uniD Dataset Format

The uniD dataset includes data extracted from 13 recordings. In total four files are provided for each recording:

- An image of the recorded road section (XX_background.png)
- A csv file describing the recording location (XX_recordingsMeta.csv)
- A csv file containing an overview of recorded vehicle and VRU tracks (XX_tracksMeta.csv)
- A csv file for the tracks' trajectories (XX_tracks.csv)

These files are created for each recording to ensure easy handling of the data. In the following, the dataset format and especially the meaning of every column is explained in detail.

Image of the Road Section (XX_background.png)

For each recording an georeferenced image of the road section is added. The image was created from the used recording itself by removing all moving vehicles through a filter. Additionally the resolution of the image was reduced.
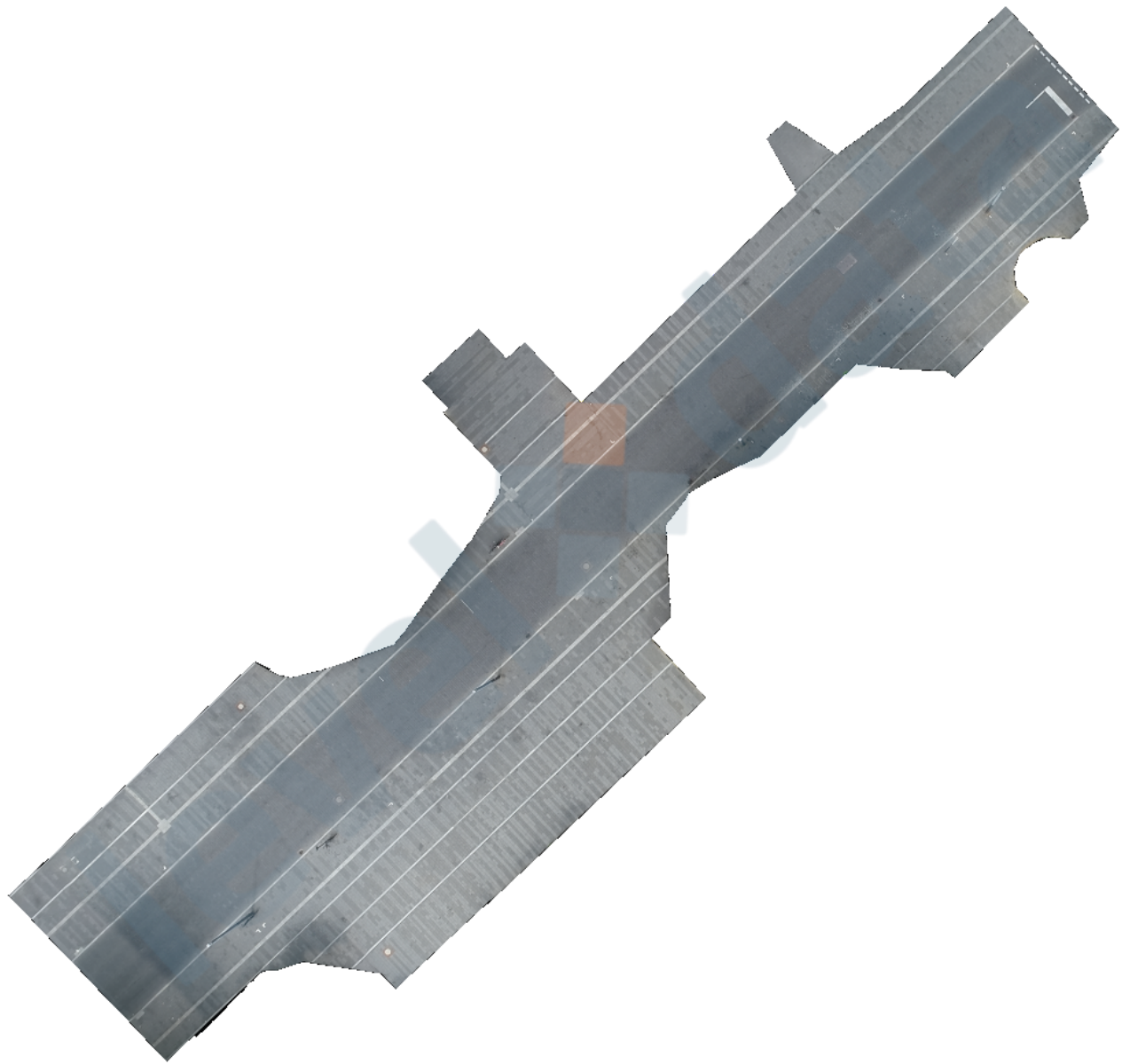
Recording Meta Information (XX_recordingMeta.csv)

This file contains metadata for each recording. The metadata provides a general overview, e.g. of the time of recording, the road section considered and the total number of objects tracked.

