_concentration	µg/m³	float	60	The concentration of coarse particulate matter (PM10) in the air, measured in micrograms per cubic meter (µg/m³), which includes particles with a diameter of 2.5-10 micrometers.

5. Data Collection and Processing

5.1. Collection Methodology

Description of the methods and devices used to collect the trajectories.

5.1.1. Trajectory Data

The trajectory data is extracted from video recordings from 14 Multi-Sensor Systems that are mounted around the AIM Research Intersection at 10 different installations. 8 of 14 installations are strategically placed on the four central traffic islands of the intersection, with each sensor aimed at the opposite side, as illustrated in the bird's eye view below (blue aims inside the intersection, green aims outside the intersection). This setup creates a redundant system that effectively captures all relevant objects within the central area of the intersection, significantly reducing the risk of occlusion. 4 other systems (red) aim at the crossings of VRU to increase their quality of detection. Another 2 systems (yellow) are placed at the northeastern area of the intersection to enable analysis of VRU behavior on the sidewalks.

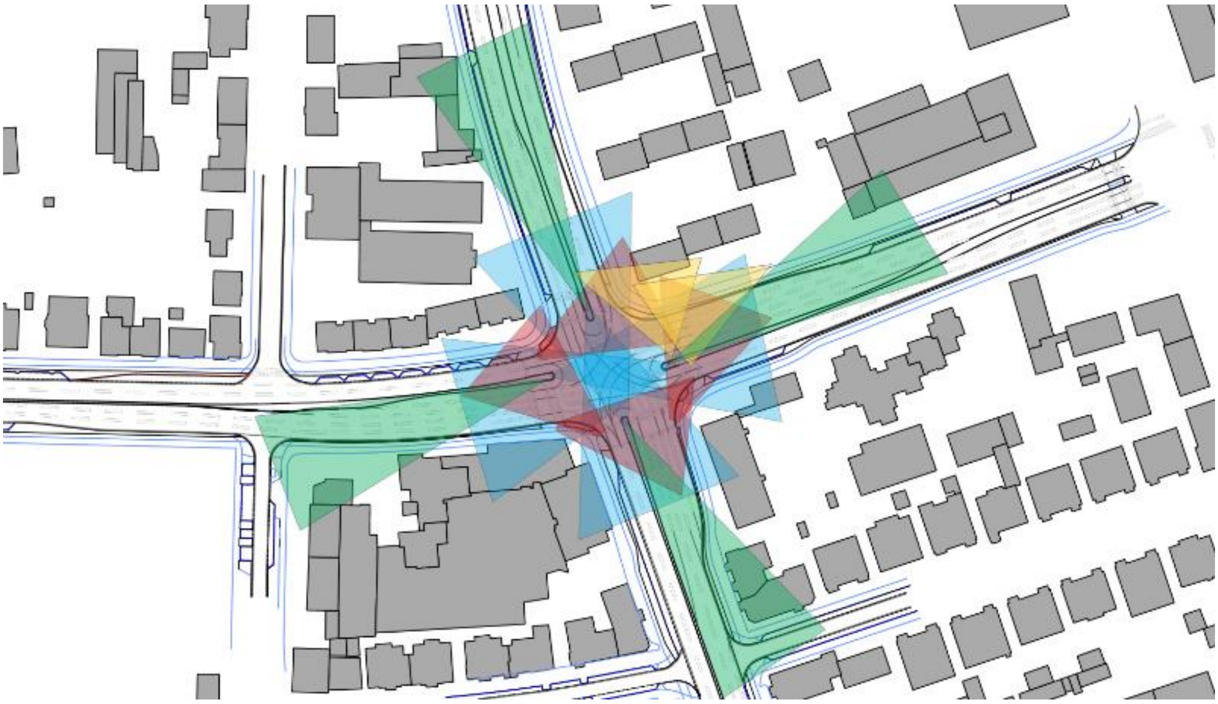

Figure 3: Camera Field of Views (FOVs) at AIM Research Intersection

The view of the central area of the intersection from the cameras with blue FOVs is shown below.

Figure 4: Camera images. Top left: facing south. Top right: facing west. Bottom left: facing north. Bottom right: facing east.

