```
----- ReconstructedTrajectories
  |-- readme_data_structure.md
  |-- ekf_parameters.csv
  |-- metadata_birdseye.csv
  |-- event_counts.csv
  |-- Event/
     |-- plots_ego_ekf.pdf
     |-- Ego_birdseye.h5
     |-- Surrounding_birdseye.h5
```

Data nature	Column name	Data type	Description
Raw	event_id	int	Index of events, consistent with video index
Raw	timestamp	int	Time index in the raw data, 1,000 timestamps = 1 second
Processed	time	float	Time in second for the convenience of trajectory smoothing
Raw	speed_comp	float	Ego vehicle speed indicated on speedometer in the raw data, unit: (m/s)
Raw	yaw_rate	float	Ego vehicle angular velocity around the vertical axis, unit: (deg/sec)
Raw	acc_lat	float	Ego vehicle acceleration in the lateral direction, unit: (g)
Raw	acc_lon	float	Ego vehicle acceleration in the longitudinal direction, unit: (g)
Raw	brake	float	On or off press of brake pedal (0.0: off, 1.0: on, 2: invalid data, 3: data not available, nan: null)
Raw	wheel_steering	float	Angular position and direction of the steering wheel from neutral position, unit: (deg)
Raw	turn_signal	float	State of illumination of turn signals (0.0: off, 1.0: left, 2.0: right, 3.0: both, 254.0: invalid data, 255.0: data not available, nan:null)
Reconstructed	x_ekf	float	Filtered coordinates of ego vehicle centroid position along the x-axis in the reconstructed coordinate system, unit: (m)
Reconstructed	y_ekf	float	Filtered coordinates of ego vehicle centroid position along the y-axis in the reconstructed coordinate system, unit: (m)
Reconstructed	psi_ekf	float	Filtered angle between ego vehicle heading direction and the x-axis (0,1) in the reconstructed coordinate system, unit: (rad)
Reconstructed	v_ekf	float	Filtered ego vehicle speed in the heading direction, unit (m/s)
Reconstructed	omega_ekf	float	Filtered yaw rate, i.e., angular velocity around the vertical axis, unit: (rad/sec)
Reconstructed	acc_ekf	float	Filtered acceleration rate in the heading direction, unit: (m/s^2)
Processed	event	int	Wether the current moment is in an event, i.e., crash or near-crash (0: False, 1: True)

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Data nature	Column name	Data type	Description
Raw	event_id	int	Index of events, consistent with Ego_birdseye.h5 and video index
Processed	target_id	int	Index assigned for each surrounding vehicle, unique across the whole dataset
Raw	timestamp	int	Time index in the raw data, 1,000 timestamps = 1 second
Processed	time	float	Time in second for the convenience of trajectory smoothing

Raw	local_dx	float	Radar-detected position of surrounding vehicle front bumper in the lateral axis (perpendicular to ego vehicle heading direction, from left to right) of the ego vehicle local coordinate system unit: (m)
Raw	local_dy	float	Radar-detected position of surrounding vehicle front bumper in the longitudinal axis (ego vehicle heading direction) of the ego vehicle local coordinate system, unit: (m)
Raw	delta_vx	float	Radar-detected surrounding vehicle relative velocity component in the lateral axis (perpendicular to ego vehicle heading direction, from left to right) of the ego vehicle local coordinate system, unit: (m/s)
Raw	delta_vy	float	Radar-detected surrounding vehicle relative velocity component in the longitudinal axis (ego vehicle heading direction) of the ego vehicle local coordinate system, unit: (m/s)
Processed	x	float	Transformed position of surrounding vehicle front bumper in the x-axis of the global coordinate system reconstructed in Ego_virdseye.h5, unit: (m)
Processed	y	float	Transformed position of surrounding vehicle front bumper in the y-axis of the global coordinate system reconstructed in Ego_birdseye.h5, unit: (m)
Processed	speed_comp	float	Transformed surrounding vehicle speed in its heading direction, unit: (m/s)
Reconstructed	x_ekf	float	Filtered coordinates of surrounding vehicle front bumper along the x-axis in the reconstructed coordinate system, unit: (m)
Reconstructed	y_ekf	float	Filtered coordinates of surrounding vehicle front bumper along the y-axis in the reconstructed coordinate system, unit: (m)
Reconstructed	v_ekf	float	Filtered surrounding vehicle speed in its heading direction, unit (m/s)
Reconstructed	psi_ekf	float	Filtered angle between surrounding vehicle heading direction and the x-axis (0,1) in the reconstructed coordinate system, unit: (rad)

```
----- SafetyCriticalTestSet
  |-- readme_data_structure.md
  |-- Event/
     |-- event_meta.csv
     |-- environment.csv
     |-- event_data.h5
```