Name	Description	Unit
recordingId	The ID of the recording. Every recording has a unique ID.	[-]
locationId	The ID of the recording location.	[-]
frameRate	The frame rate which was used to record the video.	[hz]
speedLimit	The speed limit of the driving lanes.	[m/s]
weekday	The weekday the recording was done.	[-]
startTime	The hour at which the recording was started.	[hh]
duration	The duration of the recording.	[s]
numTracks	The number of objects tracked.	[-]
numVehicles	The number of vehicles tracked.	[-]
numVRUs	The number of vulnerable road users (VRUs) tracked.	[-]
latLocation	Rough latitude coordinates of recording location. **Not the same point as the UTM coordinates below!**	[deg]
lonLocation	Rough longitude coordinates of recording location. **Not the same point as the UTM coordinates below!**	[deg]
xUtmOrigin	X value of UTM coordinate of origin of the local coordinate system for this recording location. Add this to xCenter to get UTM coordinates. See below for more information on the coordinate system.	[m]
yUtmOrigin	Y value of UTM coordinate of origin of the local coordinate system for this recording location. Add this to yCenter to get UTM coordinates. See below for more information on the coordinate system.	[m]
orthoPxToMeter	Scale factor from ortho image pixels to UTM meters. This value is needed for visualization.	[m/px]

Track Meta Information (XX_tracksMeta.csv)

This file contains an overview of all tracks. The purpose of this file is to allow to filter tracks e.g. by class.

| Name	Description	Unit
recordingId	The ID of the recording. Every recording has a unique ID.	[-]
trackId	The ID of the track. The IDs are assigned in ascending order for each recording.	[-]
initialFrame	The frame in which the track starts.	[-]
finalFrame	The frame in which the track ends.	[-]
numFrames	The total lifetime in frames.	[-]
width	The width of the tracked object. This property is set to zero for VRUs.	[m]
length	The length of the tracked object. This property is set to zero for VRUs.	[m]
class	The class of the tracked object.	[-]

Tracks (XX_tracks.csv)

This file contains all time dependent values for each track. Information such as current position, velocity and acceleration.

Name	Description	Unit
recordingId	The ID of the recording. Every recording has a unique ID.	[-]
trackId	The ID of the track. The IDs are assigned in ascending order for each recording.	[-]
frame	The frame for which the information are given.	[-]
trackLifetime	The current age of the track at this frame.	[-]
xCenter	The x position of the object's centroid in the local coordinate system. Add xUtmOrigin to get UTM coordinates.	[m]
yCenter	The y position of the object's centroid in the local coordinate system. Add yUtmOrigin to get UTM coordinates.	[m]
heading	The heading in the local coordinate system.	[deg]
width	The width of the tracked object (0 for VRUs).	[m]
length	The length of the tracked object (0 for VRUs).	[m]
xVelocity	The velocity in x-axis direction in the local coordinate system.	[m/s]
yVelocity	The velocity in y-axis direction in the local coordinate system.	[m/s]
xAcceleration	The acceleration in x-axis direction in the local coordinate system.	[m/s^2]
yAcceleration	The acceleration in y-axis direction in the local coordinate system.	[m/s^2]
lonVelocity	The longitudinal velocity.	[m/s]
latVelocity	The lateral velocity.	[m/s]
lonAcceleration	The longitudinal acceleration.	[m/s^2]
latAcceleration	The lateral acceleration.	[m/s^2]