Each multi-sensor system includes a pair of cameras (GiGEVision Prosillica GT2750) and active infrared lighting (below the cameras) to improve scene visibility. The cameras (orange) are shown below.

Object detection and tracking are based on the principle of optical flow. Objects are identified by their movement patterns at the pixel level in consecutive images. From the resulting flow field, 3D voxels are generated (white and colored pillars in the left image), which are then aggregated into objects in the form of bounding boxes (green box in the right image).

Figure 5: Object detection

5.1.2. Traffic Light Data

The traffic light data is recorded from the traffic light system.

5.1.3. Weather, Road Condition, and Air Quality Data

The weather, road condition, and air quality data is collected from sensors mounted on a traffic light pole (see Figure 6 and Figure 7). The sensor used for air quality measurements is the AQT530. General weather information is collected using the WXT530 sensor. The SP Lite 2 sensor is used to measure sunshine intensity, while the PWD sensor is responsible for determining visibility. The DSC and DST sensors are employed to assess the condition of the road surface.

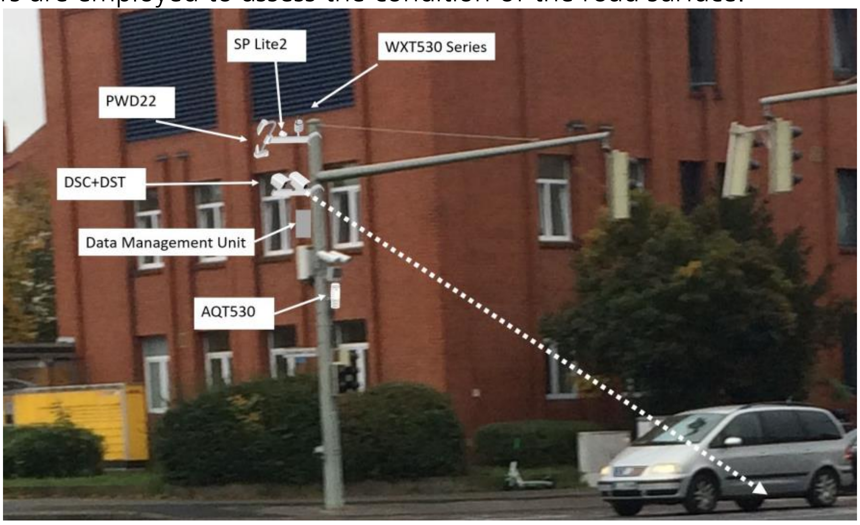

Figure 6: Weather station

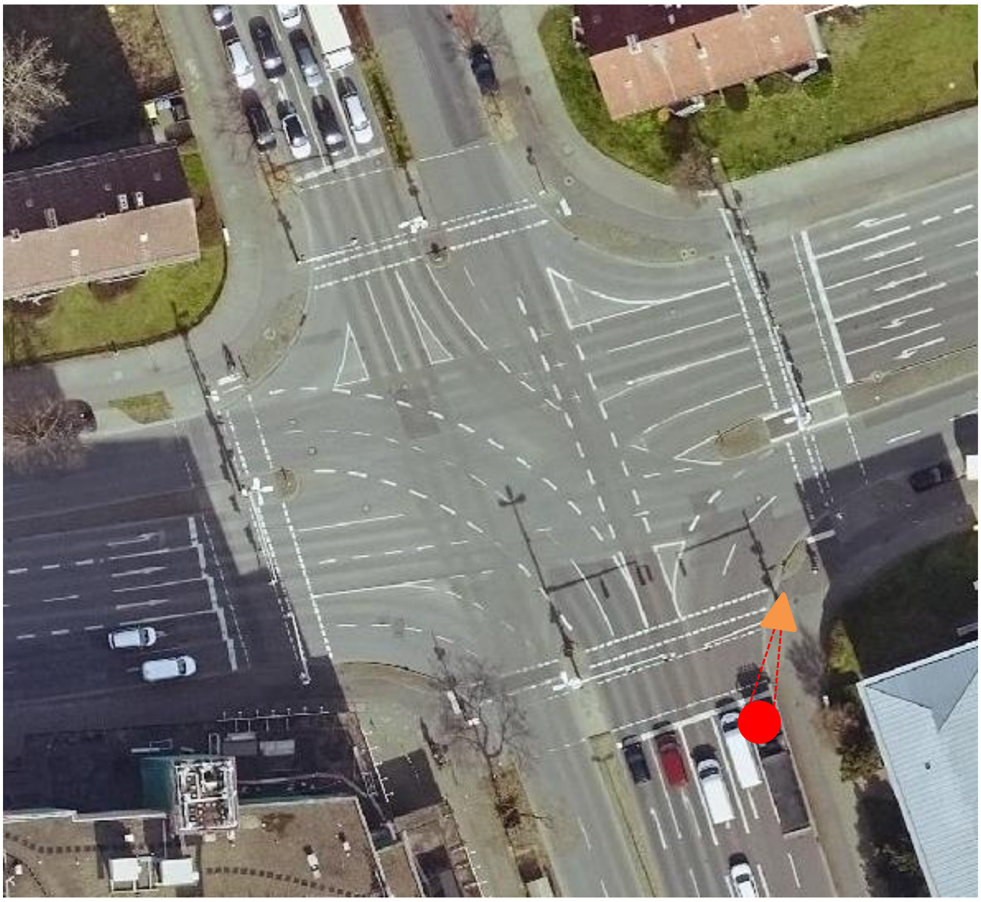

Figure 7: Position of weather station (orange triangle) and area for measuring road conditions (red dot)

5.2. Preprocessing

Steps taken to process the raw data.

5.2.1. Trajectory Data

- Trajectories of objects lasting less than a second are removed.
- Trajectories of objects covering a distance of less than 4 meters are removed.
- Dimensions and object classifications are estimated for each timestamp in the raw data. During preprocessing, the median object size is calculated and assigned to every timestamp.
- Connecting broken trajectories: Each trajectory is predicted into the future. If a new trajectory starts within 2 meters of any predicted position, the two are connected. The ID of the first object is then used to overwrite the ID of the second.
- A Kalman Filter is applied for smoothing and interpolating the position. Velocity and acceleration values are derived from the position data.
- The heading is kept constant when the smoothed velocity drops below 3 m/s.

5.2.2. Traffic light, weather, road condition and air quality data

- Data is not preprocessed.

5.3. Data Quality

While the data may not be a perfect representation of reality, it provides a digital twin, allowing for traffic analyses. If you see any opportunities to improve the data quality, please feel free to contact us. Please be aware of the following limitations when interpreting the data.