Column Name	**Data Type**	**Description**
event_id	int	Unique identifier for the event across the database.
event_category	str	Category of the event (matches the folder name) to facilitate data combination.
first	str	State of the object involved in the primary incident. Use 'none' if the event is secondary.
second	str	State of the object involved in a secondary incident. Use 'none' if not applicable.
ego_width	float	Width of the subject vehicle (in meters).
ego_length	float	Length of the subject vehicle (in meters).
target_width	float	Width of the object involved in the primary incident (in meters).
target_length	float	Length of the object involved in the primary incident (in meters).
other_width	float	Width of the object involved in the secondary incident (in meters).
other_length	float	Length of the object involved in the secondary incident (in meters).
start_timestamp	int	Timestamp marking the start of the event (1000 units = 1 second).
end_timestamp	int	Timestamp marking the end of the event (1000 units = 1 second).
impact_timestamp	int	Timestamp when impact occurred (physical contact for crashes or closest proximity for near-crashes), in 1000-unit seconds.
reaction_timestamp	int	Timestamp of the driver's reaction (in 1000-unit seconds).
severity_first	int	Severity flag for the primary incident: 0 = Not applicable, 1 = CrashRelevant, 2 = NearCrash, 3 = Crash.
severity_second	int	Severity flag for the secondary incident: 0 = Not applicable, 1 = CrashRelevant, 2 = NearCrash, 3 = Crash.

conflict	str	Major event category summarizing first, second, severity_first, and severity_second. A value of 'none' indicates that the event could not be represented in the reconstructed trajectories.
narrative	str	Narrative description of the event as recorded in the original data.
duration_enough	bool	TRUE if at least one surrounding object is present in the reconstructed trajectories for 5 seconds or longer; FALSE otherwise.

```
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```

Column Name	Data Type	Description
event_id	int	Unique identifier for the event, consistent across the entire database.
lighting	str	Lighting condition at the time of the event. Possible values: 'Daylight', 'Dawn', 'Dusk', 'Darkness, lighted', 'Darkness, not lighted', and 'Unknown'.
weather	str	Weather condition during the event. Possible values: 'No Adverse Conditions', 'Fog', 'Sleeting', 'Mist/Light Rain', 'Rain and Fog', 'Raining', 'Snow/Sleet and Fog', 'Snowing', or 'Unknown'.
surfaceCondition	str	Road surface condition during the event. Possible values: 'Dry', 'Wet', 'Gravel over Asphalt', 'Gravel/Dirt Road', 'Muddy', 'Icy', 'Snowy', or 'Unknown'.
trafficDensity	str	Traffic density at the time of the event, expressed as a Level of Service rating ranging from A1 to F.

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```

Column Name	Data Type	Description
target_id (index)	int	Unique identifier for the surrounding object detected by the subject vehicle's forward radar.
time (index)	int	Time index of the event in seconds.
event_id	int	Identifier linking the record to its corresponding event.
x_ego	float	X coordinate of the subject vehicle in the bird's-eye view (meters).
y_ego	float	Y coordinate of the subject vehicle in the bird's-eye view (meters).
v_ego	float	Speed of the subject vehicle (m/s).
psi_ego	float	Heading direction of the subject vehicle relative to the x-axis (radians).
acc_ego	float	Acceleration of the subject vehicle (m/s^2).
hx_ego	float	X component of the subject vehicle's heading (cos(psi_ego)).
hy_ego	float	Y component of the subject vehicle's heading (sin(psi_ego)).
x_sur	float	X coordinate of the surrounding object (meters).
y_sur	float	Y coordinate of the surrounding object (meters).
v_sur	float	Speed of the surrounding object (m/s).
psi_sur	float	Heading direction of the surrounding object relative to the x-axis (radians).
hx_sur	float	X component of the surrounding object's heading (cos(psi_sur)).
hy_sur	float	Y component of the surrounding object's heading (sin(psi_sur)).