Coordinate System
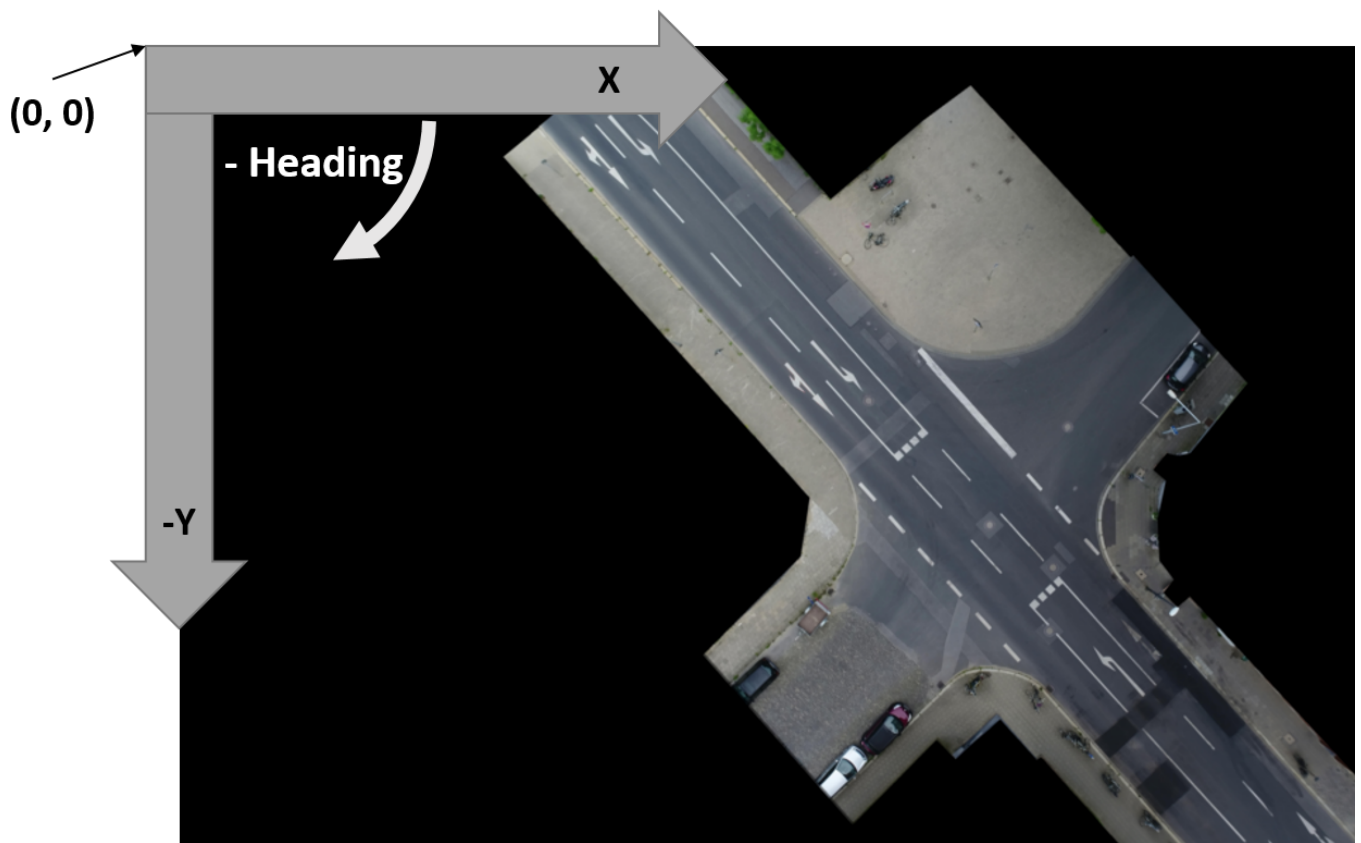
The global coordinate system used is the UTM coordinate system, as we geo-referenced our data. For easier handling of data of the same intersection in different recordings, we introduced a local UTM-like coordinate system. The only difference is, that the origin (0, 0) is very close to the recorded road section and the same for all recordings at each location. To transform positions into the global UTM coordinate system, just add xUtmOrigin and yUtmOrigin to all positions. The local coordinate system looks as follows: The horizontal axis is the x-axis, which grows to the right. The vertical axis is the y-axis, which grows upwards. The heading is calcuated as in the UTM coordinate system. Finally, we use SI units only.