5.3.1. Trajectory Data

- Accuracy:
    - The accuracy decreases as the distance from the center of the intersection increases. This is because the center area is covered by four cameras, whereas the arms of the intersection are covered by only one camera (aiming for a 20 cm accuracy).
- Limitations:
    - The position, velocity, acceleration, heading, size, and object classification may not perfectly reflect reality.
- Known Issues:
    - Preprocessing may not fully address all data limitations. Some objects may not have been detected due to insufficient contrast with the background.
    - In shaded areas (e.g., the western arm), object tracking may be interrupted as detection can fail for several seconds.
    - Objects might not be continuously tracked, leading to multiple trajectories being recorded for the same object.
    - Conversely, objects traveling close to each other may be mistaken for a single object, leading to one trajectory being recorded for multiple objects.
    - Occasionally, a trajectory may switch between different objects, meaning that a single trajectory ID could represent the movements of multiple objects.

5.3.2. Traffic Light Data

No known issues. The traffic light data accurately reflects real-world conditions.

5.3.3. Weather and Air Quality Data

Sensors are mounted on a traffic light pole in the southeastern area of the intersection. Measurements represent conditions at this location. The farther you move from the sensors, the less accurate the data becomes.

5.3.4. Road Condition Data

The road condition data is collected at the southern entrance of the intersection (see Figure 7). The road conditions in other areas of the intersection may differ from the recorded data.

5.4. Anonymization

How personally identifiable information was protected: The raw high-resolution video data is processed directly at the AIM Research Intersection in a server house to receive anonymized trajectory data. High-resolution images are converted to anonymized low-resolution images for later DLR-internal analysis. Camera images have not been published yet. More information: https://www.dlr.de/en/ts/research-transfer/research-infrastructure/data-protection/data-protection-research-crossroads-in-braunschweig

6. Citation and Usage

6.1. Citation

How to cite the dataset in academic work: A publication about the dataset will follow. For now, cite the dataset in academic work by referring to the Zenodo publication including a DOI.

6.2. Code

You can use our open source Python software TASI (TrAffic Situation analysis and Interpretation) to download, analyze, and visualize the data from the DLR UT dataset. For more details about TASI, please visit our GitHub repository https://github.com/dlr-ts.

6.3. Use Cases

These use cases demonstrate the versatility of the dataset in addressing a wide range of research and practical applications, from enhancing traffic safety to supporting the development of smart cities and autonomous vehicles.

Autonomous Vehicle Development and Validation: The dataset can be instrumental in validating autonomous driving algorithms. By simulating various weather scenarios and traffic light sequences, developers can test how autonomous systems respond to real-world challenges, improving the safety and reliability of autonomous vehicles in diverse conditions.

Behavioral Analysis of Road Users: The data allows for in-depth analysis of how different types of road users (e.g., pedestrians, cyclists, motorists) adapt their behavior in response to traffic signals and weather changes. This can lead to the development of more effective traffic management strategies and infrastructure improvements to enhance safety and comfort for all road users.

Traffic Flow Analysis and Optimization: Researchers can analyze how different weather conditions impact traffic flow and congestion patterns. By correlating trajectory data with traffic light timings and weather conditions, it's possible to identify bottlenecks and optimize traffic signal timings for improved traffic efficiency under varying environmental conditions.

Safety Assessment and Accident Prediction: The dataset can be used to study the relationship between weather conditions, traffic light cycles, and accident-prone areas. By analyzing trajectory deviations, abrupt stops, or unsafe maneuvers, researchers can predict potential accident hotspots and develop strategies to mitigate risks, especially during adverse weather conditions.

Conflict Analysis and Prediction: The dataset is valuable for analyzing traffic conflicts and predicting potential conflict scenarios on the road. Researchers can utilize the data to identify patterns and factors leading to conflicts between vehicles, pedestrians, or other road users. By advancing Surrogate Measures of Safety (SMoS), the dataset allows for the development of more accurate and reliable methods to assess safety performance. These insights can contribute to proactive traffic management strategies, enhancing road safety and reducing the likelihood of accidents before they occur.

Environmental Impact Studies: Researchers can explore how weather conditions influence emissions and fuel consumption by studying the trajectories and speed variations of vehicles. Combined with traffic light data, this can help in designing traffic systems that minimize environmental impact by reducing idling time and unnecessary stops.

Urban Planning and Infrastructure Design: Urban planners can use the data to understand how weather and traffic signals affect the movement of vehicles and pedestrians. This insight can guide the design of more resilient and efficient infrastructure, such as better drainage systems to handle rainy conditions or more effective pedestrian crossings.

7. Examples

7.1. Sample Data

Small excerpts from the dataset to show users what the data looks like.

7.1.1. Trajectory data

To improve readability in this documentation, the data in the following table is presented in a transposed format.

Table 8: Example: Trajectory data

timestamp	2023-09-24 00:00:00.016482+00:00	2023-09-24 00:00:00.066482+00:00	2023-09-24 00:00:00.116482+00:00
id	1695513598769889	1695513598769889	1695513598769889
center_easting	604824.336	604823.744	604823.151
center_northing	5792819.435	5792819.254	5792819.074
velocity_easting	-12.516	-12.537	-12.559
velocity_northing	-4.358	-4.345	-4.334
velocity_magnitude	13.253	13.268	13.286
acceleration_easting	0.158	0.143	0.13
acceleration_northing	0.063	0.069	0.074
acceleration_magnitude	0.17	0.159	0.149
yaw	-160.748	-160.825	-160.901
dimension_length	4.117	4.117	4.117
dimension_width	1.716	1.716	1.716
dimension_height	1.541	1.541	1.541
classifications_pedestrian	0.0	0.0	0.0
classifications_bicycle	0.002	0.002	0.002
classifications_motorbike	0.315	0.315	0.315
classifications_car	0.557	0.557	0.557

classifications_van	0.081	0.081	0.081
classifications_truck	0.046	0.046	0.046

Visualization of position values as trajectories (first 15 min of the dataset)

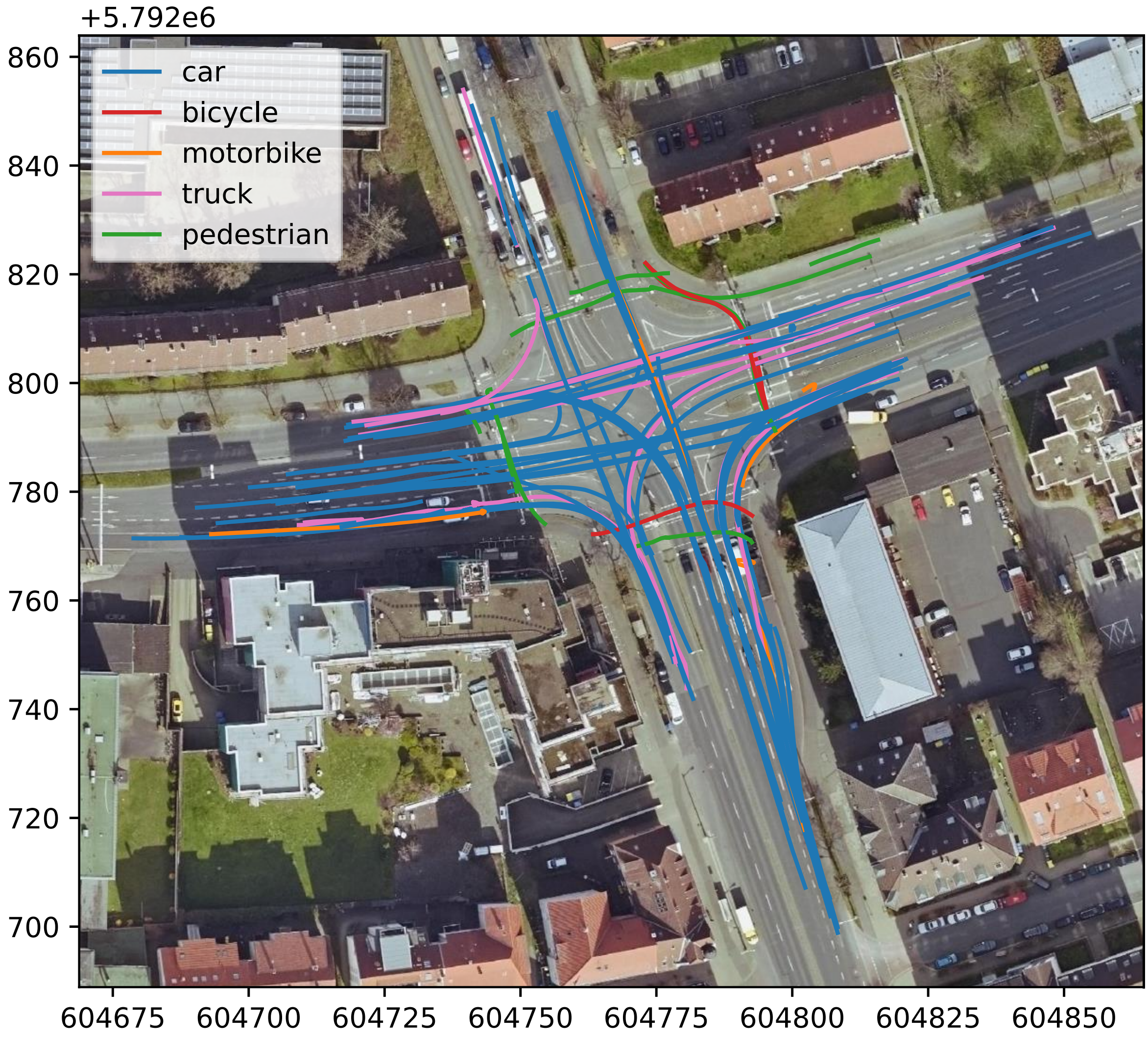

Figure 8: Trajectory data plot

7.1.2. Traffic Light Data

Table 9: Example: Traffic light data

timestamp	id	state
2023-09-24 00:00:00.992000+00:00	1	3
2023-09-24 00:00:00.992000+00:00	2	3
2023-09-24 00:00:00.992000+00:00	3	5

7.1.3. Weather Data

To improve readability in this documentation, the data in the following table is presented in a transposed format.

Table 10: Example: Weather data

timestamp	2023-09-24 00:00:00+00:00	2023-09-24 00:00:10+00:00	2023-09-24 00:00:20+00:00
air_temperature	13.3	13.3	13.3
relative_humidity	81.717	81.717	81.717
dew_point_temperature	10.235	10.238	10.238
wet_bulb_temperature	11.566	11.567	11.567
air_pressure_msl	1021.141	1021.141	1021.141
wind_direction	154.0	133.0	163.0
wind_speed	2.034	1.133	2.333
wind_gust_direction	147.0	147.0	147.0
hail_intensity	0.0	0.0	0.0
visibility	NaN	NaN	20000.0
present_weather	NaN	NaN	0.0
rain_intensity	NaN	NaN	0.0
rain_accumulation	NaN	NaN	0.0
snow_accumulation	NaN	NaN	0.0
solar_radiation	NaN	NaN	5.25

7.1.4. Road Condition Data

To improve readability in this documentation, the data in the following table is presented in a transposed format.

Table 11: Example: Road condition data

timestamp	2023-09-24 00:00:20+00:00	2023-09-24 00:00:50+00:00	2023-09-24 00:01:20+00:00
surface_temperature	14.4	14.4	14.4
surface_state	1.0	1.0	1.0
surface_grip	0.82	0.82	0.82
water_layer_thickness	0.0	0.0	0.0
ice_layer_thickness	0.0	0.0	0.0
snow_layer_thickness	0.0	0.0	0.0

7.1.5. Air Quality Data

To improve readability in this documentation, the data in the following table is presented in a transposed format.

Table 12: Example: Air quality data

timestamp	2023-09-24 00:00:20+00:00	2023-09-24 00:01:20+00:00	2023-09-24 00:02:20+00:00
no2_gas_concentration	32.504	32.504	32.504
no_gas_concentration	44.892	44.892	44.892
so2_gas_concentration	0.0	0.0	0.0
o3_gas_concentration	82.0	84.0	82.0
co_gas_concentration	119.48	118.32	117.16
fine_particle_mass_concentration	2.9	2.9	2.9
coarse_particle_mass_concentration	4.5	4.5	4.5

8. References and Further Reading

8.1. Related Work

Data from the AIM Research Intersection was used in these academic papers:

- K. Rösch *et al.,* "Space, Time, and Interaction: A Taxonomy of Corner Cases in Trajectory Datasets for Automated Driving" in *2022 IEEE Symposium Series on Computational Intelligence (SSCI)*, Singapore, Singapore, 2022, pp. 86–93.
- C. Schicktanz, L. Klitzke, and K. Gimm, "Microscopic Analysis of the Impact of Congestion on Traffic Safety and Efficiency at a Signalized Intersection: A Case Study", in *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 2827–2834.
- L. Klitzke, *et al.,* "Scenario Mining in the Urban Domain: Exploiting the Topology of a Road Network for Maneuver Annotation and Scenario Extraction", *TechRxiv,* February 16, 2022.
- T. Schripp, T. Grein, C. Schicktanz, K. Gimm, and S. Weber, "Monitoring of Ultrafine Particles and road traffic at AIM research intersection and its vicinity", in virtual, 2021.

8.2. Additional Resources

Digital Map of AIM Research Intersection:

- M. Scholz, "OpenDRIVE dataset of the inner ring road in Brunswick," 2020.

Additional resources that are planned for future publication:

- DLR UT v1.2.0: New feature: Traffic volume data. Aggregates the number of objects per lane per second from the trajectory data of the DLR UT dataset.
- DLR UT v1.3.0: New feature: OpenSCENARIO data. Trajectory data from DLR UT dataset described as FollowTrajectoryActions in OpenSCENARIO v1.2 format - ready for replay in simulation.
- DLR Highway Traffic (DLR HT): Trajectory data from the Testbed Lower Saxony.